

https://dspace.org/

Development of a Neonatal Intensive Care Short Course for Singly Qualified Professional Nurses Practising in Johannesburg

Singaram, Kerry Ann

2025

University of the Witwatersrand, Johannesburg

https://hdl.handle.net/10539/48446

Singaram, Kerry Ann. (2025). Development of a Neonatal Intensive Care Short Course for Singly Qualified Professional Nurses Practising in Johannesburg [PhD thesis, University of the Witwatersrand, Johannesburg]. WIReDSpace. https://hdl.handle.net/10539/48446

Downloaded from a DSpace repository. https://dspace.org/

DEVELOPMENT OF A NEONATAL INTENSIVE CARE SHORT COURSE FOR SINGLY QUALIFIED PROFESSIONAL NURSES PRACTISING IN JOHANNESBURG

KERRY-ANN SINGARAM

A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand, in fulfilment of the requirements for the degree of Doctor of Philosophy.

Johannesburg, 2025

DECLARATION

I, Kerry-Ann Singaram, declare that this thesis is my own, unaided work. It is being submitted for the Degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Kerry-Ann Singaram

_15_ day of _April_, 2025, in Johannesburg

DEDICATION

To the tiniest warriors, who face life’s toughest battles from their very first breath, and to the families whose hearts carry the weight of hope and uncertainty, I dedicate this study to you.

PRESENTATIONS ARISING FROM THIS STUDY

Oral Presentation on the mapping review of the study at the 2024 Johannesburg PHC Research Conference of the Johannesburg Health District (JHD), held on Wednesday, 28 August 2024: “Development of Neonatal Nursing Intensive Care Competencies: A Mapping Review”.

ABSTRACT

Neonatal mortality remains a critical issue, particularly in sub-Saharan Africa, where conditions such as preterm birth, birth asphyxia, and infections are leading causes of neonatal deaths. Neonatal Intensive Care Units (NICUs) are crucial in reducing these deaths by providing specialised care to critically ill neonates. However, in South Africa, there is a significant shortage of neonatal nurse specialists, with most NICUs staffed by singly qualified professional nurses who lack formal training in neonatal care. This gap in specialised skills is exacerbated by the scarcity of neonatal nurse training programs in South Africa and limitations in accessing the current training programs that do incorporate neonatal training.

This study aims to address this shortage by developing an outline for a neonatal intensive care short course as part of a continuous professional development (CPD) initiative. The course is designed to equip nurses, particularly those without specialist qualifications, with the competencies necessary to provide high-quality care in NICUs, thereby reducing neonatal mortality.

The study follows the ADDIE model, which includes five stages: Analysis, Design, Development, Implementation, and Evaluation. The research focuses on the first three stages—Analysis, Design, and Development. The study's objectives were as follows: Identify best practices in neonatal care from local and international literature; develop neonatal intensive care competencies to be included in the planned course. Formulate and rank essential competencies for neonatal intensive care nursing; Explore expert opinions on course structure and content, and lastly develop and evaluate the feasibility of the course outline.

The research process followed a sequential mixed methods design and involved a mapping review of existing literature, expert consultations through focus groups and interviews, and surveys with NICU nurses to determine the relevance of identified competencies. The course outline was evaluated by experts using the Delphi Method, ensuring that it is feasible and relevant for professional nurses in South Africa. Ultimately, the course will offer a pathway for nurses to upskill themselves, improving neonatal care quality and reducing preventable neonatal deaths.

ACKNOWLEDGEMENTS

To my ever-loving God, thank you for your endless love and forgiveness. I am deeply grateful for the strength you provided to help me complete this study, especially during my darkest moments.

To the love of my life, Byron Singaram, you are a God-given gift. Thank you for your unwavering support and unconditional love. I love you forever.

Kiano and Keira, my precious children, thank you for your understanding and patience while Mommy was writing her book. I promise to always strive to be a good example for you and to inspire you to do your best in everything.

To Thandi Dlaza, thank you for loving my children as if they were your own. I will always be grateful to you.

To my mom and dad, thank you for always being there for me. I will forever be grateful for your love, support, and encouragement.

To my supervisor, Dr Susan Armstrong: your expertise in nursing is remarkable, and I am truly honoured to have had you as my supervisor. Thank you for your dedicated time, endless cups of coffee, and spontaneous phone supervision.

To my co-supervisor, Dr Meghan Botes: thank you for your valuable contributions to my study. Your practical and quick-thinking solutions made this process much easier.

To my Head of Department, Professor Mavundla, and my amazing colleagues, thank you for the laughs, words of wisdom, and check-ins. Teamwork truly makes the dream work!

To the expert participants, thank you for your willingness to participate in this study and for your timely responses. Your contributions have greatly enriched this research.

To the professional nurses who participated in this study, thank you for taking the time, despite your heavy workloads. Your contributions have added immense value to this research. I promise to make this course a reality!

TABLE OF CONTENTS

DECLARATION i

DEDICATION ii

PRESENTATIONS ARISING FROM THIS STUDY iii

ABSTRACT iv

ACKNOWLEDGEMENTS v

Chapter 1: OVERVIEW OF THE STUDY 1

1.1 INTRODUCTION 1

1.2 BACKGROUND TO THE STUDY 1

1.3 PROBLEM STATEMENT 5

1.4 PURPOSE STATEMENT 6

1.5 SIGNIFICANCE OF THE STUDY 6

1.6 RESEARCH QUESTION 6

1.7 RESEARCH OBJECTIVES 6

1.8 STUDY FRAMEWORK 7

1.8.1 Phases of the study and respective steps of the ADDIE Model 7

1.8.1.1 Phase 1: Analysis (Mapping review, Formulation of competencies, Ranking Exercise, Survey, context and characteristics of participants) 7

1.8.1.2 Phase 2: Design 10

1.8.1.3 Phase 3: Development 10

1.9 CHAPTER LAYOUT 12

1.10 PHILOSOPHICAL UNDERPINNING 13

1.10.1 Ontology 14

1.10.2 Epistemology 14

1.10.3 Axiology 14

1.10.4 Methodology 15

1.11 OPERATIONAL DEFINITIONS 15
1.12 CONCLUSION 16
Chapter 2: RESEARCH METHODOLOGY 17
2.1 INTRODUCTION 17
2.2 RESEARCH SETTING 17
2.3 RESEARCH DESIGN 17
2.3.1 Sequential Mixed Methods Design 17
2.3.2 ADDIE Model 18
2.4 DESCRIPTION OF THE RESEARCH METHOD INCORPORATED INTO THE PHASES OF THE ADDIE MODEL 18
2.5 RESEARCH METHODS 24
2.5.1 Phase 1: Analysis (Mapping review, Formulation of competencies, Ranking Exercise, Survey and Profile of participants) 24
2.5.1.1 Phase 1.1.1: Mapping review 24
2.5.1.2 Phase 1.1.2: Formulation of competencies 28
2.5.1.3 Phase 1.2: Ranking Exercise 29
2.5.1.4 Phase 1.3: Survey 31
2.5.1.5 Phase 1.3.1: Context and Characteristics of participants 30
2.5.2 Phase 2: Design (Focus Group Discussion/Individual Interviews) 32
2.5.2.1 Phase 2.1 Focus Group Discussion/Individual Interviews 32
2.5.3 Phase 3 Development (Outline of the course and Verification) 33
2.5.3.1 Phase 3.1 Outline of the course 33
2.5.3.2 Phase 3.2 Verification 34
2.6 TRUSTWORTHINESS 35
2.6.1 Ensuring Trustworthiness of the Study 35
2.6.1.1 Credibility 35
2.6.1.2 Transferability 36
2.6.1.3 Dependability 36

2.6.1.4 Confirmability 36
2.7 VALIDITY 37
2.7.1 Content Validity 37
2.7.2 Construct Validity 37
2.8 RELIABILITY 38
2.8.1 Homogeneity (internal consistency) 38
2.9 ETHICAL CONSIDERATIONS 38
2.9.1 Permission to conduct the study 38
2.9.2 Researcher's adherence to ethical principles 39
2.9.2.1 Informed Consent 40
2.9.2.2 Anonymity and Confidentiality 40
2.9.2.3 Beneficence 41
2.9.2.4 Justice 41
2.9.2.5 Respect 41
2.9.2.6 Integrity 42
2.10 CONCLUSION 42
Chapter 3: ANALYSIS PHASE OF THE ADDIE MODEL: MAPPING LITERATURE REVIEW 43
3.1 INTRODUCTION 43
3.2 BACKGROUND 43
3.3 PURPOSE OF A MAPPING REVIEW 43
3.4 REVIEW QUESTION 44
3.5 OBJECTIVE OF THE MAPPING REVIEW 45
3.6 IDENTIFICATION OF RELEVANT STUDIES 45
3.6.1 Information Sources 45
3.6.2 Selection of Journals for the Mapping Review 45
3.6.3 Search Strategy 46

3.7 STUDY SELECTION 46
3.7.1 Screening 46
3.7.2 Data extraction tool 47
3.8 PRE-SELECTED JOURNAL DEMOGRAPHICS 48
3.8.1 Comparison of articles included in the study 48
3.8.2 Geographical comparison of all included articles 49
3.9 DATA ANALYSIS TECHNIQUE 51
3.9.1 Thematic presentation of findings 51
3.9.2 Applying Creswell's steps of data analysis to the mapping review 51
3.9.2.1 Organising and preparation of data 51
3.9.2.2 Establishing a general sense 51
3.9.2.3 Coding of data 51
3.9.2.4 Identification of themes and sub-themes 52
3.9.2.5 Representation of findings and interpretation of data 52
3.10 FINDINGS AND DISCUSSION OF FINDINGS ARISING FROM INCLUDED ARTICLES 52
3.10.1 Theme 1: Management of Neonatal Conditions 61
3.10.2 Common conditions in neonatal intensive care units 62
3.10.3 Theme 2: Prevention of Neonatal Conditions 66
3.10.3.1 Prevention of Neonatal conditions sourced from the mapping review 67
3.10.3.2 Prevention of Intraventricular Haemorrhage in the NICU 67
3.10.3.3 Prevention of Hypothermia in an NICU 68
3.10.3.4 Prevention of Hypoxia in the NICU 69
3.10.3.5 Prevention of Infection in an NICU 70
3.10.3.6 Prevention of Hypoglycaemia in the NICU 71
3.10.4 Theme 3: Best Neonatal Practices 71
3.10.4.1 Acute Care 72

3.10.4.2 Continuous Care 74
3.10.5 Theme 4: Promotion of Family-Centred Care 80
3.10.5.1 Effective communication with families of neonates 80
3.10.5.2 Involvement and support of families in the care of the neonate 81
3.11 TIME FRAME OF MAPPING REVIEW 83
3.12 SUMMARY OF FINDINGS 84
3.13 CONCLUSION 84
Chapter 4: ANALYSIS PHASE OF THE ADDIE MODEL: FORMULATION AND RANKING OF COMPETENCIES WITH THE EXPERT GROUP 85
4.1 INTRODUCTION 85
4.2 USE OF SANC'S GENERIC FRAMEWORK FOR ADVANCED NURSE PRACTITIONERS TO DEVELOP NEONATAL INTENSIVE CARE COMPETENCIES 85
4.2.1 Grouping of themes derived from the mapping review to align with SANC's Generic Competency Framework for Advanced Nurse Practitioners to create neonatal nursing intensive care core competencies with correlating sub-competencies 87
4.2.1.1 Development of neonatal intensive care nursing competency 1 and 2 through alignment with the core competency under Domain 2 of the SANC Competency Framework for Advanced Nurse Practitioners 88
4.2.1.2 Development of neonatal intensive care nursing competency 3 derived from the core competency Quality Improvement under Domain 3 89
4.2.1.3 Development of neonatal intensive care nursing competency 4 derived from the core competency Therapeutic Communication and Relationships under Domain 2 90
4.3 IDENTIFIED EXPERTS USED FOR THE RANKING EXERCISE 95
4.3.1 Selection and background of experts for the ranking exercise 95
4.3.1.1 Participant A: Medical consultant and Neonatologist 95
4.3.1.2 Participant B: Neonatal Nurse Specialist and Nurse Educator 95

4.3.1.3 Participant C: Neonatal Nurse Specialist and Nurse Educator 95
4.3.1.4 Participant D: Neonatal Nurse Specialist and Nurse Educator 96
4.3.1.5 Participant E: Neonatal Nurse Specialist and Nurse Educator 96
4.3.1.6 Participant F: Neonatal Nurse Educator 96
4.3.1.7 Participant G: Neonatal Nurse Educator 97
4.3.2 Sample of Participants for Ranking Exercise 97
4.4 RANKING EXERCISE HELD WITH THE EXPERT GROUP 97
4.4.1 Description of a Ranking Exercise 97
4.4.2 Co-ordination of the Ranking Exercise 98
4.4.3 Ranking Exercise 98
4.4.3.1 Colour coding of competencies 98
4.4.3.2 Ranking of core competencies by experts 101
4.4.3.3 Ranking of conditions/skills for neonatal intensive care competency by experts 102
4.4.4 Summary of results from the ranking exercise 109
4.5 CONCLUSION 111
Chapter 5: ANALYSIS PHASE OF THE ADDIE MODEL: CONTEXT OF TRAINING SITES AND DEVELOPMENT OF A SURVEY FOR PROFESSIONAL NURSES WORKING IN NICUs 112
5.1 INTRODUCTION 112
5.2 SELECTION AND DESCRIPTION OF DATA COLLECTION SITES 112
5.2.1 Description of Neonatal Intensive Care Unit in Hospital A 112
5.2.2 Description of Neonatal Intensive Care Unit Hospital B 114
5.2.3 Description of Neonatal Intensive Care Unit Hospital C 116
5.2.4 Description of Neonatal Intensive Care Unit Hospital D 116
5.3 PROFESSIONAL NURSE QUALIFICATIONS 117
5.4 DEVELOPMENT OF A SURVEY 119
5.4.1 Use of a Likert Scale for the developed survey 120

5.5 DISTRIBUTION AND COLLECTION OF SURVEYS 121
5.5.1 Distribution and collection of surveys 121
5.6 SURVEY RESULTS 122
5.6.1 Response rate of surveys 122
5.6.2 Varied response rates per item on the survey 122
5.6.3 Screening and cleaning of data 122
5.7 STATISTICAL ANALYSIS 123
5.7.1 Descriptive statistics 123
5.7.1.1 Frequencies of data 123
5.7.1.2 Discussion on Frequencies of data from the Likert scale 131
5.7.1.3 Discussion on Frequencies of data from the reasons provided of why competency related conditions/skills were deemed important/very important 136
5.7.1.4 Discussion on Frequencies of data using mean and standard deviation values 137
5.7.2 Inferential Statistics 137
5.7.2.1 Comparison of ranking of sub competencies per hospital 137
5.7.3 Reliability 139
5.8 SUMMARY OF RESULTS 139
5.9 CONCLUSION 140
Chapter 6: DESIGN PHASE OF THE ADDIE MODEL: FOCUS GROUP DISCUSSION AND INDIVIDUAL INTERVIEWS 141
6.1 INTRODUCTION 141
6.2 FOCUS GROUP DISCUSSION AND INDIVIDUAL INTERVIEWS HELD WITH THE EXPERTS 141
6.2.1 Collective findings and discussion from all interviews held with experts 141
6.2.1.1 Theme 1: Course Design 142

6.2.1.2 Theme 2: Course Structure 150
6.3 DICUSSION OF FINDINGS FROM THE FGD/INDIVIDUAL INTERVIEWS 153
6.4 CONCLUSION 154
Chapter 7: DEVELOPMENT PHASE OF THE ADDIE MODEL: COURSE OUTLINE DEVELOPMENT 155
7.1 INTRODUCTION 155
7.2 USE OF THE ADDIE MODEL TO DEVELOP THE COURSE OUTLINE 155
7.2.1 Analysis 155
7.2.2 Design 158
7.2.2.1 Distinct characteristics of a competency-based curriculum 159
7.2.3 Development 165
7.2.3.1 Development of the outline for Module 1: Introduction to Neonates. 170
7.2.3.2 Development of the outline for Module 2: Management and Prevention of Common Neonatal Conditions 171
7.2.3.3 Development of the outline for Module 3: Family-Centred Care in Neonatal Intensive Care Units 172
7.2.3.4 Development of the outline for Module 4: Unique Environment of Neonatal Intensive Care Units 173
7.2.3.5 Credit allocation per topic and length of course 173
7.2.3.6 Processes 175
7.2.4 Implementation 175
7.2.5 Evaluation 176
7.3 CONCLUSION 176
Chapter 8: DEVELOPMENT PHASE OF THE ADDIE MODEL: VERIFICATION OF THE COURSE OUTLINE 177
8.1 INTRODUCTION 177
8.2 DEFINITION OF A DELPHI STUDY AND EXPLANATION OF ITS USE IN

THIS STUDY 177
8.3 RELEVANCE OF THE RESEARCH QUESTION TO A DELPHI STUDY.179
8.4 STEPS OF THE DELPHI PROCESS 179
8.4.1 Defining and recruiting experts 179
8.4.2 Developing the questionnaires 180
8.4.2.1 Development of initial questionnaire 180
8.4.2.2 Results and calculation of consensus from round 1 of the Delphi 182
8.4.2.3 Development of second questionnaire 182
8.4.2.4 Results from round 2 of the Delphi per questionnaire 183
8.5 SUMMARY OF RESULTS 193
8.5.1 Resources 193
8.5.2 Credits 194
8.5.3 Content 194
8.5.4 Identification of potential barriers 195
8.6 CONCLUSION 196
Chapter 9: OVERVIEW, IMPLICATIONS, EVALUATION, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION 197
9.1 INTRODUCTION 197
9.2 OVERVIEW OF THE STUDY 197
9.3 IMPLICATIONS FOR CLINICAL PRACTICE 198
9.4 EVALUATION OF THE STUDY 200
9.4.1 Evaluation of the Mapping Review and Competency Formulation 200
9.4.2 Evaluation of the Ranking Exercise 200
9.4.3 Evaluation of Survey Distribution 201
9.4.4 Evaluation of Focus Group Discussions and Individual Expert Interviews 201
9.4.5 Evaluation of Course Outline Development 201

9.4.6 Evaluation of Course Verification 201
9.5 STUDY LIMITATIONS 202
9.6 RECOMMENDATIONS 203
9.6.1 Recommendations for Policy development 203
9.6.2 Nursing Education 203
9.6.3 Future Research 204
9.7 CONCLUSION 204
REFERENCES 206
APPENDICES 240
Appendix A DATA EXTRACTION TOOL DEVISED BY TAYLOR and TAYLOR (2014) 240
Appendix B Survey for professional nurses working in NICUs 256
Appendix C Information Letter for the Experts 261
Appendix D Consent Form for Phases 1.2 And 1.3 264
Appendix E Information Letter for Registered Nurses Working in Identified NICUs 266
Appendix F Interview Transcription sample 269
Appendix G Assessors' Approval 270
Appendix H HOD Approval to Conduct the Study 271
Appendix I Hospital B Approval to conduct the research 272
Appendix J Hospital C Approval to conduct the research 276
Appendix K Hospital D Approval to conduct the research 277
Appendix L Hospital A Approval to conduct the research 278
Appendix M Dean's Approval to conduct the research 279
Appendix N Ethics Waiver for the Study 280
Appendix O Phases 1.2 and 1.3 Ethics Approval 282
Appendix P Phase 2 Ethics Approval 284
Appendix Q Phase 3 Ethics Approval 285

Appendix R Consent form for Audio Recording of Focus Group Discussion/Individual Interviews 286
Appendix S Evaluation of neonatal intensive care short course form (Initial questionnaire for the Delphi study) 287
Appendix T Evaluation of neonatal intensive care short course form (Subsequent questionnaire for the Delphi study) 291

List of Figures

Figure 1-1: Picture illustrating the ADDIE model (Kurt, 2018) 11
Figure 1-2: Flow diagram illustrating the chapter layout 13
Figure 2-1: Prisma Diagram from mapping review 27
Figure 3-1: Prisma Diagram from mapping review 48
Figure 3-2: Graph illustrating articles published from January 2020-March 2022 in pre-selected journals compared to articles included in the mapping review per journal 49
Figure 3-3: Geographical representation of articles published per country 50
Figure 3-4: Visual representation of no. of articles per theme in all pre-selected journals 61
Figure 3-5: Infographic used for counselling of parents. The figure summarises and explains the early and late complications of prematurity Chandrasekharan et al. (2017) 64
Figure 4-1: Results of Ranking of core competencies by experts 102
Figure 8-1: Summary of the Delphi study process 178

List of Tables

Table 2-1: Summary of the research methods used per phase 19
Table 3-1: h-index, SJR and Impact Factor for the pre-selected journals 46
Table 3-2: Selection of studies 47
Table 3-3: Themes, categories and articles per theme 52
Table 3-4: No. of articles per theme in all pre-selected journals 60
Table 3-5: Neonatal conditions sourced from the mapping review with definitions ... 65
Table 4-1: Process of developing neonatal nursing intensive care competencies 92
Table 4-2: Results of Ranking of neonatal intensive care competencies by experts 102
Table 4-3: Results of Ranking of conditions from neonatal intensive care competency 1 105
Table 4-4: Results of Ranking of sub-competencies from core competency 2 106
Table 4-5: Results of Ranking of sub-competencies from core competency 3 108
Table 4-6: Results of Ranking of sub-competencies from core competency 4 109
Table 5-1: Depiction of professional nurse qualifications in the four identified NICUs 117
Table 5-2: Distribution and collection of surveys details for all selected units 121
Table 6-1: themes and sub-themes arising from the interviews with the experts 142
Table 7-1: Competencies per module 159
Table 7-2: Results in percentages of the ranking exercise and survey responses .166
Table 7-3: Breakdown of notional hours and weeks of the course 174
Table 8-1: Results and calculation of consensus from round 1 of the Delphi 182
Table 8-2: Results from round 2 of the Delphi per questionnaire 183

Chapter 1: OVERVIEW OF THE STUDY

1.1 INTRODUCTION

Chapter One provides an overview of this study, including the background, problem statement, purpose statement, significance of the study, research question, research objectives, study framework, and operational definitions.

1.2 BACKGROUND TO THE STUDY

A child's life can be categorised into the following periods: neonatal; infancy; childhood and adolescence. Categorisations of these periods are important in healthcare, as each period calls for different approaches to healthcare to increase chances of child survival. The neonatal period is globally recognised to begin at birth and end at twenty-eight (28) completed days of life. It is recognised as the most vulnerable period in a child's life (Pathirana, et al., 2016). The World Health Organisation (WHO) (2020) states that 75% of neonatal deaths occur during the first week of life and 2.4 million children died in the first month of life (WHO, 2020).

Conditions such as preterm birth; birth asphyxia, infections and birth defects are the leading causes of neonatal deaths globally. From the list of leading causes of neonatal mortality preterm birth ranks the highest and can be defined as any birth before 37 weeks of gestation (Quinn, et al., 2016). Prematurity is a condition among neonates that results from preterm birth and accounts for most of the Neonatal Intensive Care Unit (NICU) admissions. A neonate born prematurely is termed a premature infant, and their high risk of mortality can be attributed to their lack of an ability to adapt to extra-uterine life because their organs have not been fully developed (van Heerden, et al., 2019).

Whilst prematurity contributes to the highest percentage of NICU admissions, neonates born after 40 weeks, termed full-term infants, are also vulnerable to health problems requiring admission. Conditions such as infections; asphyxia, congenital abnormalities and meconium aspiration are the leading reasons for hospital admissions of term neonates into NICUs (Rhoda, et al., 2018).

Severity of a neonate's condition determines the level of care the neonate needs. In instances where the presenting condition is critical, a neonate requires admission into a specialised neonatal unit called a Neonatal Intensive Care Unit (NICU). The arrival of a new-born baby naturally prompts an emotional journey for its parents. This journey gets more complex if the baby must be hospitalised. Parents therefore look to NICUs as a source of hope in assisting in the recovery of their child (Hagen, et al., 2019).

NICUs are equipped to deal with sick neonates by offering neonatal intensive care, which entails round-the-clock nursing care, management after complicated surgeries, provision of continuous respiratory support and the rendering of expert skills and knowledge by health professionals specialising in neonatal care (Fanelli, et al., 2020). The end goal of a NICU should be the attainment of stability of a neonate, where possible, by providing the appropriate care to promote growth and recovery (Namnabati, et al., 2016). An article written by Kwashash and Banerjee (2018) states that effectiveness of care offered by NICUs is directly proportional to the positive outcomes of neonates. NICUs therefore need to ensure that staff are functioning at a high level of expertise.

The nature of an NICU requires nursing staff to have a continuous bedside presence, as they are responsible for monitoring neonates for subtle cues that may indicate clinical decline and providing timeous interventions in the prevention of morbidity and mortality of a neonate (Lake, et al., 2016). It is therefore important for nurses working in NICUs to acquire and retain the skill set to be able to work in an environment that deals with the specific needs of a neonate, and more importantly to be able to keep abreast of up-to-date evidenced-based care.

NICUs are technologically advancing globally to improve the survival rates of neonates. NICU admissions are not only on the rise, but healthcare workers are seeing more complex, critically ill neonatal cases. It is vital for nursing staff to stay on top of recent practices to manage the dynamics of evolving NICUs (Mirlashari, et al.,2016). The Council of International Neonatal Nurses has stated that neonatal nursing is a highly specialised field for nurses to meet the complex needs of neonates and their families therefore it is mandatory that they possess the necessary competencies to do so (The Council of International Neonatal Nurses,2019). The South African Nursing Council currently does not acknowledge Neonatal Nursing as an individual clinical nurse specialisation, despite the field of neonatal nursing meeting all

the criteria for a designated specialist nurse defined by the International Council for Nurses (Maree et al., 2021).

Sub-Saharan Africa and Southeast Asia are both regions that are struggling with high neonatal mortality rates, despite increasing the number of facilities to care for sick neonates. Gage et al. (2021) attributes this to poor quality neonatal care. A study done by Masaba and Mmusi-Phetoe (2020) looked at neonatal survival rates between Kenya and South Africa and found that South Africa is still struggling with neonatal deaths despite having a more developed economy. According to Masaba and Mmusi-Phetoe (2020), countries with a more developed economy are associated with offering better neonatal care, particularly intensive neonatal care; a recommendation from this study was to strengthen the quality of education in the field of neonatal nursing.

The trajectory towards becoming a neonatal nurse specialist in South Africa has been complicated by the migration of nursing education to the Higher Education Framework, which has led to many registered nurses no longer qualifying for entry into specialty training (Geyer, 2016). This shift is a result of changes in education legislation, particularly the National Qualifications Framework (NQF) Act of 2008, which impacted all educational programs in the country. While this change has professionalised the nursing field, it has also created mixed feelings within the nursing education sector.

Although the shift to higher education has enhanced the professional status of nursing, it has simultaneously made it more difficult for many nurses to qualify for further advancement within their specialty. The NQF, as defined by the South African Qualifications Authority (SAQA, 2020), is a national framework that outlines principles and guidelines for recording learner achievements, enabling the national recognition of acquired skills and knowledge. The NQF aims to create an integrated system that encourages lifelong learning, yet this shift has inadvertently created barriers to specialty training for a significant number of nurses, complicating their career progression in the neonatal nursing field.

The South African Nursing Council (SANC) ended the licensing of specialised neonatal nurses as a distinct specialisation in 2012. This decision had a negative impact on training opportunities for nurses seeking advancement in the field of neonatal nursing (Maree et al., 2020). The only Neonatal critical care course that is still being offered in

South Africa is a full-time course and not accessible to the majority of nurses. In addition, this course does not enable registration with SANC as a neonatal nurse specialist; this is only possible if professional nurses embark on an advanced midwifery speciality through a post graduate diploma in Midwifery and Neonatal Nursing Sciences. This then limits advancement opportunities for professional nurses who do not qualify to meet the criteria to enter such courses. The lack of specialised neonatal nurses can be attributed to a lack of educational opportunities that focus on caring for ill neonates and opportunities to advance as a specialised neonatal nurse (Maree, et al., 2020).

Limited training opportunities for nurses working in NICUs significantly affect the safety of nursing care, as most of the workforce lacks the necessary skills to provide specialised care for ill neonates. Nieuwoudt et al. (2022) investigated the causes and contributing factors of neonatal deaths at a regional hospital in the Eastern Cape. They identified hypothermia, hypoxia, and hospital-acquired infections as three leading causes of neonatal mortality in NICUs. The authors noted that these causes are largely preventable by healthcare workers. Additionally, 75% of adverse events were attributed to inadequate neonatal transfers between hospitals.

Nurse educators need to seek out alternative ways to ensure practice ready nurses are allocated to work in NICUs. One way of doing this is by means of Continuous Professional Development (CPD), which refers to lifelong learning that takes place in a professional career, with the aim of improving patient outcomes.

The driving force of CPD is to equip nurses to provide comprehensive nursing care to their patients, by utilising the best available evidence. CPD can be achieved through informal and formal routes in the form of, among others, journal clubs, bedside teaching, courses and workshops (Mlambo, et al., 2021). While research shows the benefits of CPD on patient outcomes, there are logistical challenges when trying to implement CPD in various settings. Factors such as financial constraints, a lack of learning resources and the inability of employers to release staff members for face-to-face learning need to be considered when attempting to provide appropriate CPD training to nurses in an NICU (Hakvoort, et al., 2022).

A dynamic healthcare system in South Africa and the responsibility of nurses to protect the safety of patients, as stated in the Nursing Act no. 33 of 2005, has forced regulatory bodies such as the South African Nursing Council (SANC) to prioritise CPD among

practising nurses. The SANC has developed a CPD framework for nurses and midwives in South Africa. This framework, although not yet fully implemented, stipulates that it is mandatory for nurses to accumulate 15 CPD points annually as a pre-requisite to continued practice. CPD points are accumulated through attendance of various accredited educational and training opportunities (The Continuous Professional Development Framework for Nurses and Midwives in South Africa, 2021).

1.3 PROBLEM STATEMENT

South Africa faces a critical shortage of specialist neonatal nurses, resulting in many neonatal intensive care units (NICUs) being staffed by singly qualified professional nurses, registered with the South African Nursing Council (SANC) as general nurses but lacking specialised neonatal training. This skills gap presents a significant challenge in neonatal care, particularly in a region where neonatal mortality rates remain alarmingly high. In Sub-Saharan Africa, most neonatal deaths occur within the first week of life and are commonly linked to preterm birth, birth asphyxia, infections, and congenital abnormalities (Moundzika-Kibamba & Nakwa, 2018). These conditions frequently necessitate intensive care, where expert nursing is crucial for improving outcomes.

NICUs provide specialised care for critically ill neonates, one of the most vulnerable patient populations (Lake et al., 2016). Neonatal intensive care nursing is a specialised field designed to reduce neonatal mortality through advanced, evidence-based care. However, due to the shortage of neonatal-trained nurses, many general nurses working in NICUs rely on informal learning from the limited number of available specialists. This reliance on experiential learning without structured training may compromise the quality of care and hinder efforts to reduce neonatal mortality rates.

To address this gap, nurse educators must implement innovative strategies to equip these nurses with essential neonatal care knowledge and skills. One such approach is the development of a structured short course in neonatal intensive care nursing. Providing accessible, flexible training—such as online or blended learning options—can support the professional development of singly qualified nurses who may be unable to take formal study leave. By enhancing their competencies through targeted education, this initiative aims to improve neonatal care quality, reduce preventable complications,

and ultimately contribute to better health outcomes for neonates.

1.4 PURPOSE STATEMENT

This study aims to develop an outline for a neonatal intensive care short course that will serve as a contributor to continuous professional development for nurses working in NICUs who lack specialist training in the field.

1.5 SIGNIFICANCE OF THE STUDY

The development of an outline for a short course, with the intention of implementation, on neonatal intensive care nursing will give nurses, who have not had the opportunity to specialise but are required to nurse in a specialist unit, the opportunity to equip themselves with the knowledge that will improve the quality of care and reduce the likelihood of adverse effects when caring for neonates in an NICU.

1.6 RESEARCH QUESTION

How can singly qualified nurses working in neonatal ICUs best be supported to gain additional knowledge required to care for compromised neonates?

1.7 RESEARCH OBJECTIVES

- To explore best practices recommended in local and international literature required to care for compromised neonates.
- To develop neonatal intensive care competencies to be included in the planned course.
- To explore the perceptions of expert views on the structure and processes of the course.
- To develop an outline for a neonatal intensive care short course for singly qualified professional nurses working in NICUs as a means of contributing to their continuous professional development.

- To evaluate the outline for a neonatal intensive care short course for relevance and feasibility through expert review.

1.8 STUDY FRAMEWORK

The researcher chose the ADDIE model to guide this process. The ADDIE model is used to guide the instructional design process in the development of instructional courses and training programmes. It provides the developer with clearly defined steps for the effective implementation of a course or programme (Peterson, 2003). The ADDIE model comprises of five steps which are: Analysis, Design, Development, Implementation and Evaluation. Educators find these steps helpful as there are clear instructional steps to follow when designing educational programmes, and this structured process ensures that an educational programme developed meets the desired learning objectives (Kurt, 2017).

The researcher embedded three of the five steps of the ADDIE Model - Analysis, Design and Development - into the different phases of the study. The implementation and evaluation steps of the ADDIE Model will be addressed as part of the researcher's post-doctoral work. The first three steps of the ADDIE Model were additionally used to guide the process for the development of the outline for a neonatal intensive care short course. The development process to formulate the outline for a neonatal intensive care short course is described in detail in Chapter 7:. A brief explanation of how the ADDIE Model was used per phase is given below. Each phase of the study will take on a clearly defined chapter format in line with the relevant step of the ADDIE Model used.

1.8.1 Phases of the study and respective steps of the ADDIE Model

1.8.1.1 Phase 1: Analysis (Mapping review, Formulation of competencies, Ranking Exercise, Survey, context and characteristics of participants)

The analysis step is the most important step in the ADDIE model as this step involves a training needs analysis including what content needs to be included in the desired educational programme. The analysis step comprises of an assessment of the potential students' learning needs and the compilation of learning objectives and outcomes (Nada, 2015). This is achieved by examining standards and competencies

that students have to acquire and demonstrate after completion of the course (Peterson, 2003).

Analysis, as per the ADDIE model, was achieved during phases 1.1.1; 1.1.2; 1.2; 1.3 and 1.3.1 of the research.

1.8.1.1.1 Phase 1.1.1: Mapping review (Analysis)

A mapping review is used to map out and categorise existing literature in a particular field or topic. Its purpose is to collate, describe and catalogue available evidence relating to a topic of interest (James, et al., 2016). This type of review method is an emerging review and differs from both scoping and systematic reviews in that it focuses on targeted journals and on specified topics within a defined period. The benefit of this type of literature search is that it focuses attention on the completeness within the literature of the subject choice (Bradbury-Jones, et al., 2019). Information received from the pre-selected journals is then mapped out to synthesise up to date information on the topic of interest (Bradbury-Jones, et al., 2019). The nature of a mapping review does not require key words to guide the literature search as all articles must be considered within the pre-selected journals, and within the specified time frame (James, et al., 2016).

In this phase, a mapping review was used to search purposively selected journals to identify best practices, recommended in local and international literature, required to care for compromised neonates. Journals were selected purposively on their likelihood to publish research relevant to neonatal nursing. The researcher used the international Scopus (2017), SCImago Journal and Country Rank to determine highest ranking journals in the field of neonatal nursing.

A data extraction tool devised by Taylor and Taylor (2014) was used to assist in the mapping review process (Appendix A). It assisted with the synthesis of information retrieved from identified journals, by allowing the researcher to systematically collect information relevant to the areas focused on by the mapping review (Bradbury-Jones, et al., 2019). Chapter 3: details how the mapping review was conducted.

1.8.1.1.2 Phase 1.1.2: Formulation of competencies (Analysis)

Identification of best practices with the use of Creswell's steps of data analysis classified the following themes: knowledge of management of neonatal conditions,

prevention of preventable neonatal conditions, neonatal intensive care skills needed in NICU and Family-Centred Care.

Each theme had corresponding categories that translated into best practices for caring for compromised neonates. Best practices identified through the mapping review led to the formulation of neonatal intensive care competencies using the South African Nursing Council's (SANC) generic framework for Advanced Nurse Practitioners.

Chapter 4: provides a detailed discussion of the formulation of neonatal intensive care competencies, including their corresponding neonatal conditions and required skills.

1.8.1.1.3 Phase 1.2: Rank order scale (Analysis)

The rank ordering process aims to collect ordinal data and arrange it in a sequential order of importance (de Vos et al., 2017). For this ranking exercise, the neonatal intensive care competencies along with their corresponding neonatal conditions and required skills, derived from phase 1.1.2, served as the foundation. The competencies and associated neonatal conditions and skills were distributed to an expert group (N=7) for ranking by importance as an individual exercise. The researcher recorded the rankings and compiled the results. An outline and discussion of the expert ranking exercise is presented in Chapter 4.

1.8.1.1.4 Phase 1.3: Context and characteristics of participants (Analysis)

The researcher identified the context and characteristics of the potential students through researcher observations of the NICU settings and analysis of the staff profiles. This is discussed in detail in Chapter 5.

1.8.1.1.5 Phase 1.3.1: Survey (Analysis)

The researcher developed a survey (Appendix B) that incorporated the formulated neonatal intensive care competencies, along with their corresponding neonatal conditions and required skills, to assess their importance and relevance for professional nurses working in NICUs.

In the first section of the survey, participants (professional nurses employed in NICUs) were asked to rate the importance of each neonatal condition and required skill associated with their respective competencies on a scale from 0 to 3, where a score of 3 indicated the highest level of importance. The second section of the survey

requested participants to explain why they considered the identified conditions and skills to be important by selecting from provided reasons. Further details regarding the design and distribution of the survey, as well as a discussion of the survey results, are presented in Chapter 5.

1.8.1.2 Phase 2: Design

This step in the ADDIE model involves identification of the processes and structure of content needed for the development of an educational course. (Peterson, 2003) and was achieved during phase 2.1 of the study.

1.8.1.2.1 Phase 2.1 Focus Group discussions/ Individual Interviews

A Focus Group Discussion with five participants (N=5) and two individual interviews (N=2) were conducted with the same experts from phase 1.1.3 to explore their views on the structure and processes of a course. The researcher initiated the discussions with the central question: “What factors should be considered in developing and offering an online/blended learning course?” Prompting questions were asked based on the participants' responses. The themes and sub-themes that emerged from this data collection are discussed in further detail in Chapter 6.

1.8.1.3 Phase 3: Development

During the Development step in the ADDIE model, the instructional materials and learning content are created to produce tangible learning tools. Development, as per the ADDIE model, was achieved during phase 3.1.

1.8.1.3.1 Phase 3.1: Outline of the course

The researcher combined data from the previous phases to provide a comprehensive understanding of the content needed when developing the outline for the intended short course. The specific triangulation method that was used was methodological triangulation, which entails using various methods to gather data on the same phenomenon and includes qualitative and quantitative methods.

The researcher along, with two educational experts, designed the outline for a neonatal intensive care short course, using the ADDIE Model as a guide. This phase is discussed in detail in Chapter 7.

1.8.1.3.2 Phase 3.2: Verification of the course outline

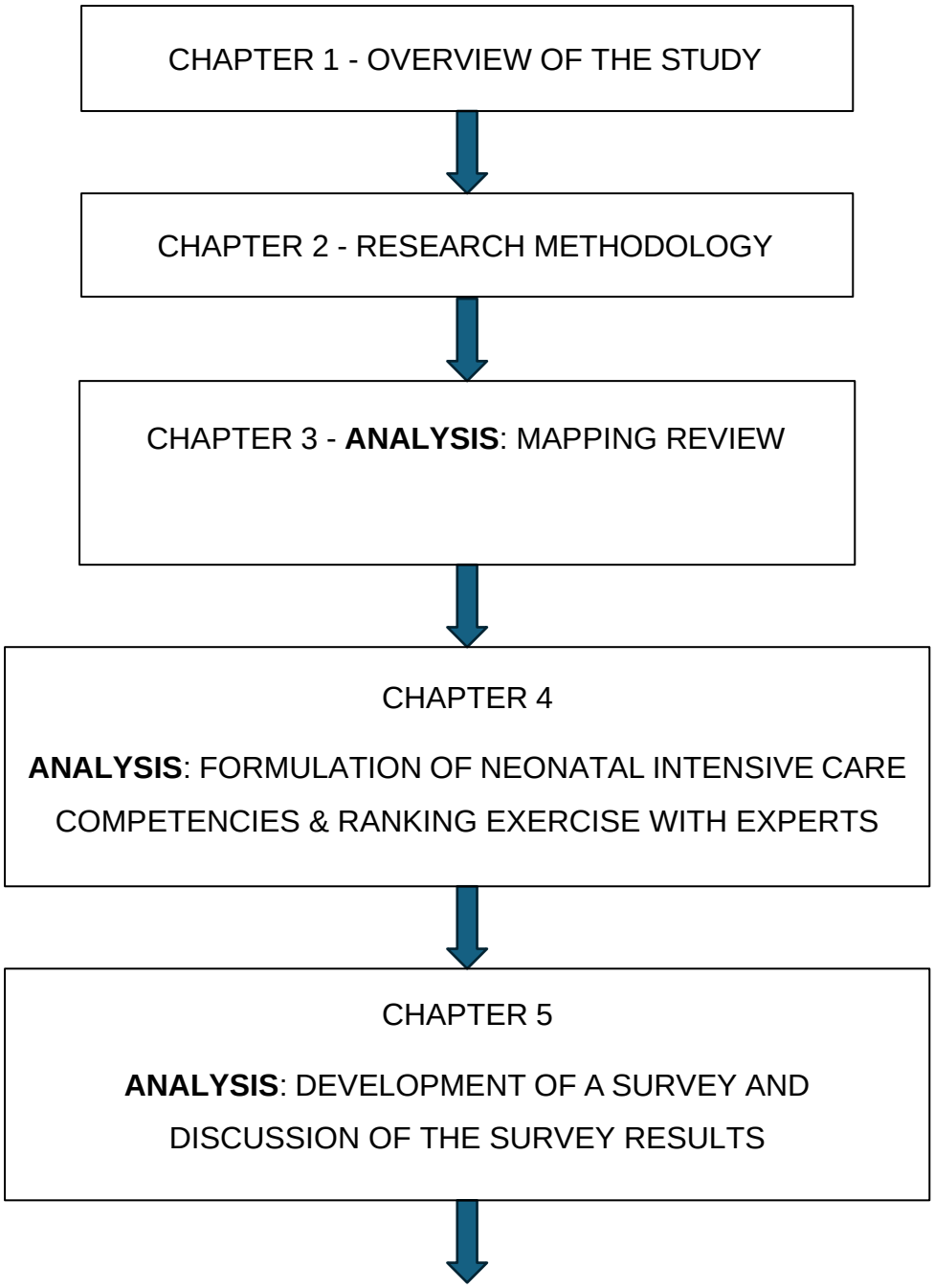
The researcher evaluated the outline for a neonatal intensive care short course for relevance and feasibility using the Delphi Method, with the same experts used in phases 1.2 and 2.1. This phase is discussed in detail in Chapter 8.



Figure 1-1: Picture illustrating the ADDIE model (Kurt, 2018)

1.9 CHAPTER LAYOUT

The sequence of each chapter, and the information that is discussed in each chapter is illustrated below in the form of a flow diagram:



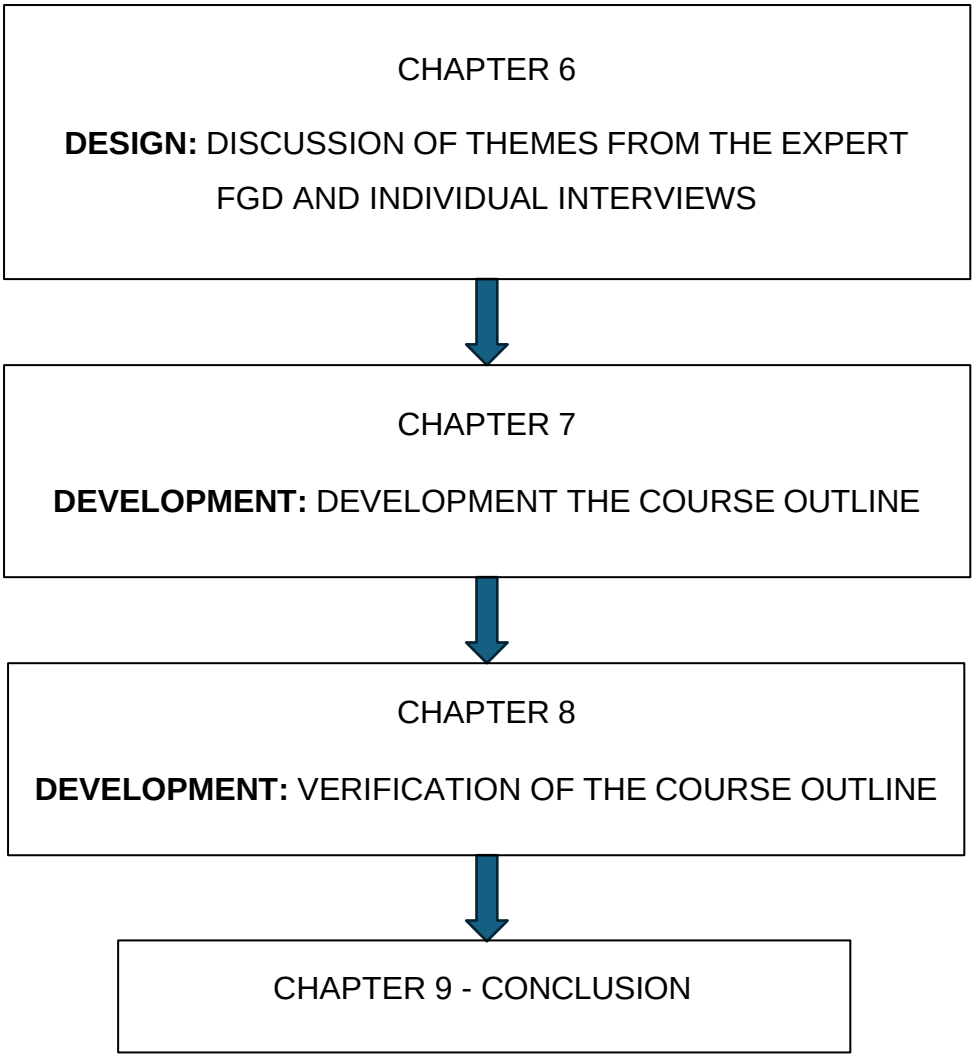


Figure 1-2: Flow diagram illustrating the chapter layout

1.10 PHILOSOPHICAL UNDERPINNING

Philosophical underpinnings in research are the set of beliefs and values that guide the research process, influence how researchers approach phenomena, interpret data and understand knowledge (Cheraghi, et al., 2019). The researcher undertaking a research study uses key philosophical concepts relevant to research, which are: Ontology (study of the nature of reality); Epistemology (what is known about that reality); Axiology (the social values), and Methodology (how is the knowledge acquired) (Handema, et al., 2023).

1.10.1 Ontology

Ontology alludes to what the researcher believes to be real and true in his/her field of study; is what he/she believes objective or subjective (Ahmed, 2008). The researcher, having had clinical experience in a Neonatal Intensive Care Unit, observed a lack of evidenced based care rendered by professional nurses. and upon conducting a mapping review found scientific evidence of compromised neonatal intensive nursing care due to inadequate training of professional nurses and lack of knowledge of the latest evidenced based care when caring for compromised neonates.

1.10.2 Epistemology

Epistemology is the study of knowledge and how it is acquired and is guided by epistemological stances (Cushing, 1994). The stance the researcher used was pragmatism. Pragmatism suggests that ideas get their meaning from the results they produce and are considered true when they are proven to work. In this way, ideas are seen as tools or plans to guide action (McLaughlin, 2024). This stance uses a variety of research methods in a research study with intention of improving patient care and health outcomes. The researcher combined quantitative and qualitative approaches to develop an outline for a neonatal intensive care short course for singly qualified professional nurses with the intention of improving neonatal health outcomes.

1.10.3 Axiology

Axiology pertains to the values and ethics that underpin the research process, this includes the researcher's adherence to ethical principles and maintenance of academic integrity throughout the research process (Biedenbach & Jacobsson, 2016). The ethics committee of the university requires researchers to apply for ethics approval. Approval for this study was granted per phase of the study. Ethical principles were applied in all interactions with all participants used in the study; details of this are discussed in detail in Chapter 2. The researcher ensured academic integrity by adhering to the principles of trustworthiness throughout the study and through consistent interactions with the researchers' supervisors.

In axiology, value is defined as any characteristic of an object or idea that fulfils human need or brings satisfaction. When people recognise and appreciate these qualities, the object or idea is assigned value. In this sense, value reflects the significance

attributed to something based on its perceived meaning or benefit (Irabor & Onwudinjo, 2022).

Philosophers generally define value as that which is desirable or useful. One perspective suggests that value confers goodness or importance upon something, while others expand this view, suggesting that value encompasses what we admire, enjoy, or find worthwhile, shaping our choices and behaviours. (Irabor & Onwudinjo, 2022).

The researcher found value in developing an outline for a neonatal intensive care short course for professional nurses who have had no prior training on neonatal nursing care prior to them working in NICUs. The researcher found additional value in the positive impact this course would have on the health outcomes of vulnerable neonates.

1.10.4 Methodology

Methodology in the context of philosophical underpinnings is determined by the researcher's epistemological stance, which was pragmatism. A mixed methods approach was used, which is a combination of qualitative and quantitative approaches. This approach acknowledges that nursing practice is complex and therefore requires a diversity of data sources to inform practice (Ryan, 2019).

The researcher used qualitative approaches in the form of a mapping review to initiate the process of formulation of neonatal intensive care nursing competencies, a Focus Group Discussion (FGD) and individual interviews to guide the structures and processes needed to be followed when designing the intended short course.

Quantitative approaches were used in the form of a ranking exercise to determine which formulated neonatal intensive care nursing competencies were deemed important by expert participants; and surveys to determine the importance and relevance of the identified competencies for professional nurses working in NICUs.

1.11 OPERATIONAL DEFINITIONS

Best practices: in this study best practices and evidenced based practices are assumed to be best practices as they were drawn from the peer reviewed literature

and refer to high quality approaches rendered by professional nurses working in NICUs to improve neonatal outcomes.

Compromised Infant in this study refers to critically ill neonates that require admission into a Neonatal Intensive Care Unit.

Neonatal intensive care competencies in this study refer to the attributes, knowledge and skills needed by professional nurses working in Neonatal Intensive Care Units.

Neonatal Nurse in this study, the term "Neonatal Nurse" refers to all nurses working in Neonatal Intensive Care Units (NICUs), regardless of whether they hold a specialty qualification.

Professional Nurse in this study refers to a registered nurse who is licensed and trained to care for patients, families and communities.

Singly qualified nurses in this study refers to nurses who have met the prescribed educational and clinical requirements to be able to register with the South African Nursing Council (SANC) as professional nurses to practice nursing within South Africa, however, do not have a specialised field of practice.

Outline for a neonatal intensive care short course in this study refers to a developed course outline based on information and feedback from literature, neonatal experts, nursing education experts and professional nurses working in NICUs with the aim of increasing the educational opportunities of singly qualified nurses working in NICUs who want to upskill themselves. The course will be developed to meet the limit for a short course and will therefore be less than 120 credits.

1.12 CONCLUSION

In this Chapter, the background of this study, the problem statement, research question, purpose, objectives, and study framework were explained. Definition of key concepts were provided, and the research design and method were briefly covered and are explained in detail in the following Chapter.

Chapter 2: RESEARCH METHODOLOGY

2.1 INTRODUCTION

In the previous chapter a background to the study was discussed. In this chapter, the research setting, design, population, sampling and methods used for data collection and data analysis per phase of the study are discussed, as well as an explanation of the measures taken by the researcher to ensure ethical compliance and trustworthiness of the study.

2.2 RESEARCH SETTING

The research setting comprised the NICUs of four central hospitals, which serve as referral units for sick neonates from both the private and public sectors in Gauteng and surrounding provinces. These hospitals are also affiliated with the university where the short course will be offered. A detailed description of the research setting is provided in Chapter 5, outlining the context in which potential participants of the educational program work. This description was essential in understanding their working conditions, enabling the program to be tailored to meet the specific needs of prospective students.

2.3 RESEARCH DESIGN

The research design for this study was a sequential mixed methods design using the ADDIE model as a framework to guide the study.

2.3.1 Sequential Mixed Methods Design

A mixed methods design is a combination of quantitative and qualitative research methods. It is used to address intricate problems, by allowing the researcher flexibility to draw from the strengths of both quantitative and qualitative research methods to attend to the different levels of a layered research question (Gray & Grove, 2021). Sequential mixed methods design refers to a mixed methods design in the form of phases and can be characterised by an initial qualitative phase of data collection and analysis, followed by quantitative data collection and analysis or vice versa and finally ending off with the integration and linking of both findings (Berman, 2017). This form of design allows for increased depth of understanding as it draws on the unique characteristics of both quantitative and qualitative methods to better understand the area of interest (Doorenbos, 2014).

The researcher followed a sequential process when conducting the study in the form of phases. Each phase of the study was designed to add to the body of knowledge to enhance the development of the desired goal, which was the development of an outline for a neonatal intensive care short course. Each phase conducted by the researcher produced different data sets, which were used as the foundation to develop the course outline. The researcher started with the qualitative phase of the study followed by the quantitative design.

2.3.2 ADDIE Model

The researcher chose the ADDIE model to guide the research process. The ADDIE model is used to guide the instructional design process in the development of instructional courses and training programs. It provides the developer with clearly defined steps for the effective implementation of a course or programme (Peterson, 2003). The ADDIE model consists of five steps: Analysis, Design, Development, Implementation, and Evaluation. Each step has its own individual characteristics to ensure that the educational product meets the learning objectives of learners (Saptioti, et al., 2022).

2.4 DESCRIPTION OF THE RESEARCH METHOD INCORPORATED INTO THE PHASES OF THE ADDIE MODEL

Table 2-1 below indicates how the research study was organised with respect to the steps of the ADDIE model. The summary includes the research methods used per step. Research methods include all techniques and methods the researcher needs to undertake while conducting the research, from data gathering and analysis to ensuring trustworthiness and ethical considerations of the study (Botma et al., 2010). Research methods are all referred to as “the tools of the trade” that help collect, build and analyse information (Walliman, 2011).

Table 2-1: Summary of the research methods used per phase

Steps of the ADDIE Model	Phase	Phase Objectives	Research Method and Data Collection	Population and Sample
Analysis-Relevant research objective: To explore best practices, recommended in local and international literature, required to care for compromised neonates.	1.1.1 Mapping review	Identify best practices, recommended in local and international literature, required to care for compromised neonates.	Search within selected journals: data extraction was used to assist with the mapping out and synthesis of data (Appendix A).	Location of evidence: Highest ranking journals in Neonatal Nursing and Neonatology according to SCImago, Journal and Country Rank: Journal of neonatal nursing, The journal of Perinatal and Neonatal Nursing Journal of Obstetric, Gynaecologic and Neonatal Nursing. Inclusion criteria: Discussion Papers, literature reviews, research studies published in English from January 2020 to 2022. Full text articles Exclusion criteria: Articles not published in English.
Analysis-Relevant research objective: To develop neonatal intensive care competencies to be included in the planned course	1.1.2 Formulation of competencies	To formulate neonatal intensive care competencies arising from identified best practices.	Themes and corresponding categories derived from the mapping review were translated into best practices, which were then converted into neonatal intensive care competencies aligned with the South African Nursing Council's (SANC) Generic Competency Framework for Advanced Nurse Practitioners	All articles included from the following journals: • Journal of neonatal nursing, • The journal of Perinatal and Neonatal Nursing • Journal of Obstetric, Gynaecologic and Neonatal Nursing (N=109).

Steps of the ADDIE Model	Phase	Phase Objectives	Research Method and Data Collection	Population and Sample
Analysis-Relevant research objective: To develop neonatal intensive care competencies to be included in the planned course.	1.2 Ranking Exercise	To rank the formulated neonatal intensive care competencies in order of importance	Ranking exercise of formulated competencies.	Population: The population consisted of specialists with knowledge of neonatal nursing and/or education and on-line teaching, employed in a variety of settings including two higher education institutions and both private and public hospitals (N=16). Sampling: Purposive sampling. One Neonatal Intensivist (n=1), two nurse educators (n=2), four neonatal nursing specialists(n=3) and a member of a Neonatal Nursing Association. (n=1). Total sample size (N=7).

Steps of the ADDIE Model	Phase	Phase Objectives	Research Method and Data Collection	Population and Sample
Analysis Relevant research objective: To develop neonatal intensive care competencies to be included in the planned course.	1.3 Context and Characteristics of potential students.	To determine the importance and relevance of the formulated neonatal intensive care competencies for professional nurses working in NICU care nursing.	Researcher observation and analysis of staff profiles.	Population: All Professional Nurses working in NICUs in four academic and specialist hospitals in Johannesburg (N=167). Sampling: Total Population Sampling (N=167)
Analysis Relevant research objective: To develop neonatal intensive care competencies to be included in the planned course.	1.3.1 Survey	To determine the importance and the relevance of the identified competencies for professional nurses working in NICUs.	A survey was used in this phase (Appendix B).	Population: All Professional Nurses working in NICUs in four academic and specialist hospitals in Johannesburg (N=167). Sampling: Convenience sampling was done. All nurses working in NICUs at four academic hospitals who were on duty at the time of data collection. Total Sample (n=160), Realised sample (N=114).

Steps of the ADDIE Model	Phase	Phase Objectives	Research Method and Data Collection	Population and Sample
Design Relevant research objective: To explore expert views on the structure and processes of the course.	2.1 Focus Group discussions/ Individual Interviews	To gain expert insight on how best to design the intended course.	FGD/Individual Interviews. Question posed: What factors should be considered in developing and offering this on-line / blended learning course?	Population: The population consisted of experts with knowledge of neonatal nursing and/or education and on-line teaching, employed in a variety of settings including two higher education institutions and both private and public hospitals (N=16). Sampling: Purposive sampling. One Neonatal Intensivist (n=1), two nurse educators (n=2), four neonatal nursing specialists(n=3) and a member of a Neonatal Nursing Association. (n=1). Total sample size (N=7).

Steps of the ADDIE Model	Phase	Phase Objectives	Research Method and Data Collection	Population and Sample
Development Relevant research objectives: To develop an outline for a neonatal intensive care short course for singly qualified professional nurses working in NICUs as a means of contributing to their continuous professional development. To evaluate the outline for a neonatal intensive care short course for relevance and feasibility through expert review.	3.1 Outline of the course	To structure the short course.	Use of the ADDIE Model and consultation with two nursing education experts.	Educational Experts (N=2).
	3.2 Verification	To evaluate the outline of the developed short neonatal intensive care course for relevance and feasibility through expert review.	A Delphi questionnaire was formulated based on the on-line/blended programme developed in phase 2. Participants answered questions pertaining to the content, design, and feasibility of the course. There was allowance for comments.	Same as phases 1.2 and 2.1.

2.5 RESEARCH METHODS

2.5.1 Phase 1: Analysis (Mapping review, Formulation of competencies, Ranking Exercise, Profile of participants and Survey)

The focus of this phase of the study was to identify what content needs to be included in the educational course for whom it is designed. This was achieved by conducting a needs analysis whereby developers examine standards and competencies that students must master after completion of a course (Peterson, 2003). Analysis, per the ADDIE model, was achieved during phases 1.1.1; 1.1.2; 1.2; 1.3 and 1.3.1 of the research study.

2.5.1.1 Phase 1.1.1: Mapping review

A mapping review is used to map out and categorise existing literature in a particular field or topic. Its purpose is to collate, describe and catalogue available evidence relating to a topic of interest (James, et al., 2016). This type of review method is an emerging review and differs from that of a scoping or systematic review in that it focuses on targeted journals on specified topics within a defined period. The benefit of this type of literature search is that it focuses attention on the completeness within the literature of the subject choice (Bradbury-Jones, et al., 2019). Information received from the pre-selected journals is then mapped out to synthesise up-to-date information on the topic of interest (Bradbury-Jones, et al., 2019). The nature of a mapping review does not require key words to guide the literature search as all articles must be considered within the pre-selected journals, within the specified time frame (James, et al., 2016).

2.5.1.1.1 Data collection for the mapping review

In this phase a mapping review was used to search purposively selected journals to identify best practices required to care for compromised neonates recommended in local and international literature. Journals were selected purposively on their likelihood to publish research relevant to neonatal nursing. The researcher used the international Scopus (2017) SCImago Journal and Country Rank to determine highest ranking journals in the field of neonatal nursing.

A data extraction tool designed by Taylor and Taylor (2014) was used to assist in the mapping review process (Appendix A). The data extraction tool (Appendix A) assisted with the synthesis of information retrieved from identified journals, by allowing the researcher to systematically collect information relevant to the areas focused on by the mapping review (Bradbury-Jones, et al., 2019). The pre-selected journals chosen for the mapping review were Journal of Neonatal Nursing; Journal of Obstetric, Gynaecological and Neonatal Nursing and The Journal of Perinatal and Neonatal Nursing.

2.5.1.1.2 Data analysis for the mapping review

Creswell's steps of data analysis were used to identify best practices recommended required to care for compromised neonates from selected articles in local and international literature. Data analysis refers to the interpretation of themes or patterns that emerge from data collected by the researcher (Creswell & Creswell, 2018), which entailed:

- Organising and preparation of data
- Establishing and preparation of data
- Coding of data
- Identification of themes and sub-themes
- Interpretation of themes and sub-themes
- Representation of findings and interpretation of data

Each will be described in order in the following paragraphs

Organising and preparation of data:

The researcher read through each article within the selected journals within the specified time frame. All articles from January 2020 to March 2022 were considered for the mapping review.

The researcher reflected on the objectives and the research question of the study to guide the process of inclusion and exclusion of articles. A total of three-hundred and sixty (N=360) articles were screened, a total of one-hundred and fifty-seven (N=157) articles were excluded based on the title and a total of ninety-four (N=94) articles were excluded based on the abstract. This left the researcher with a total of one-hundred and nine full articles to analyse.

The researcher used a data extraction tool (Appendix A) to organise the included articles in terms of study design, data collection method, methods of analysis and topics covered per article.

Establishing a general sense

The researcher uploaded all the included articles onto the MAXQDA platform. The MAXQDA® data analysis software platform is a widely used software programme to assist researchers with analysis of qualitative data. The software does not code data for the researcher but assists with the storage and management of data. It allows for visual displays of codes and is an efficient method for identifying patterns and themes that emerge from the coding process (Guetterman & James, 2023). The researcher re-read all the included articles prior to initiating the next phase of coding.

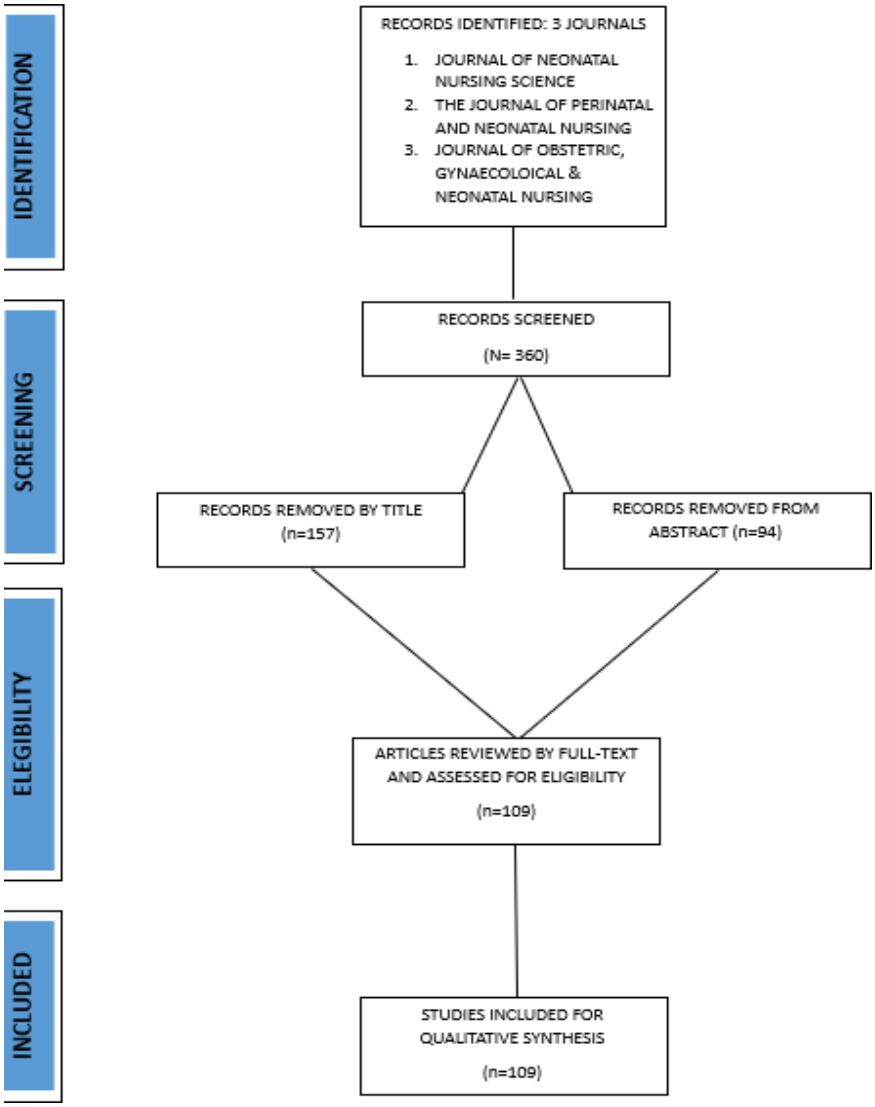


Figure 2-1: Prisma diagram from mapping review

Coding of data

The researcher used the coding technique offered by MAXQDA to code data from each article included in the study; text segments were formed by the researcher that spoke to neonatal nursing intensive care competencies. Codes were formed by the researcher by finding the most appropriate phrase to identify text segments. The researcher examined all codes thoroughly, and thereafter chose the most descriptive

wording to provide a topic to the codes identified, thus creating themes. Using MAXQDA a codebook was generated, which created a clearer overview of all codes formulated.

Identification of themes and sub-themes

Identification of categories allowed the researcher to produce themes from the coded data. Themes were then analysed by the researcher to elaborate on theme inter-connections and patterns found by the researcher.

Interpretation of themes and subthemes and representation of findings

Discussion of themes and categories per theme are discussed in detail with the integration of literature in Chapter 3.

2.5.1.2 Phase 1.1.2: Formulation of competencies

Themes and corresponding categories derived from the mapping review were translated into best practices, which were then converted into neonatal intensive care competencies aligned with the South African Nursing Council's (SANC) Generic Competency Framework for Advanced Nurse Practitioners.

The researcher and the supervisors examined the themes and categories and aligned them with the competencies formulated by the South African Nursing Council (SANC) for an advanced nurse practitioner. The decision to align the competencies derived from the mapping review with SANC's Generic Competency framework for advanced nurse practitioners was made due to the specialised nursing skill set required to meet the needs of the vulnerable population that Neonatal Intensive Care Units care for.

Neonatal Nursing competencies formulated, with their corresponding conditions and skills required to care for neonates in NICU, were used as material for the ranking exercise by experts in the field of Neonatology and Nursing Education, and the formulation of a survey (Appendix B) for professional nurses working in NICUs. Details of the formulation of the survey (Appendix B) are provided in Chapter 5:. The competencies formulated by use of the mapping review and alignment with the SANC's competencies for advanced nursing practitioners were separated into two parts: first, the main competency; second, the related neonatal conditions and activities necessary to ensure proficiency in each specific competency.

Phase 1.1.2 is discussed in detail in Chapter 4.

2.5.1.3 Phase 1.2: Ranking Exercise

A ranking exercise aims to collect ordinal data and arrange it in a sequential order of importance (de Vos et al., 2017). The researcher utilised the neonatal nursing competencies, along with the related neonatal conditions and skills necessary for proficiency in each main competency, as the dataset for the individual experts to rank from most important to least important.

2.5.1.3.1 Population

Population is defined as all individuals who are of a particular type or possess an individual element and who also serve as the focus of the research (Burns & Grove., 2012). To explore or explain real-world contexts, it is important to look for a variety in people to obtain a mix of perspectives (Kortjiens et al., 2017). The population of interest was nursing education experts, neonatal intensive care nurse specialists with more than twenty years of clinical experiences in NICU and medical neonatal intensive care specialists.

2.5.1.3.2 Sampling

Nonprobability sampling was used in the form of purposive sampling for this phase. Purposive sampling is a common application in mixed methods studies and involves the purposeful selection of participants based on their knowledge, understanding and insights of the area of study (Grove & Gray, 2021). The researcher extended an invitation to the following potential participants in the study: two Neonatal intensivists (N=2); Nursing Educators (N=2); Neonatal Nursing specialists (N=4) and Board members of the Neonatal Nursing Association of Southern Africa (N=8).

An information letter (Appendix C) and consent form (Appendix D) was sent to all purposively selected participants. Participants who agreed to participate in the study were: One Neonatal Intensivist (n=1), two nurse educators (n=2), four neonatal nursing specialists(n=4) and a member of a Neonatal Nursing Association. (n=1). The total sample size for this phase was (N=7).

2.5.1.3.3 Data collection tool

A ranking exercise was used as the data collection tool in this phase. The ranking exercise was done individually.

Neonatal conditions and skills necessary to ensure proficiency in each specific competency were used as the basis for the ranking exercise among the expert participants. Competencies and related neonatal conditions and skills were printed on cards and given to the members of the expert group that met as a group, to rank in order of importance. The researcher captured written notes of the comments the experts made during this exercise as they provided information on their rationale, which provided useful information at a later stage of the study. A face-to-face ranking exercise was conducted individually for one of the experts and for the other expert the ranking exercise was conducted online. Details of the process are provided in chapter 4 which deals with the ranking exercise part of this study.

2.5.1.3.4 Data Analysis

Each ranked item was assigned a number, and a total score was calculated by summing the individual ranks provided by each participant. The higher the total score, the higher the individual item was ranked among all the experts.

To accommodate participants availability, the ranking exercise was conducted on three separate occasions. On the first occasion, it was done individually with one expert followed by an individual interview, on the second occasion it was done as a group where each participant did an individual ranking exercise followed by a FGD with five experts (N=5) and on the third occasion it was done individually with one expert followed by an individual interview.

The process and discussion of results of the ranking exercise by experts is discussed in further detail in Chapter 4.

2.5.1.4 Phase 1.3: Context and Characteristics of participants

In this phase of the study the researcher used observation and analysis of staff academic profiles to determine the importance and relevance of the formulated Neonatal Nursing Competencies for working in NICUs.

2.5.1.4.1 Population

The population were professional nurses working in the selected academic hospitals in NICUs (N=167).

2.5.1.4.2 Sampling

Total population sampling was used as the researcher analysed all the staff profiles from all four academic hospitals (N=167).

2.5.1.4.3 Research method and Data collection

The researcher observed each NICU in terms of structural layout, patient profiles, and staff-to-patient ratios.

Additionally, the researcher met with the unit managers at the selected study sites and obtained staff profiles that included the qualifications of all personnel.

2.5.1.4.4 Data analysis

The researcher's observation of each unit was translated into a description of each unit, and staff qualifications were categorised according to the various nursing qualifications. Descriptions of each unit with the use of descriptive statistics is provided in detail in Chapter 5.

2.5.1.5 Phase 1.3.1: Survey

In this phase of the study a survey (Appendix B) was distributed to professional nurses working in NICUs at the four (4) purposively selected academic hospitals. Details on the distribution of the survey is addressed in Chapter 5.

2.5.1.5.1 Population

The population were professional nurses working in the selected academic hospitals in NICUs (N=167).

2.5.1.5.2 Sampling

The researcher used convenience sampling. The researcher handed out surveys to all professional nurses who were on duty at the time of data collection, a total of one-hundred and sixty (N=160) surveys were handed out and the researcher received one-hundred and fourteen (n=114) completed surveys.

Due to the nature of the sampling technique all professional nurses working in the NICU were invited to participate in the study, and this meant that enrolled nurses or nursing assistants working in the relevant units were excluded from the study. This exclusion criterion was based on the intention of the course to be designed, which was for singly qualified professional nurses.

2.5.1.5.3 Data collection

Prior to distribution of the surveys (Appendix B), the researcher met with the unit managers of each of the NICUs, to provide them with information of the study and what

was expected from the potential participants. The unit managers then gave the researcher an opportunity to talk to all staff members in the unit. At this time information letters (Appendix E) and consent forms (Appendix D) were handed out. The researcher then distributed the surveys per shift in each unit at a time convenient for the staff. Details of dates and times of meetings with unit managers, staff and distribution of the survey are illustrated in tabulated form in Chapter 5.

2.5.1.5.4 Data collection tool

The survey (Appendix B) was compiled by the researcher and the supervisors. The survey (Appendix B) consisted of 5 pages, the survey was divided into 3 parts. Each part had the heading of a main competency, which did not require ranking, along with its related neonatal conditions and skills necessary for proficiency in each main competency. In total there were 33 competency related neonatal conditions and skills to be ranked under their respective main competency.

Participants were then asked to provide a reason as to why they deemed the ranked items very important/important from a list of reasons provided.

2.5.1.5.5 Data analysis

All data from the surveys was initially captured on an Excel data capture sheet. The data capture sheet was then sent to an external expert statistician to produce descriptive and inferential statistics. The statistical analysis of the results done by the researcher is discussed in further detail in Chapter 5.

2.5.2 Phase 2: Design (Focus Group Discussion/Individual Interviews)

Design, as per the ADDIE model, involves planning of the course structure, content and assessment methods (Peterson, 2003).

2.5.2.1 Phase 2.1 Focus Group Discussion/Individual Interviews

A Focus Group Discussion (FGD) was conducted with the experts who met as a group, along with two separate individual interviews for those who could not attend. The FGD and individual interviews focused on the processes and structures that should be incorporated, in addition to the content from the ranking exercise. The experts provided suggestions on how the course should be designed for implementation as a blended learning experience.

2.5.2.1.1 Population

The population of interest was nursing education experts, neonatal intensive care nurse specialists with more than twenty years of clinical experiences in an NICU and medical neonatal intensive care specialists.

2.5.2.1.2 Sampling

Purposive sampling was used. The expert team were the same participants used in phase 1.2. Participants who agreed to participate in the study were: one neonatal Intensivist (n=1), two nurse educators (n=2), four neonatal nursing specialists (n=3) and a member of a Neonatal Nursing Association. (n=1). The total sample size for this phase was (N=7).

2.5.2.1.3 Data collection

The researcher initiated the FGD and individual interviews with the following question: “What factors should be considered in developing and offering this on-line/blended learning course?”. The researcher followed with prompting questions based on the participant responses.

All Interviews and the FGD were digitally recorded and transcribed by an external company specialising in transcription of interviews.

2.5.2.1.4 Data Analysis

Transcripts (Appendix F) were uploaded onto MAXQDA to assist the researcher with data analysis. The researcher used Cresswells steps of data analysis to analyse the interviews and FGDs.

Themes that merged during this phase are discussed in detail in Chapter 4.

2.5.3 Phase 3 Development (Outline of the course and Verification)

2.5.3.1 Phase 3.1 Outline of the course

The researcher designed an outline of a short course for nurses who have not received specialised training in neonatal intensive care, based on information gathered in phases 1.1.1,1.1.2, 1.2, 1.3, and 2.1 (phases 1 and 2) with the assistance of her supervisors who are educational experts. The researcher used the ADDIE model as a guiding instructional tool to design the outline for a short course on neonatal intensive

care nursing. Details of the development of the outline of the course with the use of the ADDIE model is discussed in Chapter 7.

2.5.3.1.1 Population and Sampling

Data from phases 1 and 2.

2.5.3.1.2 Data collection and data collection tools

The following methods of data collection were used: a mapping review, formulation of neonatal Intensive Care Competencies, a ranking exercise with expert participants, survey for professional nurses working in identified NICUs, researcher observation and staff analysis and lastly an FGD/ individual interviews.

2.5.3.1.3 Data Analysis

Methodological triangulation was used, where the researcher employed different methods to collect data, which were a mix of quantitative and qualitative methods. Triangulation of data is observed during the development of the outline for the neonatal intensive care short course, which is described in Chapter 7.

2.5.3.2 Phase 3.2 Verification

A Delphi study, with an expert panel, was then conducted with the aim of reaching a 90% consensus on the utility of the programme. The Delphi method refers to a process whereby an expert panel must reach a 90% consensus on a presented topic. It is beneficial in getting the collective opinion from experts in the face of complex material (Grime & Wright, 2016). The results of the Delphi are discussed in detail in Chapter 7:.

The developed outline for a neonatal intensive care short course was sent to the experts who participated in phase 1.2 of the study. An electronic link was sent to each participant individually, with the course outline and questions pertaining to the content, design, and feasibility of the course. The Delphi questionnaire used a three-option questionnaire; the options were: yes/partially/no. Participants were asked to comment, in a comment section that was provided under each item, if they answered the question with partially or no, for purposes of improvement for the course. At the end of the questionnaire a comment section was provided for any questions or additional suggestions that were not addressed in the questionnaire.

An 85% consensus was reached for the first round of the Delphi along with constructive feedback from experts by means of their comments when answering partially. No experts answered “no” in round 1. A second questionnaire was sent to the experts via an electronic link addressing their comments, to elicit a 90% consensus that illustrated satisfaction with how comments were addressed. More details of the development of the questionnaires and responses are addressed in Chapter 8.

2.6 PRINCIPLES OF RIGOUR

Trustworthiness in research refers to the researcher’s ability to demonstrate that the data collected throughout the study is authentic and valid (Grove & Gray, 2021). In qualitative research, trustworthiness is ensured through specific principles of trustworthiness, while in quantitative research, the accuracy of findings is maintained by adhering to the principles of validity and reliability. Although the approaches may differ, both serve to enhance the credibility and rigor of the research process.

2.6.1 Ensuring Trustworthiness of the Study

A trustworthiness framework was provided by Lincoln and Guba (1985) that guides researchers to ensure credibility of research findings. The framework comprises four criteria to ensure trustworthiness in a qualitative study. Explanation of each criterion is defined in an article written by Ahmed (2024) titled “The pillars of trustworthiness in qualitative research.” The researcher applied the concept of trustworthiness during all phases of the study.

2.6.1.1 Credibility

The researcher engaged in member checking with each expert participant throughout the data collection and analysis process. During this time, a professional rapport was established, with constant communication to clarify queries and discuss unclear feedback from the experts. Reflexivity was maintained by acknowledging personal beliefs and biases, which allowed the researcher to adopt an objective approach, minimising distortions in the findings.

The researcher also spent time in the identified NICUs, observing the working conditions and becoming familiar with the staff.

Contact details of the researcher and supervisors were provided to all participants for

any queries that might arise.

A sequential mixed methods design was chosen to ensure triangulation of data, enhancing the study's validity and credibility. Triangulation was achieved by integrating results from the mapping review, a ranking exercise by experts, interviews, Focus Group Discussions, surveys completed by NICU nurses, and expert evaluation of the developed course outline.

The triangulation process is discussed in detail in Chapter 7, where corroboration of findings across each phase is highlighted. The researcher demonstrates how triangulation from all phases was incorporated into the development of the course outline.

2.6.1.2 Transferability

Each phase of the study was explained in detail in this chapter, including the research methods used in each phase, the study setting, and a detailed description of the participants involved in the qualitative portion.

By offering a comprehensive description of these aspects, other researchers can assess whether the study is applicable to their own contexts or situations.

2.6.1.3 Dependability

All documentation for each phase of the study was electronically stored by the researcher. This included articles identified in the mapping review, codebooks generated from MAXQDA, consent forms, ranking exercise results, transcriptions of all audio recordings, data capture sheets of survey results, and completed surveys. These measures contributed to the study's dependability by ensuring systematic data management, transparency, and auditability. By electronically storing all documentation, including sources, analytical tools, consent records, and raw data, the researcher established a clear and organized audit trail, enhancing consistency, verification, and the potential replication of the study's processes and findings.

2.6.1.4 Confirmability

Confirmability refers to the objectivity of findings. This was more applicable during phase 1.2 with the expert participants and the concept of reflexivity was used to avoid the researchers' opinions or biases to distort any information relayed by the experts.

Member checking of the experts was done by the researcher, to clarify any queries on the transcriptions of the individual interviews, Focus Group Discussions, and

comments from the Delphi questionnaire.

The objectivity of the survey findings from the professional nurses working in NICUs was ensured by instructing them to follow the survey's directions without any interference from the researcher.

2.7 VALIDITY

Validity is a concept mostly used in quantitative studies, and its purpose is to ensure accuracy of measurement of results derived from a quantitative study (Heale & Twycross, 2015).

To ensure that the results derived from the quantitative study are valid, the data collection tool (Appendix B) used in the study met the following criteria:

2.7.1 Content Validity

Content validity refers to the actual content of the tool, and adherence to content validity. The content of the tool must have variables that the researcher wishes to measure (Heale & Twycross, 2015).

The purpose of the survey (Appendix B) for this study was to ascertain which conditions and skills linked to specific neonatal intensive care nursing competencies were important to professional nurses working in NICUs. The content of the survey was developed through a mapping review of pre-selected journals that published articles relevant to neonatal nursing.

2.7.2 Construct Validity

Construct validity is a type of validity used to assess whether the data collection tool accurately measures the construct to be measured (Heale & Twycross, 2015).

The survey designed was done in the form of a Likert scale, where participants were asked to choose between four options as to whether they deemed the conditions and skills outlined in the survey as very important/important/slightly important/not important. This allowed for variation of responses and did not limit the participants to one choice.

The researcher additionally requested the participants to provide a reason as to why they deemed a certain condition or skill very important/important from a list of four reasons provided, thus creating a space for flexibility of answers.

Use of a Likert scale is favorable in that it allows for quantifiable results that can be easily used for statistical analysis.

2.8 RELIABILITY

Reliability is the sibling of validity to ensure consistency of results derived from a quantitative study (Heale & Twycross, 2015).

2.8.1 Homogeneity (internal consistency)

Internal consistency is a measure of reliability that assesses the extent to which the items within a data collection tool instrument are consistent or interrelated in measuring the intended construct (Heale & Twycross, 2015).

A Cronbach Alpha is a popularly used test to ascertain internal consistency of an instrument. The Cronbach Alpha result is a number between 0 and 1 and an acceptable reliability score is one that is higher than 0.7.

With the assistance from a statistician, a Cronbach alpha calculation to test the homogeneity among the conditions/skills per competency to be ranked was performed. The Cronbach Alpha score based on the conditions/skills to be ranked was calculated as 0.790. This illustrates that internal consistency was achieved for the conditions/skills to be ranked.

2.9 ETHICAL CONSIDERATIONS

The principal responsibility of a researcher, when conducting a study, is to ensure that all phases of the study are conducted in an ethical manner (Brink et al., 2012). Research activities in African countries are increasing in numbers, and this growth calls for sound ethical review structures, which are conducted by research ethics committees, who in turn abide by international guidelines for all research involving human participants (Mokgatla-Mpoipolai et al., 2014). Along with ethical clearance given by ethics committees, the researcher must abide by ethical principles when choosing participants for the study (Arifen, 2018).

2.9.1 Permission to conduct the study

Permission to conduct the study was requested and obtained from the following entities:

- The University to which the researcher is registered for the Doctor of Philosophy degree's Postgraduate Research Committee, given on the 14/01/2022 (Appendix G).
- The Head of Department of the department to which the student belongs, given on the 03/08/2022 (Appendix H).
- Hospital B's ethics committee and Chief Executive Officer (CEO) given on the 09/09/2022 (Appendix I).
- Hospital C's ethics committee and CEO given on the 04/10/2022 (Appendix J).
- Hospital D's ethics committee and CEO given on the 10/10/2022 (Appendix K).
- Hospital A's ethics committee and CEO given on the 17/11/2022 (Appendix L).
- The Dean of the Faculty of Health Sciences of the University to which the researcher is registered, given on 05/12/2024 (Appendix M).
- The University's Research Ethics Committee, where the researcher is registered provided ethical clearance per phase of the study thus ensuring each phase met the intended objectives; progress reports had to be sent to the committee, which were signed off by the researcher's supervisor/s. Dates of clearance per phase are as follows:
    - Ethics waiver to conduct the mapping review (phase 1.1) was granted on 17/02/2022 (Appendix N).
    - Ethical clearance for phases 1.2 and 1.3 was granted on 05/01/2023 (Appendix O).
    - Ethical clearance for phase 2 was granted on the 24/06/2022 (Appendix P).
    - Ethical clearance for phase 3 was granted on the 14/04/2024 (Appendix Q).

2.9.2 Researcher's adherence to ethical principles

For the researcher to ensure the well-being, dignity and protection of the rights of human participants, the researcher upheld the principles of ethics throughout the conduct of the study (Polgar & Thomas, 2020).

2.9.2.1 Anonymity and Confidentiality

The principle of anonymity and confidentiality refers to the protection of participants' personal information and involves the researcher taking steps to ensure data obtained from the participants is kept secure and confidential.

In phase 1.2 a Focus Group Discussion (FGD) was conducted with experts; total confidentiality could not be guaranteed due to the nature of the discussion. The researcher requested the experts who participated in the FGD to keep confidential information discussed within the space of the FGD and to avoid discussing information shared outside the group. Each expert participant who contributed to either the FGD or individual interviews was given a pseudo name for the purposes of confidentiality when quoting the experts during discussion of findings.

Confidentiality was guaranteed for the two individual interviews conducted with the two experts.

Surveys distributed to the professional nurses in phase 1.3 did not request names, therefore the researcher could ensure total confidentiality in this phase.

2.9.2.2 Beneficence

This ethical principle refers to the securing of the well-being of the participant, who has a right to protection from discomfort and harm. Potential participants were informed that the decision to participate in the study or not would not in any way affect their academic status or reputation. The researcher reassured the voluntary participants that participating in the study would cause no harm, and if they wished to do so could withdraw at any time of the study without facing any penalty.

2.9.2.3 Justice

Justice refers to the participants' right to fair selection and treatment. The researcher must select participants that would best meet the objectives of the study rather than her own choice or preference.

The expert participants were selected purposely based on their expertise in the fields of nursing education and neonatology, which entailed suggestions and contributions of what the desired course for neonatal intensive care nursing would require.

The professional nurses were selected based on their place of work, which is an NICU,

as these participants would be the potential students for the intended course and the researcher's aim for the course was to meet the needs of the learner.

2.9.2.4 Respect

Respect refers to a participant's rights to self-determination and full disclosure of the research study.

The concept of informed consent can be explained as the voluntary agreement from the study participants to be involved in the study and is not merely a document to be signed but rather a procedure to be explained for sound understanding of the research and possible risks.

Two information letters were drafted under the guidance of a member of the ethics committee; the first information letter (Appendix C) was drafted for the experts who participated in phase 1.2 and the second information letter was drafted for the professional nurses working in NICUs who participated in phase 1.3 (Appendix E).

The researcher sent out the relevant information letters to the intended participants and gave them time to read the information letter before being addressed by the researcher. The researcher met with all the participants and provided a space for queries pertaining to the information letter. Once the information letters were well comprehended by the participants the researcher then handed out consent letters (Appendix D) to all participants. The consent letters were the same for both phases, however there was an additional consent letter (Appendix R) provided to the experts requesting consent to audio record their interviews and the Focus Group Discussion. All participants who participated in this study signed a consent form/s.

The researcher emphasised voluntary participation to all potential participants. All voluntary participants of the study were treated with respect and professionalism.

During the commencement of the FGD, expert participants were encouraged to respect one another's values and opinions.

Lastly the researcher did not coerce the participants to participate in the study by promise of any material benefits of the study.

2.9.2.5 Integrity

The principle of integrity involves reporting research findings, avoiding falsification of findings and plagiarism in the collection, analysis and reporting of data.

The researcher will communicate all findings with all participants of the study in the form of a presentation of findings to experts and the professional nurses who participated in the study.

The researcher intends to communicate findings through national and international conferences and publish articles from the study conducted in high-ranking journals specialising in neonatal care.

Data from the surveys was analysed by an expert in the field of statistics.

Each chapter written up was sent to the supervisors for corrections, and the researcher met with the supervisors on a regular basis to discuss the mapping review results, themes that emerged from the interviews and FGD, results that emerged from the survey and Delphi Questionnaire.

The survey (Appendix B) and outline for the neonatal intensive care course was developed by the researcher and the supervisors who are educational experts.

2.10 CONCLUSION

The previous chapter introduced the background and outline for the study. This chapter laid out the research design and research methodology per phase conducted, steps the researcher took to ensure trustworthiness, validity, and reliability of the study and finally the ethical principles adhered to for each phase of the study. The next chapter, Chapter 3, provides a detailed description of the mapping review.

Chapter 3: ANALYSIS PHASE OF THE ADDIE MODEL: MAPPING LITERATURE REVIEW

3.1 INTRODUCTION

The previous chapter presented the research methodology and design that was applied throughout the study. The objective of this phase of the study was to identify best practices required to care for compromised neonates that are recommended in local and international literature. This forms the analysis step of the ADDIE Model.

This chapter discusses the mapping review and contains the following sections: background, purpose of a mapping review, aim of the review, research question, research objective specific to the mapping review, identification of relevant studies, study selection, findings and discussion.

3.2 BACKGROUND

Nurses are pivotal in attaining positive health outcomes for patients (Melariri, et al., 2022). It is imperative that nurses possess the necessary competencies to render safe and effective care to patients (Mrayyan, et al., 2023). Neonatal Competencies in this study refer to the attributes, knowledge and skills needed in a Neonatal Intensive Care Unit.

Professional nurses working in NICUs work in a highly specialised field caring for a vulnerable population. This requires them to have the skills and knowledge necessary to ensure positive outcomes for sick neonates (Maree et al., 2020). While neonatal intensive care nursing competencies align with general nursing competencies, they differ due to the unique characteristics of the neonatal population. Neonatal intensive care nurses must apply specialised skills, critical thinking, and knowledge when caring for this vulnerable population.

3.3 PURPOSE OF A MAPPING REVIEW

A mapping review is an emerging type of literature review. Mapping reviews differ from the traditional methods of literature reviews, such as scoping, integrated and systematic reviews, in that a mapping review focuses on targeted journals, with a

specific subject and is utilised during a defined period (Bradbury-Jones, et al., 2019). Aveyard and Bradbury-Jones (2019) further describe a mapping review as a method of investigating trends in academic published literature, which has been utilised extensively in the following niches: theory in qualitative research and vicarious trauma in child protection research. The aim of a mapping review is to identify up-to-date research within a particular field and has four distinct features:

- Focuses on identifying trends in a specific area rather than in a body of knowledge.
- Creates a mapping out of findings replacing the traditional synthesis of findings.
- Remarks on the all-round approach to knowledge production rather than what evidence is available.
- Examines theoretical knowledge.

Aveyard and Bradbury-Jones (2019) conclude that it is the four distinct features of a mapping review that make it an ideal method to inquire on current practices in literature reviews in the field of nursing.

Campbell et al. (2023) describes a mapping review as being visual, and data extracted should be displayed in visual summaries such as graphs and tables. Campbell et al. (2023) support Aveyard and Bradbury-Jones description of a mapping review's distinguishing features and state that unlike a scoping review the outcome of the literature review is not known prior to the literature search.

3.4 REVIEW QUESTION

Most literature reviews are guided by a review question; however, a mapping review differs in that the literature search is not guided by a question but rather a topic of interest. The researcher must take into consideration all articles published within a specified time frame within pre-selected journals that are likely to publish articles on the topic of interest (Khalil, et al., 2024).

The researcher used the objective of the mapping review as overall guidance when conducting the mapping review.

3.5 OBJECTIVE OF THE MAPPING REVIEW

The objective for the mapping review was to identify best practices recommended in local and international literature required to care for compromised neonates.

3.6 IDENTIFICATION OF RELEVANT STUDIES

3.6.1 Information Sources

Journals were selected purposively according to their likelihood of publishing research relevant to neonatal intensive care nursing. The researcher used the international Scopus (2017) SCImago Journal and Country Rank to determine highest ranking journals in the field of neonatal nursing. The researcher identified all journals that were likely to publish articles related to neonatal nursing. The following journals were selected for the mapping review based on their high rankings: Journal of Neonatal Nursing Science; Journal of obstetric, gynaecological & neonatal nursing and The Journal of Perinatal & Neonatal Nursing.

3.6.2 Selection of Journals for the Mapping Review

The SCImage comprises a research group from the Spanish National Research Council at the University of Granada. The research group has created a visual platform by means of information analysis where one can view the overall rankings of academic journals contained in the Scopus database on the SCImago Journal Rank (SJR) website. The research group developed this platform using the algorithm from Google PageRank. The algorithm sets out to determine the importance of a website by counting the number and quality of links to a page. The assumption is that the more links there are to a specific website the better that website is. SCImago, using this algorithm, works out the SCImago Journal Rank indicator for each journal on the Scopus database; the higher the SRJ number the more prestigious the journal. The SJR database, in addition, allows researchers opportunities to compare journals regarding their h-index and Impact score (SCImago Journal & Country Rank, 2021).

The h-index of a journal calculates how many times an article in a specific journal has been cited and is calculated per year (Hirsch & Buela-Casal, 2014). The impact factor is a number that indicates on average how many times in a two-year period an article in a journal has been cited. While the h-index highlights a researcher's academic

contribution the impact factor illustrates journal prestige, with both numbers having to be elevated to show success (Sharma, et al., 2014).

The researcher searched for high impact neonatal nursing journals on the SJR database.The following journals were highly ranked and are listed from highest to lowest ranking on the SRJ website: Journal of obstetric, gynaecological & neonatal nursing; The Journal of Perinatal & Neonatal Nursing and Journal of Neonatal Nursing Science.

Other journals that appeared on the SJR website upon review were more likely to publish articles on gynaecological nursing with a few on neonatal nursing and were therefore excluded from the selection of journals for the mapping review.

Table 3-1: h-index, SJR and Impact Factor for the pre-selected journals

Name of Journal	h-index	SJR	Impact Factor
Journal of obstetric, gynaecological & neonatal nursing	80	0.510	1.65
The Journal of Perinatal & Neonatal Nursing	47	0.386	1.24
Journal of Neonatal Nursing Science	26	0.315	1.03

3.6.3 Search Strategy

The nature of a mapping review does not require key words to guide the literature search as all articles must be considered within the pre-selected journals, within the specified time frame (James, et al., 2016). All articles from January 2020 to March 2022 in the pre-selected journals were considered for the mapping review.

3.7 STUDY SELECTION

3.7.1 Screening

Screening was conducted by the researcher in consultation with the supervisors. The topic of interest for the researcher was centred around which articles would provide

knowledge on best practices required to care for compromised neonates. Articles were first filtered through their titles and then through their abstracts, articles that provided knowledge on best practices required to care for compromised neonates were included in the synthesis of the mapping review. Studies that were included were plotted on a data extraction tool (Appendix A).

3.7.2 Data extraction tool

A data extraction tool can be described as an organisational aid for the researcher conducting a literature review by assisting the researcher with categorising data from an article according to the following categories: Study design; Data collection method; Method of analysis and topics covered by the article.

The researcher used a data extraction tool (Appendix A) modified by Taylor et. al. 2014 to suit a mapping review which can be found in the appendices for reference.

A PRISMA diagram was used to illustrate the selection process of studies in the mapping review.

Table 3-2: Selection of studies

Journal	**Titles Screened**	**Abstracts read**	**Full Articles read and included**
Journal of Neonatal Nursing Science	151	106	53
Journal of obstetric, gynaecological & neonatal nursing	124	46	29
The Journal of Perinatal & Neonatal Nursing	85	51	27

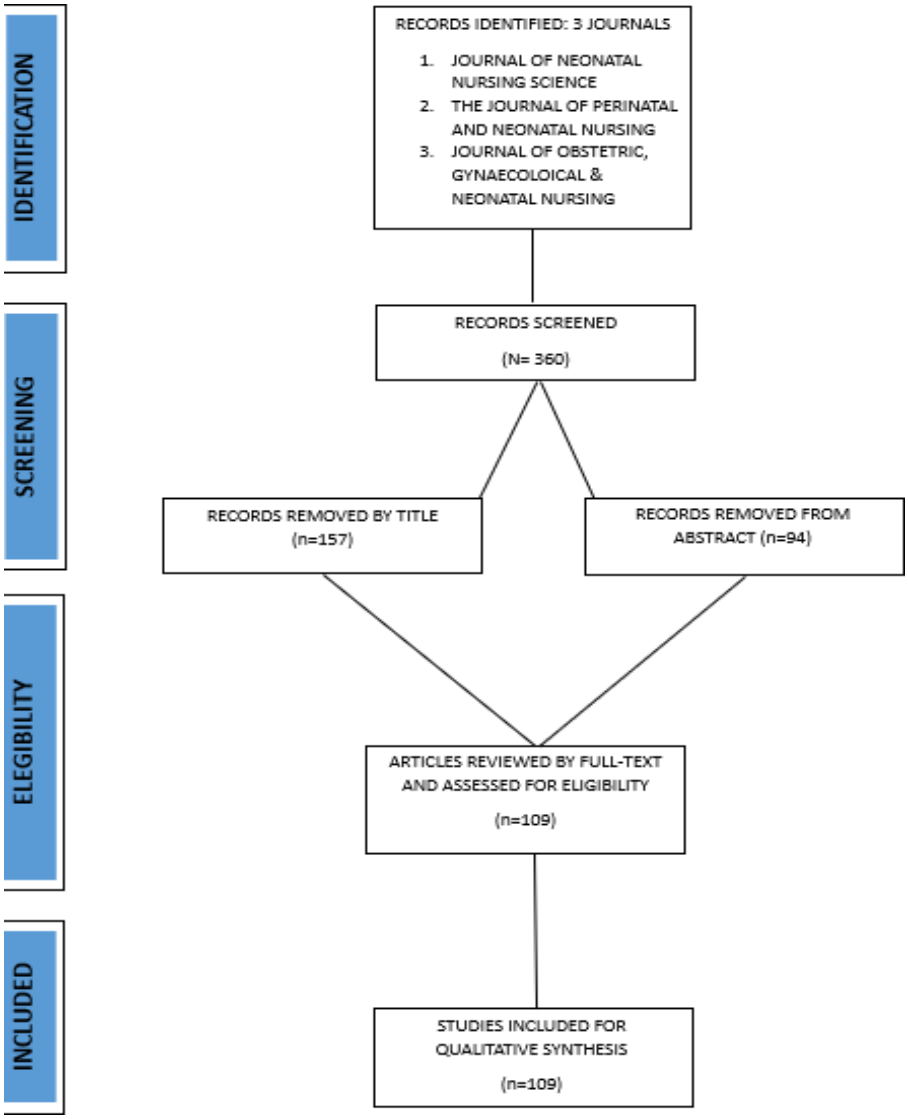


Figure 3-1: Prisma Diagram from mapping review

3.8 PRE-SELECTED JOURNAL DEMOGRAPHICS

3.8.1 Comparison of articles included in the study

The researcher began by reviewing the Journal of Neonatal Nursing Science, from which fifty-three articles (n=53) were selected for inclusion in the mapping review synthesis. The second journal reviewed was the Journal of Obstetric, Gynaecological

and Neonatal Nursing, with twenty-nine articles (n=29) included in the mapping review synthesis. The final journal reviewed was the Journal of Perinatal & Neonatal Nursing, from which twenty-seven articles (n=27) were selected. In total, one hundred and nine articles (N=109) were incorporated into the mapping review synthesis.

The majority of articles included in the mapping review synthesis originated from the Journal of Neonatal Nursing Science. Although this journal ranks lower on the SCImago Journal Rank (SJR) scale compared to the other selected journals, it was observed that its exclusive focus on neonatal nursing provided a greater selection of relevant articles. In contrast, the Journal of Obstetric, Gynaecological and Neonatal Nursing and the Journal of Perinatal & Neonatal Nursing presented a mix of neonatal nursing and midwifery content, with fewer articles specifically related to neonatal nursing than those available in the Journal of Neonatal Nursing Science.

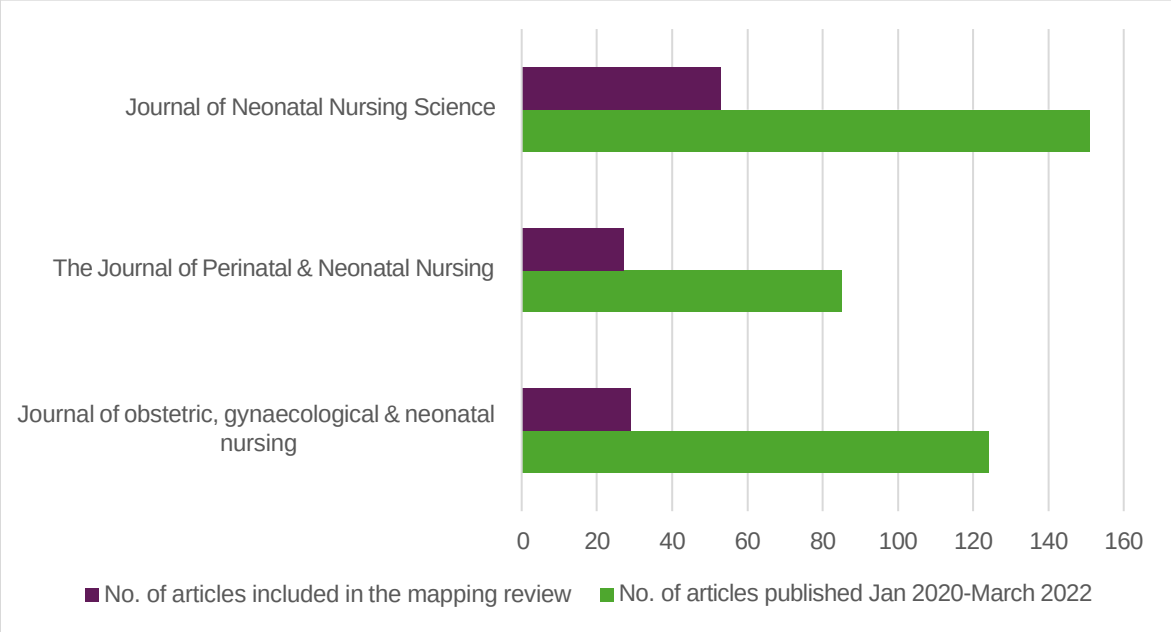


Figure 3-2: Graph illustrating articles published from January 2020-March 2022 in pre-selected journals compared to articles included in the mapping review per journal

3.8.2 Geographical comparison of all included articles

For articles that described research studies, the researcher noted the country where the research study was conducted.

For literature reviews and discussion papers the researcher chose the geographical location of the country of the first author or the majority of authors of the paper to illustrate the geographical publishing significance. The United States of America (USA) took the lead with thirty-seven articles (N=37), followed by Australia (N=11) and Canada (N=8). There was an array of international articles included in the mapping review, however the researcher found only two local articles (N=2) related to neonatal best practices.

An article published by Man et al. (2004) attributed the high research output of academic papers in the USA to a combination of significant financial support for research and optimum collaborative networks compared to developing and under-developed countries. Even though articles were filtered for this mapping review, articles published in USA regarding best practices required to care for compromised neonates was higher compared to other countries. From this mapping review it is well illustrated that publishing dominance by the USA continues.

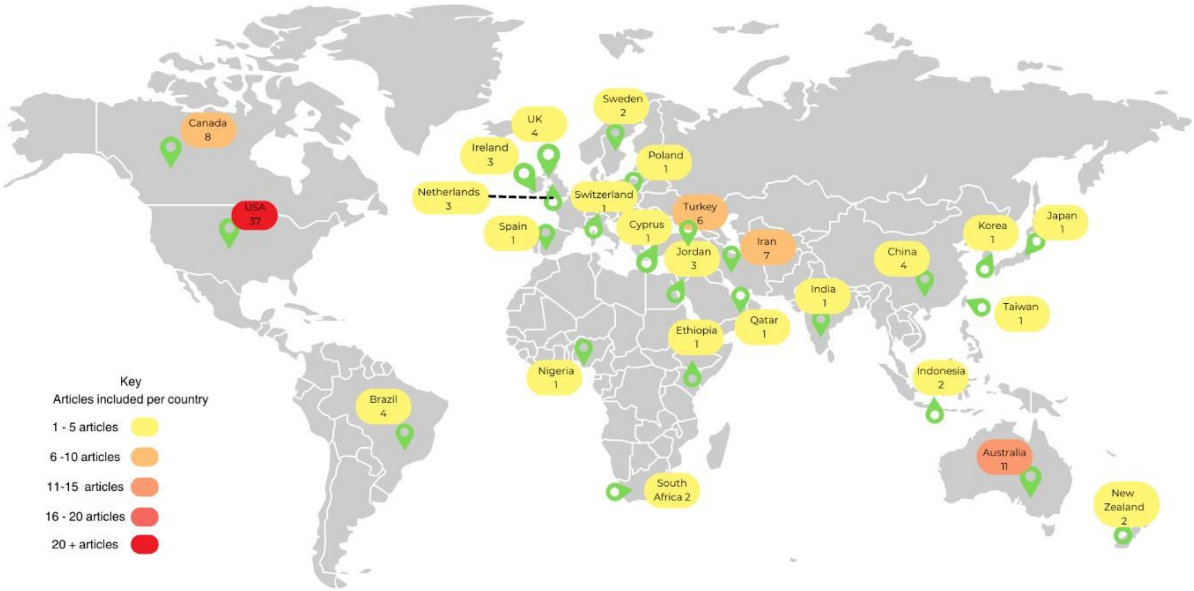


Figure 3-3: Geographical representation of articles published per country

3.9 DATA ANALYSIS TECHNIQUE

3.9.1 Thematic presentation of findings

The mapping review resulted in key findings related to best practices required to care for compromised infants. The researcher used MAXQDA® software to assist with data analysis, coupled with Creswell's 6 steps of data analysis. All articles included were loaded onto the MAXQDA® program and a coding system was used, after which the researcher grouped the codes into subcategories. The researcher, with the assistance of the supervisors, further grouped the categories to produce four main themes.

MAXQDA® is a widely used software to assist researchers with analysis of qualitative data. The software does not code data for the researcher but assists with the storage and management of data and allows for visual displays of codes, and an efficient method for identifying patterns and themes that emerge from the coding process (Guetterman & James, 2023). As explained in chapter 2, the researcher used Creswell's steps of data analysis to guide the process of data analysis while working on the MAXQDA® software. Creswell's steps of data analysis is a step-by-step guide to assist researchers with qualitative data analysis. The following steps were applied by the researcher when analysing the qualitative data (Creswell & Creswell, 2018).

3.9.2 Applying Creswell's steps of data analysis to the mapping review

3.9.2.1 Organising and preparation of data

The researcher saved all included articles electronically and loaded the articles on the MAXQDA® software for analysis.

3.9.2.2 Establishing a general sense

The researcher read over all articles included and grouped them according to similarity of topics.

3.9.2.3 Coding of data

The researcher reviewed the research objective. Text segments were formed from the researcher highlighting best practices required to care for compromised infants that frequently arose. Codes created on MAXQDA® were formed by the researcher finding the most appropriate literature for identified text segments. The researcher examined

all codes thoroughly and chose the most descriptive wording to give a topic to these codes, thus creating umbrella themes with associated categories.

3.9.2.4 Identification of themes and sub-themes

Identification of categories allowed the researcher to produce themes from the coded data. Themes were then analysed by the researcher to elaborate on theme inter-connections and patterns found by the researcher.

3.9.2.5 Interpretation of data

This is final stage of Creswell's data analysis is explored in section 3.10.

3.9.2.6 Representation of findings

This is final stage of Creswell's data analysis is explored in section 3.10.

3.10 FINDINGS AND DISCUSSION OF FINDINGS ARISING FROM INCLUDED ARTICLES

The articles selected are grouped under the themes selected from the data analysis in Table 3-3 below.

Table 3-3: Themes, categories and articles per theme

Theme	**Categories**
Clinical Management of Neonatal Conditions	Common conditions in neonatal intensive care units
Articles from the mapping review	
1. "Knowledge of and Perceived Competence in Trauma-Informed Care and Attitudes of NICU Nurses Toward Mothers of Newborns with Neonatal Abstinence Syndrome" (Salameh & Polivka, 2020). Journal of Obstetric, Gynecologic, & Neonatal Nursing (JOGGN) 2. "Transcutaneous Bilirubin Levels and Risk of Significant Hyperbilirubinemia in Early-Term and Term Newborns" (Sarici, et al., 2021). JOGGN 3. "Improving Evaluation and Treatment of Hyperbilirubinemia in Late Preterm Infants" (Brown, et al., 2020). Journal of Perinatal and Neonatal Nursing (JPNN) 4. "Physiological parameters of preterm infants in different postures: An observational study" (Cheraghi, et al., 2020). Journal of Neonatal Nursing (JNN)	

5. ”Compliance With Best Practice Guidelines for Neurodevelopmental Supportive Care in South Africa” (Rheeder, et al., 2021). (JPNN)
6. ”Implementation of a Detection Tool to Aid Early Identification of Necrotising Enterocolitis” (Oddi & Moyer , 2021). (JOGNN)
7. ”The effect of supportive program on maternal self-confidence in caring of infants with gastrointestinal anomalies: A randomized clinical trial” (Jabraeili, et al., 2020). (JNN)
8. ”Magnitude and factors associated with neonatal hypothermia among neonates admitted in neonatal intensive care units: Multicentre cross-sectional study” (Nebiyu, et al., 2021). (JNN)
9. ”Concordance of infrared non-contact thermometer aimed at the forehead versus digital thermometer vis axilla method in the preterm infant on admission to the Townsville Neonatal Unit” (Smith, et al., 2020). (JNN)
10. ”An Introduction to Neonatal EEG” (Ryan, et al., 2021). (JPNN)
11. ”Association of Nurse Staffing With Nosocomial Infections of Vey Low-Birth-Weight Infants” (Joo Lee, et al., 2020). (JPNN)
12. Achieving Normothermia in Low-Birth-Weight Neonates” (Long & Holdbrooks, 2020). (JOGNN)
13. ”Effects of Dextrose Gel in Newborns at risk for Neonatal Hypoglycaemia in a Baby-Friendly Hospital” (Stanzo, et al., 2020) (JOGNN)
14. ”How Much Glucose Is in the Gel Used to Treat Neonatal Hypoglycaemia?” (Stanzo, et al., 2021). (JOGNN)
15. ”Skin-to-Skin Care is Associated with Reduced Stress, Anxiety, and Salivary Cortisol and Improved Attachment for Mothers of Infants With Critical Congenital Heat Disease” (Lisanti, et al., 2020). (JOGNN)
16. What is the effectiveness of combining warming mattresses and plastic bags versus plastic bags only for thermoregulation in preterm infants? A systematic review” (Langan, et al., 2020). (JNN)
17. ”Effects of Massage Therapy on Indirect Hyperbilirubinemia in Newborns Who Receive Phototherapy” (Korkmaz & Esenay, 2020). (JOGNN)

Theme	Categories
Prevention of preventable Neonatal Conditions	Knowledge of preventable neonatal intensive care conditions Warning signs of preventable neonatal intensive care conditions

Articles from the mapping review

1. ” Application of a Bundle in the Prevention of Per-Intraventricular Haemorrhage on Preterm Newborns” (Ferreira, et al., 2020). (JPNN)
2. “A narrative review of thermoregulation techniques used by paediatric theatre staff during intra hospital transfer from paediatric theatres to the Neonatal Intensive Care Unit (NICU)” (Struzik & Dow, 2020). (JNN)
3. ”Neonatal oxygen saturation alarm compliance-under recognised source of iatrogenic harm? An audit and survey of nursing opinion” (Harris, et al., 2020). (JNN)
4. “Gloving and Touch Practices of Neonatal Nurses” (Nist, et al., 2022). (JPNN)
5. “Decreasing the Number of NICU Admissions Related to Hypoglycaemia” (Youseff & Kleytman, 2021). (JOGNN)

Theme	Categories
Best Neonatal Practices	Acute care Continuous care

Articles from the mapping review

1. ”Evaluation of time to antibiotic administration for suspected late-onset sepsis in the Neonatal Intensive Care Unit: A quality improvement project” (Infanti, et al., 2021). (JNN)
2. ”The evolution of the neonatal nurse practitioner in Australia: A discussion paper” (Forbes-Coe, et al., 2020). (JNN)
3. ”Examining workplace-based education strategies for the 21st century neonatal nurse: Literature Review” (Bromley, et al., 2021). (JNN)
4. ”Improving the quality of neonatal care in Nigeria through the education of maternity health workers” (Emmanuel, et al., 2021). (JNN)

5. “Level 1 neonatal nursing staff perceptions of their role: A qualitative Framework Analysis study investigating the complex and diverse workload undertaken by nurses in special care baby units” (Gibbs, et al., 2021). (JNN)
6. “Nursing diagnosis of preterm infants in the neonatal intensive care unit: A cross-sectional study” (Taghinejad, et al., 2021). (JNN)
7. “South African neonatal nurse specialisation- is professional licensing justifiable?” (Maree, et al., 2021). (JNN)
8. “Contributing factors to diaper dermatitis and NICU length of stay” (Esser, et al., 2021). (JNN)
9. ” Facilitating neonatal MARSI evidence into practice: Investigating multimedia resources with Australian Neonatal Nurses- A participatory action research project” (August, et al., 2021). (JNN)
10. “The effects of continuous positive airway pressure (CPAP) on nasal skin” (Haymes, 2020). (JNN)
11. “High fidelity tracheostomy simulation quality improvement project” (Hurley, et al., 2021). (JNN)
12. ”Breastfeeding self-efficacy, social support, and breastfeeding among Chinese mothers with late preterm infants” (He, et al., 2022). (JNN)
13. ”Effect of antenatal and postnatal individualized counselling of mothers on exclusive human milk feeding in preterm infants during hospital stay at discharge: A randomized controlled trial” (Sujata, et al., 2022). (JNN)
14. ”Identifying priorities for practice improvement related to breastfeeding support in a neonatal intensive care unit (NICU) in Medellin, Colombia” (de Armas, et al., 2021). (JNN)
15. ”Perinatal morbidities, congenital malformations and breastfeeding outcomes” (Silva, et al., 2021). (JNN)
16. "PRIME (preterm infants need milk early)- Success of a multidisciplinary quality improvement project in a tertiary neonatal unit” (Murphy, et al., 2021). (JNN)
17. ”Survey of neonatal ICU nurses’ knowledge of neonatal nutrition in Japan” (Asai, et al., 2020). (JNN)
18. “Nurses’ perspectives on pain management practices during newborn blood sampling in China” (Hu, et al., 2021). (JNN)
19. “Nurse to infant vocalisation during nursing care: Does it vary between painful and non-painful procedures” (Zwimpfer, et al., 2021). (JNN)

20. ”The effect of two different lancets and heel warming on duration of crying and procedure time during blood sampling: A randomized controlled study” (Balci, et al., 2021). (JNN)
21. “Perceptions of expressed breast milk for preterm infants in Malawian hospitals: A qualitative study” (Ong, et al., 2022). (JNN)
22. “Effect of Left and Right Semi-Elevated Side-Lying Positions on Feeding Performance of Preterm Infants” (Aktas, et al., 2022). (JOGNN)
23. “Influence of Quiet Time on the Auditory Environment of Infants in the NICU” (Zauche, et al., 2021). (JOGNN)
24. “Skin-to-Skin Care is Associated with Reduced Stress, Anxiety, and Salivary Cortisol and Improved Attachment for Mothers of Infants With Critical Congenital Heart Disease” (Lisanti, et al., 2021). (JOGNN)
25. “Systematic Review of the Effectiveness of Involving Parents During Painful Interventions for Their Preterm Infants” (Eissler, et al., 2021). (JOGNN)
26. “Implementation of Cue-Based Feeding to Improve Preterm Infant Feeding Outcomes and Promote Parents’ Involvement” (Thomas, et al., 2021). (JOGNN)
27. “Integrative Review of the Experiences of Registered Nurses Who Support Breastfeeding Women” (Prokop, et al., 2021). (JOGNN)
28. “Metasynthesis of Factors That Influence Parents’ Participation in Pain Management for Their Infants in the NICU” (McNair, et al., 2020). (JOGNN)
29. “Perspectives of Nurses in Mississippi on Implementation of Baby-Friendly Hospital Initiative” (Burnham, et al., 2021). (JOGNN)
30. “Secondary Qualitative Analysis of Moral Injury in Obstetric and Neonatal Nurses” (Beck, 2022). (JOGNN)
31. “A Quality Improvement Project to Increase Frequency of Skin-to-Skin Contact for Extreme Low-Birth-Weight Infants in the Neonatal Intensive Care Unit” (Nation, et al., 2021). (JPNN)
32. “Association of Nurse Staffing with Nosocomial Infections of Very Low-Birth-Weight Infants” (Lee, et al., 2020). (JPNN)
33. “Comparing the Analgesic Effects of 4 Nonpharmacologic Interventions on Term Newborns Undergoing Heel Lance” (Chang, et al., 2020). (JPNN)
34. “Determinants of the Very Low-Birth-Weight Infant’s Intestinal Microbiome” (Desorcy-Scherer, et al., 2020). (JPNN)
35. “Effect of the Helping Babies Breathe Training Program” (Hatamleh, et al., 2020). (JPNN)
36. “Evaluation of an e-Learning Breastfeeding Program for Postpartum Mothers of Moderately High-Risk Newborn Infants Admitted to the Special care Nursery” (Fu, et al., 2021). (JPNN)

37. “Fresh Perspectives on Hospital-Acquired Neonatal Skin Injury Period Prevalence From a Multicenter Study” (August, et al., 2020). (JPNN)
38. “Maternal Milk and Relationships to Early Neurobehavioral Outcome in Preterm Infants” (Pineda, et al., 2020). (JPNN)
39. “Mothers’ Adaption to a Late Preterm Infant When Breastfeeding” (Gerhardsson, et al., 2020). (JPNN)
40. “Neonatal Transfusion Practice” (Orsi, et al., 2021). (JPNN)
41. “Perinatal & Neonatal Collaboration to Optimize Outcomes in Extremely-Low-Birthweight Infants” (Horak & Spellman, 2021). (JOGNN)
42. “Protocolized Versus Non-Protocolized Weaning to Reduce the Duration of Invasive Mechanical Weaning in Neonates” (Bol, et al., 2020). (JPNN)
43. “The Effect of 3 Positions Given to Preterm Infants During Heelstick Procedure on Pain and Durations of Crying and Procedure” (Erkut, et al., 2021). (JPNN)
44. “Using Social Media to Disseminate Effective Pain Treatments for Newborns During Needle-Related Painful Procedures in China” (Hu, et al., 2021). (JPNN)
45. “MISSED CARE phenomenon on neonatal intensive CARE unit (NICU)” (Rozensztrauch, et al., 2021). (JNN)
46. “Recognizing and mitigating infant distress in Neonatal Intensive Care Unit (NICU)” (Givrad, et al., 2021). (JNN)
47. ”The role of mothers during painful procedures on neonates: A focused ethnography” (Hassankhani, et al., 2020). (JNN)
48. “Use of Rapid Cycle Deliberate Practice as a Promising Simulation Method for Improving Nurses’ Neonatal Resuscitation Confidence and Competence” (Imossi & Bailey, 2020). (JOGNN)

Theme	**Categories**
Promotion of Family-Centred Care	• Effective communication with families of neonates • Involvement & support of families in the care of neonates • Creation of a therapeutic environment for the family of a dying neonate • Effective management of challenges or barriers to Family-Centred Care due to COVID-19

Articles from the mapping review

1. “How is the communication of bad news being performed in Neonatal Intensive Care Units and how to improve it: A Scoping Review” (Machado, et al., 2020). (JNN)
2. “Clinical intervention involving parents in their preterm infant’s care to promote parental sensitivity: A case study” (Melancon, et al., 2021). (JNN)
3. ”Engaging parents of hospitalized neonates during a pandemic” (Duff, et al., 2021). (JNN)
4. “Exploring Indonesian nurses’ perspectives on preparing parents of preterm infants for hospital discharge: A qualitative study” (Hariati, et al., 2022). (JNN)
5. “Family-Centred Care in Dedicated Neonatal Units: An Integrative Review of International Perspectives” (Vetcho, et al., 2020). (JNN)
6. “Family-centred care in the Neonatal Intensive Care Unit: A concept analysis and literature review” (Larocque, et al., 2021). (JNN)
7. “Knowledge of low-birth-weight care as a source of coping strategies for mothers: Cross sectional study in perinatology wards” (Tambunan, et al., 2020). (JNN)
8. “Neonatal family integrated care: Ensuring a positive parental experience” (Bradford-Duarte & Gbinigie, 2020). (JNN)
9. “Neonatal intensive care nurses’ perceptions of implementing parent discharge preparation tools” (DesMadryl, et al., 2021). (JNN)
10. “Parent engagement in the NICU” (Novak & Vittner, 2021). (JNN)
11. “The effect of an emotional support training program on acute stress disorder among mothers of preterm infants hospitalized in neonatal intensive care units” (Al-Maghaireh, et al., 2020). (JNN)
12. “The evolution of neonatal family centred care” (Reid, et al., 2021). (JNN)
13. “The transition home of extremely premature babies: An integrative review” (Green, et al., 2021). (JNN)
14. “The effect of telenursing on the rate of newborn readmission” (Gholami, et al., 2022). (JNN)
15. “Beliefs and attitudes of nurses towards open visiting policy in neonatal intensive care units: A descriptive cross-sectional study in northwest Iran” (Ghorbani & Jabraeili, 2022). (JNN)

16. “Maternal stress and perceived nurse support among mothers of premature infants in the neonatal intensive care unit of a tertiary hospital in Qatar” (Mariano, et al., 2022). (JNN)
17. Perceptions of expressed breast milk for preterm infants in Malawian hospital: A qualitative study” (Ong, et al., 2022). (JNN)
18. “Systematic Review of the Effectiveness of Involving Parents During Painful Interventions for Their Preterm Infants” (Eissler, et al., 2021). (JOGNN)
19. ”Clinicians’ Self-Reported Practices Related to End-of-Life Care for Infants in NICUs in Jordan” (Razeq, et al., 2020). (JOGNN)
20. “Effect of Fathers’ Presence and Involvement in Newborn Care in the NICU on Mothers’ Symptoms of Postpartum Depression” (Kim, et al., 2020). (JOGNN)
21. “Emotional Work of Neonatal Nurses in a Single-Family Room NICU” (Doede & Trinkoff, 2020). (JOGNN)
22. “Factors That Influence Women’s Symptoms of Postpartum Depression After Discharge of Their Preterm Infants From the NICU” (Grippi, 2021). (JOGNN)
23. “Integration of Maternity and Neonatal Care to Empower Parents” (Stelwagen, et al., 2020). (JOGNN)
24. “Tool to Enhance Relationships Between Staff and Parents in the Neonatal Unit” (Eeles & Gibbs, 2020). (JOGNN)
25. “Barriers to Transition to Home from the Neonatal Intensive Care Unit” (Hebballi, et al., 2021). (JPNN)
26. “Dignity” (Mohammadi, et al., 2020). (JPNN)
27. “Early Intervention for Preterm Infants and Their Mothers” (Zhang, et al., 2021). (JPNN)
28. “Early Perinatal Workforce Adaptions to Covid-19 Pandemic” (Vanderlaan & Woeber, 2022). (JPNN)
29. “Effect of a Parent Empowerment Program on Parental Stress, Satisfaction, and Length of Stay in the Neonatal Intensive Care Unit” (Nieves, et al., 2021). (JPNN)
30. “Infant-Family Mental Health in the NICU” (Driver, et al., 2021). (JPNN)
31. “Parents Descriptions of Neonatal Palliation as a Treatment Option Prior to Peri-viable Delivery” (Jager, et al., 2020). (JPNN)
32. “What Neonatal Intensive Care Nurses Have Experienced in COVID-19 Pandemic in Turkey” (Karakul, et al., 2022). (JPNN)
33. “Conceptualizing the early detection and intervention if infant mental health disorders in neonatal nursing” (Gordon, et al., 2021). (JNN)

34. “Infant mental health in intensive care: Laying a foundation for social, emotional and mental health outcomes through regulation, relationships and reflection” (Browne, 2021). (JNN)
35. “COVID-19 in babies: Knowledge for neonatal care” (Green, et al., 2020). (JNN)
36. “Neonatal nursing in the COVID-19 pandemic: can we improve the future?” (Montes, et al., 2020). (JNN)
37. “Parent-Targeted Education Regarding Infant Pain Management Delivered During the Perinatal Period” (Richardson, et al., 2020). (JPNN)
38. “Post-discharge Telephone-Based Program for NICU Parents” (Youseff & Kleytman, 2020). (JOGNN)
39. “Stress and social support among registered nurses in level II NICU” (Bry & Wigert, 2022). (JNN)

Table 3-4 illustrates the number of articles per theme in all pre-selected journals, while Figure 3-4 provides a visual representation of the number of articles per theme in these journals.

Table 3-4: No. of articles per theme in all pre-selected journals

Theme	**No. of articles**
Management of Neonatal Conditions	17
Prevention of Neonatal Conditions	5
Best Neonatal Practices	48
Promotion of Family-Centred Care	39
Total no. of articles	**109**

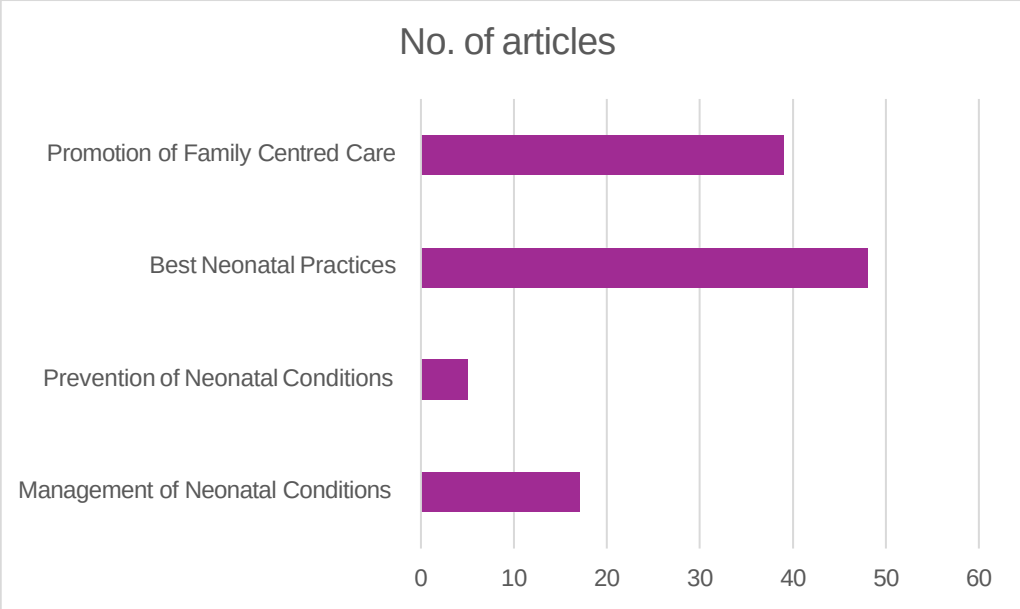


Figure 3-4: Visual representation of no. of articles per theme in all pre-selected journals

3.10.1 Theme 1: Management of Neonatal Conditions

The first 28 days of a newborn's life is known as the neonatal phase. This phase is a vulnerable period in the neonate's life especially if the neonate is born before the full 40-week gestational period, deeming them premature (Al-Momani, 2020). Al-Momani's reasons for considering a premature neonate to be vulnerable are the following: inadaptability to extra-uterine life; increased susceptibility to infection due to an immature immune system and impaired functionality of underdeveloped organs. Neonatal admission is not limited to premature neonates. Full term infants with complications during birth, medical, surgical and congenital conditions are also candidates for neonatal intensive care admission.

When a neonate succumbs to a condition that is either in need of prompt intervention or life-threatening, the neonate will be admitted into a neonatal intensive care unit (Williams, et al., 2018). The neonate will then be handed over to the care of the neonatal intensive care staff, who play a critical role in the survival of the neonate. A neonatal intensive care nurse performs a variety of tasks; main tasks include: initiating mechanical ventilation, continuous monitoring of vital signs, feeding of the neonate and adhering to infection control measures throughout (Lee, et al., 2020). Lee, et al.

(2020) emphasise that neonatal nurses, along with performing their tasks, must be knowledgeable in a variety of neonatal conditions they are nursing to enhance the care rendered, to avoid possible complications that may arise and to act efficiently when warnings of deterioration are on the horizon.

3.10.2 Common conditions in Neonatal Intensive Care Units

A majority of neonatal admissions are due to prematurity of a neonate. Specialised care offered to a premature neonate by a Neonatal Intensive Care Unit aids in supporting a premature neonate to adapt to extra-uterine life (Khasawneh, et al., 2020). Khasawneh et al. (2020) defines a premature as a baby born before 37 weeks of gestation. Premature neonates are further classified according to their weight. According to the World Health Organisation weight classification, a premature neonate who weighs less than 2500 grams is classified as a low-birth-weight infant, a premature neonate born weighing less than 1500 grams is classified as a very low birth weight infant and a premature neonate born weighing less than 1000 grams is classified as an extremely low birth weight infant. Neonatal birthweight has an unparalleled impact on neonatal mortality and morbidity, with mortality and morbidity rates increasing the lower the gestational age and birthweight (Vilanova, et al., 2018).

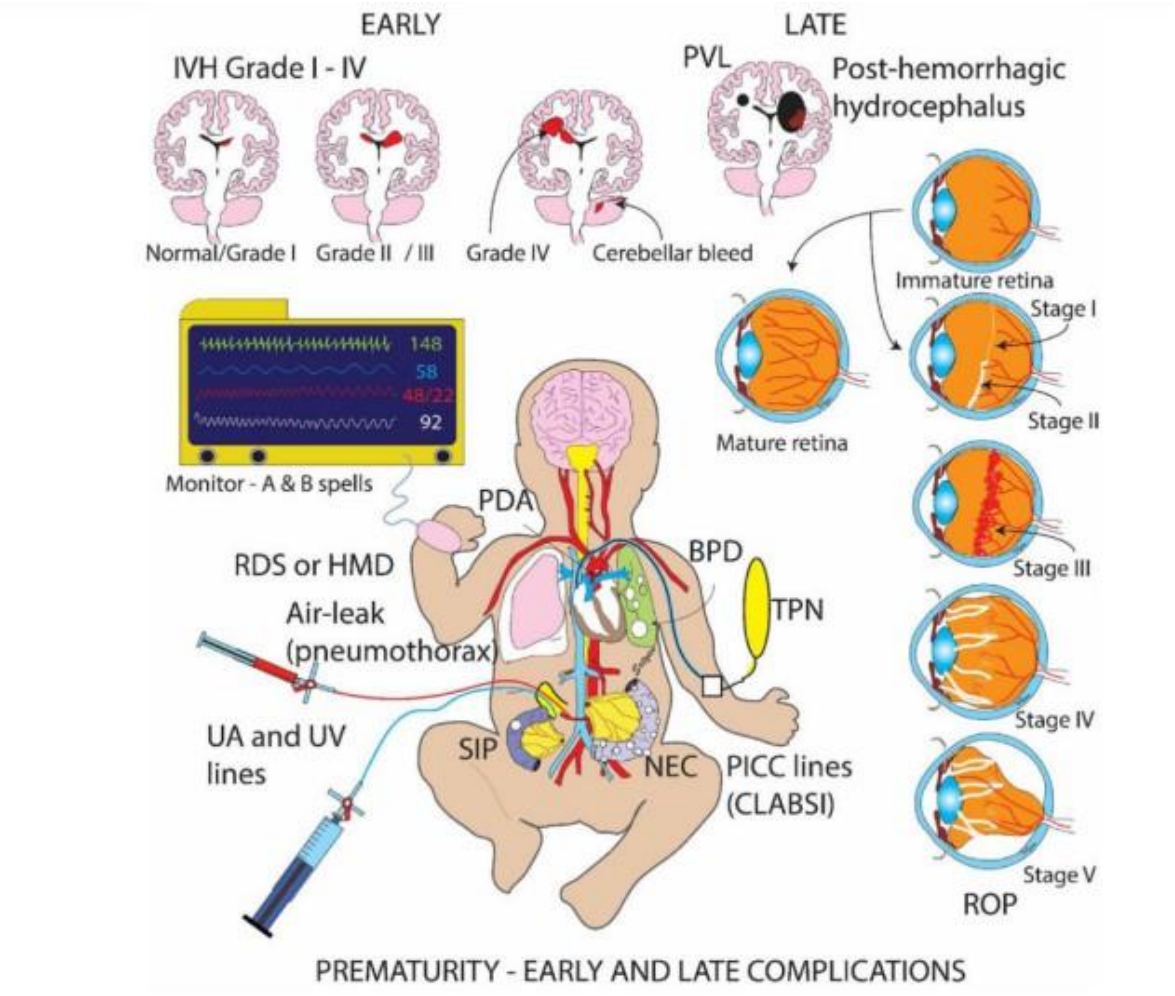
Chandrasekharan et al. (2017) designed an infographic highlighting the early and late complications of prematurity (Figure 3-5). The main aim of this visual tool is to assist parents of neonates admitted into an NICU to better understand the physiological differences of a preterm neonate and the common conditions they are likely to develop due to organ immaturity and altered immunity. Conditions illustrated in the infographic are apnoea, bradycardia, bronchopulmonary dysplasia, central line associated blood infection, intraventricular haemorrhage, necrotising enterocolitis, patent ductus arteriosus, respiratory distress syndrome, retinopathy of prematurity and spontaneous intestinal perforation.

It is important to note that NICUs are not units isolated for preterm neonates, there are conditions that affect term neonates that require admission into an NICU. Admission of term neonates into an NICU is associated with significantly high rates of neonatal morbidity and mortality. Main conditions associated with term neonate admission into NICUs are hypoglycaemia, respiratory distress, cardiovascular instability and hyperbilirubinemia (Talisman, et al., 2022).

There were 17 included articles in the mapping review that described the latest management trends for various conditions. These articles highlighted the need for nurses to know how to manage these conditions as they were common conditions found in NICUs globally. There was commonality of neonatal conditions highlighted from the mapping review and to the conditions mentioned in current literature outside the targeted journals. They can be categorised into three categories: neonatal medical conditions, neonatal surgical conditions and neonatal congenital conditions.

Figure 3-5 presents an infographic used for counseling parents, summarising and explaining the early and late complications of prematurity as outlined by Chandrasekharan et al. (2017). This visual tool enhances parental understanding and supports informed decision-making regarding neonatal care.

Following this, Table 3-5 provides a comprehensive overview of neonatal conditions identified through the mapping review, along with their definitions. This table serves as a reference to contextualize the various health challenges preterm infants may face, further supporting healthcare professionals in guiding parental education and care planning.



ABBREVIATIONS:

- A & B – Apnea and bradycardia
- BPD – bronchopulmonary dysplasia
- CLABSI – central line associated blood infection
- IVH – intraventricular hemorrhage (bleeding in the brain)
- NEC – necrotizing enterocolitis
- PDA – patent ductus arteriosus (a fetal channel shunting blood from the aorta to the lungs)
- PICC line – percutaneously inserted central catheter (a small tube placed in the baby's vein and threaded to reach a large blood vessel near the heart)
- PVL – periventricular leukomalacia
- RDS – respiratory distress syndrome; or HMD – hyaline membrane disease – refers to immature lungs with surfactant deficiency
- ROP – retinopathy of prematurity
- SIP – spontaneous intestinal perforation
- TPN – total parenteral nutrition
- UA – umbilical arterial (line used to monitor blood pressure and draw blood for lab studies)
- UV – umbilical vein (line used to provide nutrition and fluids)

Figure 3-5: Infographic used for counselling of parents. The figure summarises and explains the early and late complications of prematurity Chandrasekharan et al. (2017)

Table 3-5: Neonatal conditions sourced from the mapping review with definitions

	Conditions	Definitions
MEDICAL	**Neonatal Abstinence Syndrome**	Disorder affecting multiple systems in a neonate due to prolonged intrauterine drug exposure. Chief symptoms comprise central nervous system, gastrointestinal and autonomic manifestations (Salameh & Polivka, 2020).
	Hyperbilirubinemia	Common clinical neonatal condition associated with high levels of bilirubin in the blood. This abnormality creates a clinical picture of yellow discolouration of the skin and sclera. This condition varies in severity; if pathogenic can cause toxicity to the brain (Sarici, et al., 2021).
	Respiratory Distress Syndrome	Condition that mainly affects premature infants with poorly developed lungs. Clinical signs are an oxygen saturation below 85%, a respiratory rate above 60/min and heart rate of more than 140/min. This condition is regarded as an emergency (Cheraghi, et al., 2020).
	Intraventricular Haemorrhage	Bleeding in the brain most commonly occurring in preterm infants. This condition is graded according to the severity of the bleed. Grade IV being the most severe (Ferreira, et al., 2020).
	Hypothermia	Continuing drop in neonates body temperature below 36.5 ˚C leading to detrimental effects from metabolic stress to death (Nebiyu, et al., 2021).
	Hypoxia	Lack of oxygen to the neonatal brain before, shortly after birth and during hospital admission (Harris, et al., 2020).
	Infection	A neonatal condition caused by a virus, fungus or bacteria. Neonatal infections may escalate to a neonatal sepsis and can result in abnormal immune responses proving detrimental to the neonate (Infanti, et al., 2021).
	Hypoglycaemia	A neonatal condition characterised by a significant drop in blood glucose levels, and as a result vital organ functionality is compromised (Stanzo, et al., 2020).
	Persistent pulmonary hypertension (PPHN)	Maladaptation of a neonate's respiratory and circulatory systems from inter uterine to extra uterine life (Soni, et al., 2021).

	Conditions	Definitions
SURGICAL	**Necrotising Enterocolitis**	Gastrointestinal condition characterised by dead tissue of the intestinal mucosa. Clinical manifestations include a distended abdomen, large gastric aspirates. If the condition worsens, surgical intervention is required to remove the necrosed tissue (Oddi & Moyer , 2021).
	Gastroschisis	Abdominal wall defect which presents with the appearance of a neonate's intestines outside the abdominal cavity. Surgical intervention is needed to place the intestines back into the abdomen (Bhat, et al., 2020).
	Omphalocele	Abdominal wall defect which presents with the appearance of a neonate's intestines outside the abdominal cavity, however, differs from gastroschisis as the contents are covered with the peritoneum. Most neonates with this condition will have additional congenital anomalies, unlike the neonates with gastroschisis (Zahouani & Mendez, 2023).
CONGEN -ITAL	**Congenital heart defects**	A defect in the heart that develops before birth (Lisanti, et al., 2020).

3.10.3 Theme 2: Prevention of Neonatal Conditions

The United Nations Children's Fund and The World Health Organisation formulated a report titled "Ending preventable newborn deaths and stillbirths by 2030." In this report they state that 80% of all newborn deaths result from the following preventable conditions: complications due to prematurity, intrapartum related deaths and neonatal infections (United Nations Children's Fund, 2020). The report goes further to state that poor-quality care accounts for 61% of neonatal deaths, and for this outcome to be improved there needs to be compliance and application of evidenced based care, quality infection control management and increased motivation among medical staff.

According to Lee et al. (2020), to optimise the health of neonates admitted into an NICU Neonatal Nurses must be competent in the management and prevention of

neonatal conditions and be efficient in their management when signs of deterioration are approaching (Lee, et al., 2020).

3.10.3.1 Prevention of Neonatal conditions sourced from the mapping review

Five (N=5) of the articles sourced mentioned prevention of specific neonatal conditions; these conditions were: Intraventricular Haemorrhage; Hypothermia; Hypoxia; Infection and Hypoglycaemia. These conditions made an appearance in articles sourced mentioning the management of neonatal conditions, further solidifying that these conditions are common amongst the neonatal population group. The articles sourced that mentioned the management of Intraventricular Haemorrhage; Hypothermia; Hypoxia; Infection and Hypoglycaemia, stressed the importance of prevention of these conditions as these conditions have the potential to cause fatal complications, and emphasised that prevention of these conditions is better than cure.

All five (N=5) articles mentioned that Neonatal Nurses need to have knowledge on the specific conditions as these conditions are opportunistic to a vulnerable neonate. The articles further went on to explain that if Neonatal Nurses have knowledge of a specific preventable condition, they will be able to prevent the condition from occurring.

3.10.3.2 Prevention of Intraventricular Haemorrhage in the NICU

Intraventricular Haemorrhage (IVH) is characterised by bleeding in the brain, most commonly occurring in preterm infants; this condition is graded according to the severity of the bleed. Grade IV being the most severe (Ferreira, et al., 2020). Ferreira et al. (2020) explain that IVH is one of the main causes of neurological damage in preterm neonates, and it is important to note that there is no specific management to limit the bleeding, therefore prevention of the condition by early interventions is the best hope to avoid an IVH diagnosis.

Ferreira et al. (2020) formulated a care bundle to aid the prevention of IVH, which comprises of the following: keeping the neonate in a prone position; minimal handling; suctioning of the ET tube, when necessary; avoidance of a lumbar puncture and neonatal weighing. Ferreira et al. (2020) implemented this care bundle on a group of preterm neonates for a period of the first 72 hours of a preterm neonate's life and there was a significant difference in terms of IVH diagnosis and IVH severity between the control and intervention group, with the intervention group resulting in lower numbers

of IVH diagnoses and lower numbers of preterms already diagnosed with IVH progressing to advanced stages.

A review article written by Pei-Chen Tsao (2023), a paediatrician at a Medical University Centre in Taiwan, titled “Pathogenesis and Prevention of Intraventricular Haemorrhage in Preterm Infants” supported the use of the care bundle to prevent IVH and emphasised that application of the bundle within the first 72 hours of a neonates life is paramount, particularly preterm infants needing ICU support (Tsao, 2023).

3.10.3.3 Prevention of Hypothermia in an NICU

Hypothermia in a neonate can be defined as a continuing drop in a neonate’s body temperature below 36.5 ˚C, leading to detrimental effects from metabolic stress to death (Nebiyu, et al., 2021).

Preterm neonates are particularly prone to hypothermia due to their thin skin, lack of ability to shiver, low energy reserves and inadequate or developing vascular control, which prevents them from achieving optimum thermoregulation. It is imperative that care in an NICU offers adequate thermoregulation in the form of safe heating methods and adequate transfer methods to avoid heat loss (Struzik & Dow, 2020).

Prevention of Neonatal Hypothermia guidelines have been published by a multitude of evidence-based sources, such as the World Health Organisation, 1997; Wyckoff et al., 2015; Expert group of China neonatal resuscitation project, 2017 and Sweet et al., 2019. Among these sources three intervention processes emerged to ensure the prevention of Neonatal Hypothermia: intervention in a delivery room; intervention on the way from a delivery room to an NICU and intervention in an NICU (Liu, et al., 2022).

All interventions are of importance in ensuring that adequate thermoregulation is achieved, however, an adequate intervention in an NICU is of concern to neonatal NICU nurses, as the following management must be implemented in an NICU to avoid Hypothermia (Liu, et al., 2022):

1. Intensive Care cribs must be pre-heated to the neutral temperature of the neonate prior to placing neonate in the crib
2. Items such as wet wipes, nappies, barrier creams, saturation probe and temperature probe must be placed in the incubator prior to use
3. Unnecessary opening of closed incubators

4. Adequate humidification of incubators
5. Timely temperature monitoring
6. Creation of a nest for neonate to lay in
7. Covering of extremely low birth weight infants in a translucent plastic cover.

Liu et al. (2022) states that for prevention of hyperthermia to be successful, it is critical for NICU staff to undergo continuous training on the prevention of Neonatal Hypothermia.

3.10.3.4 Prevention of Hypoxia in the NICU

Hypoxia is defined as the lack of oxygen to a neonatal brain before, shortly after birth or during hospital admission (Harris, et al., 2020). All neonates admitted into a NICU are prone to hypoxia, however preterm neonates are most vulnerable due to their immature brain and underdeveloped respiratory and cardiovascular system (Harris, et al., 2020). Harris et al. (2020) explains that preterm neonates on supplemental oxygen require continuous monitoring of their oxygen saturation and heart rate to avoid periods of hypoxia.

Results from the Canadian Oxygen Trial showed that periods of hypoxia experienced by neonates admitted in an NICU have an association with eventual death or neurodevelopmental disabilities at the age of 18 months (Martin & Harijith, 2021).

A prevention strategy, suggested by Harris et al. (2020) for Neonatal Nurses, is oxygen saturation targeting for premature infants. This requires a neonatal nurse to set oxygen saturation limits on the saturation monitoring machines, however, Harris et al. (2020) did mention that alarm fatigue is a concern in NICUs and therefore saturation alarms may be missed. There is also much debate on what the oxygen targets needs to be set to for a specific neonate at a specific gestational age or having a specific condition. Currently the recommended Saturation Oxygen target range is 90-95% and 90-94% for extremely low birth weight infants (Bachman, et al., 2023).

The recommendation that Harris et al. (2020) makes is for oxygen saturation alarms to be set according to unit protocol and nursing staff to receive training on how to set alarms and the importance of oxygen saturation targeting.

Sola et al. (2014) state that the most used drug in NICU is oxygen, and like any other drug should be managed as such. Sola et al. (2014) supports the use of continuous

oxygen saturation and heart rate monitoring by oxygen saturation targeting, as over oxygenation can also cause complications such as blindness of the neonate.

Oxygen saturation targeting should not be a practice isolated to preterm neonates; it should be applied to all neonates in an NICU as hypoxia is non-discriminatory.

3.10.3.5 Prevention of Infection in an NICU

Infection in a neonate can be caused by a virus, fungus or bacterium. Neonatal infections may escalate to a neonatal sepsis and can result in abnormal immune responses proving detrimental to the neonate (Infanti, et al., 2021). All neonates admitted into an NICU are vulnerable to hospital acquired infections (HAIs), and HAIs are associated with high mortality rates, longer hospital stays and neurodevelopmental disabilities (Johnson, et al., 2021).

Common sources of HAIs come from central lines, urinary catheters, surgical sites and ventilators. Johnson et al. (2021) formulated general infection control concepts to be taken into account when managing a neonate in an NICU, which are:

1. Hand Hygiene
2. Central line maintenance
3. Topical antisepsis in a neonate
4. Avoidance of contamination during medication and intravenous fluid preparation and administration
5. Cleaning and disinfection of reused medical equipment
6. Environment structuring to mitigate exposure to sources of infection
7. Environmental cleaning
8. Mitigating exposures from family and employees.

Infection prevention and control practices supported by the WHO show that hand hygiene with the use of soap and water or an alcohol-based rub continues to be the most effective way to prevent infection in an NICU. However, there are factors that need to be considered and managed by unit managers to adhere to correct hand hygiene practices. Artificial nails worn by medical staff caring for neonates have shown to increase cross contamination, and lack of supplies of soap, water and alcohol-based rubs in an NICU preclude proper hygiene controls (Johnson, et al., 2021). Incorrect adherence to gloving policies in an NICU further contribute to the spread of infection;

healthcare providers are using gloves when not deemed necessary and this practice is further exacerbated by the low compliance to hand hygiene when wearing gloves (Nist, et al., 2022).

3.10.3.6 Prevention of Hypoglycaemia in the NICU

Hypoglycaemia is a neonatal condition characterised by a significant drop in blood glucose levels, as a result of which vital organ functionality is compromised (Stanzo, et al., 2020). For hypoglycaemia to be prevented, neonatal nurses must identify the neonates who are at risk of having a low blood glucose; these neonates are: born between 34-37 weeks, small for gestational age, large for gestational age or they are born from mothers who are diabetic (Stanzo, et al., 2021).

Other than the type of high risk neonates there are adjustable factors that could contribute to neonatal hypoglycaemia such as: hypothermia, delayed feeding and undiagnosed maternal sepsis (Youseff & Kleytman, 2021). Neonatal nurses need to understand that hypoglycaemia among neonates is multifactorial and therefore a neonate must be managed holistically to avoid complications due to hypoglycaemia.

Neonatal nurses need to follow unit protocol for blood glucose screening and pay special attention to neonates who are at risk for hypoglycaemia and be knowledgeable on the warning signs of hypoglycaemia to act efficiently (Abramowski, et al., 2023).

3.10.4 Theme 3: Best Neonatal Practices

The Interactive Domain Model (IDM) developed by Kahan and Goodstadt (2001) serves as a guiding framework to the best practices approach to assist healthcare professionals with health promotion. The model defines best practices in healthcare as a set of activities that are in alignment with health promotion, goals and ethics, theories and beliefs, evidence, and good understanding of the environments to ensure promotion of health in any given situation (Kahan, 2012).

In this study, best practices and evidenced based practices are assumed to be best practices as they were drawn from the peer reviewed literature and refer to high quality approaches rendered by professional nurses working in NICUs to improve neonatal outcomes.

Neonatal context research brings the application of best practices in the management of neonatal conditions, interactions with the families and nutrition (Klock, et al., 2019). Research within neonatal nursing and neonatology surfaces data to support evidenced-based practice. Evidenced-based neonatal nursing practice has become the best approach/practice to promote good outcomes for NICU patients (Linsday-Sutherland, 2019). The researcher used evidence sourced from the mapping review to identify best practices in neonatal nursing practiced globally.

Articles sourced from the mapping review gave insight into the most current evidenced-based practices regarding acute and continuous care of a neonate admitted into an NICU.

3.10.4.1 Acute Care

3.10.4.1.1 Effective initiation of neonatal resuscitation

Neonatal Resuscitation is regarded as acute care in the case of seriously ill neonates and the guidelines of neonatal resuscitation are governed by the European Resuscitation Council in collaboration with the International Liaison Committee on Resuscitation. It is imperative that nurses working in NICUs are familiar with the guidelines and are competent in carrying those guidelines out when involved in a neonatal resuscitation (Karlsson, et al., 2023).

Imossi and Bailey (2020) believe that continuous training of neonatal nurses on neonatal resuscitation contributes to adhering to best neonatal practice. Imossi & Bailey (2020) illustrated this in their study titled “Use of Rapid Cycle Deliberate Practice as a Promising Simulation Method for Improving Nurses’ Neonatal Resuscitation Confidence and Competence”. Nurses in this study were trained on neonatal resuscitation using simulation techniques, which allowed for immediate feedback, repetitive practice, practice focused on weaknesses, debriefing and scenarios gradually becoming more intense. Ninety-six percent of nurses that underwent the training felt this training was more effective than other forms of simulation they had experienced (Imossi & Bailey, 2020).

The Helping Babies Breathe (HBB) initiative has also assisted in improving midwives’ and neonatal nurses’ skill and competency in neonatal resuscitation. This programme set out to train nurses on the important steps of drying, providing warmth to the

neonate, stimulation of breathing and correct bag mask technique (Hatamleh, et al., 2020). Hatamleh et al. (2020) recommended that nurse training institutions should implement HBB training programmes as essential parts of their training programs.

3.10.4.1.2 Early initiation of breastmilk

Breast milk is invaluable to neonates: it protects neonates from the likes of Necrotising Enterocolitis (NEC), respiratory problems and most conditions that contribute to neonatal mortality. Early initiation of breastmilk is associated with reduced NICU stays as well as better neurodevelopmental outcomes. An initiative from a multidisciplinary team called Preterm Infants need Milk Early (PRIME) was implemented in an NICU, where staff working in the NICU were responsible to encourage mothers to express and feed the maternal milk to admitted neonates as early as 1-2 hours after delivery and then at given intervals (Murphy, et al., 2021).

Literature found in the mapping review centred around the neonatal nurses' support of mothers to give their neonates expressed milk and advocated for the use of donated breastmilk where hospital facilities have donor milk banks should maternal milk be inaccessible. Neonatal nurses can improve the uptake of neonates receiving maternal breastmilk by providing support for milk expression, and by supporting transitioning a neonate to direct breastfeeding and creating policies and tools related to breastfeeding in NICUs (de Armas, et al., 2021).

Literature found in the mapping review also highlighted the gap in knowledge of neonatal nutrition by Neonatal nurses and mentioned that neonatal nurses who are knowledgeable in neonatal nutrition can improve the nutritional outcomes of neonates (Asai, et al., 2020).

3.10.4.1.3 Execution of safe administration of a blood transfusion

Administration of blood products to neonates is a common practice in NICUs, and neonatal nurses need to be competent in carrying out the skill correctly with the correct prescription from medical doctors. Syringe pumps are commonly used to deliver blood products to neonates, as they have the capability to deliver lower volumes of blood at accurate frequencies to avoid volume overload, which could be fatal in neonates (Orsi, et al., 2021).

Neonatal nurses need to be competent in using syringe pumps and be knowledgeable of the dangers of incorrect blood transfusion practices to avoid complications. In addition, neonatal nurses need to be familiar with the care needed when handling blood products, care involved during a neonate receiving blood products and knowledge of appropriate measures to take should a reaction to the blood product occur (Cherem, et al., 2017).

Along with the clinical application of administration of blood products, neonatal nurses must abide by all administrative requirements prior to administering blood products, which entails consent from guardians and checking the prescription against the blood product with a fellow neonatal nurse. Neonatal nurses must be knowledgeable on how blood products are prescribed; an important factor is weight as it is used in the calculation of dosage; therefore, neonatal nurses must be consistent with documenting the weight of the neonate timeously. Unit policies must be available to guide neonatal nurses through safe management and handling of blood products to avoid mismanagement (Flores, et al., 2020).

3.10.4.2 Continuous Care

3.10.4.2.1 Maintenance of skin integrity

All neonates, particularly preterm neonates, are at risk for impaired skin integrity due to their underdeveloped, thin skin. Most skin related injuries occur due to medical adhesives, pressure from endotracheal tubes and Nasal Continuous Airway Pressure nasal prongs, and diaper dermatitis (DD).

Regarding the removal of medical adhesives such as endotracheal strapping, nurses need to be familiar with the different type of adhesives used in an NICU as well as the type of removal technique that suits the individual product. Neonatal best practice recommends elevating the edge of the adhesive slightly and using a two-handed technique to slowly remove the adhesive. Best practice methods suggest that an adhesive not be pulled at an upright angle and not removed before 24hours of placing the adhesive (August, et al., 2020).

Term neonates are more prone to contracting diaper dermatitis due to prolonged stays in an NICU, a culmination of moisture, friction, stool, and urine are contributing factors to obtaining diaper dermatitis (Esser, et al., 2021). Esser et al. (2021) found that the

incidence of diaper dermatitis increased when the neonate experienced other skin related injuries and recommended that routine collection of skin integrity data is crucial in understanding the link between prolonged stay and severity of Diaper Dermatitis. The study promoted the use of a Diaper dermatitis algorithm for prevention and management of DD, which consists of bum baths, use of barrier creams and use of more specialised creams should signs of DD appear.

A study by Haynes 2020, which looked at skin breakage from ET tubes and nasal prongs, identified that neonatal nurses lacked knowledge on neonatal skin assessments that are critical to managing the prevention of skin injuries from the likes of ET tubes and nasal prongs. The study suggests neonatal nurse competence in conducting a neonatal skin assessment and doing so routinely to avoid skin related injuries (Haymes, 2020).

3.10.4.2.2 Safe and correct administration of medication

It is common knowledge that medication administration and nursing come hand-in-hand and cannot be separated in any context. Nurses are key to safe medication preparation, administration and discarding of medication. Despite this, medication errors in an NICU do still occur, due to incorrect dosage and giving of the incorrect medication, with nurses being the main culprit according to literature (El Aziz, et al., 2021). WHO states that nurses play a vital role in ensuring neonatal safety regarding medication administration, as they are the sole providers of the practice, therefore neonatal nurses must ensure that neonates receive the right medication, right dose, right route, right time and right observation for possible adverse effects (WHO,2017).

A study by Infanti et al. (2021) looked at timely administration of antibiotics in NICUs to prevent late onset sepsis; the study found that early administration of antibiotics when early signs of sepsis are evidenced reduces the rate of late onset sepsis of a neonate, with the latter being more dire. The study also suggested that correct preparation and administration of antibiotics by neonatal nurses is important, as incorrect preparation and administration can cause preventable complications and not assist in curbing the sepsis but rather exacerbating the condition (Infanti, et al., 2021).

3.10.4.2.3 Promotion of a neuroprotective environment with the implementation of quiet time

The neurodevelopment of neonates admitted into an NICU can be at risk, and more so as the admission persists. Invasive procedures, prolonged ventilation and a noisy NICU environment can negatively affect a neonate's brain development. The long-term consequences of negative neurodevelopmental can be seen in decreased white matter of the brain, resulting in lowered IQ and cognitive and motor developmental delays (Rheeder, et al., 2021).

Professor Welma Lubbe from the North-West University in South Africa formulated best practice guidelines for neurodevelopmental care of preterm infants. These guidelines have both short-term and long-term benefits for neonates, from decreased hospital stay to higher IQs. The first guideline centres around the environment of neonates and describes that the optimum environment for neonates is that of intra-uterine life meaning that NICUs should adopt quieter practices in terms of avoiding unnecessary alarms, minimal handling from the medical team and nurses should avoid raised voices and allow for quiet time moments in NICUs to aid the healing process (Lubbe,2019).

Nurses should be aware of the benefits of quiet time to ensure adherence to the practice and be advocates for the process in terms of developing protocols to allow consistency of the practice (Zauche, et al., 2021).

3.10.4.2.4 Correct management of phototherapy

Phototherapy is a UV light therapy commonly used to treat hyperbilirubinemia in neonates due to pathological causes. Bilirubin serum levels determine if phototherapy should be initiated, and factors such as weight, gestational age and risk factors are considered. Although phototherapy is the standard treatment of hyperbilirubinemia it is linked with adverse effects such as: hyperthermia, dehydration, diarrhoea, discolouration of skin and skin burns (Korkmaz & Esenay, 2020). Delays in the initiation of phototherapy is detrimental to a neonate, as increasing levels of bilirubin can cause irreversible brain damage (Brown, et al., 2020).

Neonatal nurses are key to optimising neonatal safety and reduced hyperbilirubinemia levels through correct management of phototherapy. This is achieved when nurses

understand the condition of hyperbilirubinemia and the positive and negative effects of phototherapy (Korkmaz & Esenay, 2020).

Along with traditional methods of nursing care surrounding a neonate undergoing phototherapy, recent studies have shown that massage therapy as a technique working hand-in-hand with phototherapy to reduce bilirubin levels in a neonate is effective; this technique is supported by Pooja Pandey's (2023) guidelines on the roles and responsibility of a nurse during care of neonates undergoing phototherapy.

A massage must follow a special technique and steps and is said to reduce bilirubin levels, increase gut motility, improve circulation, and increase calmness of a neonate. Neonatal nurses are encouraged to drive this practice and encourage parents to participate in the massage under the guidance of a nurse to promote bonding (Korkmaz & Esenay, 2020).

3.10.4.2.5 Promotion of skin-to-skin contact with primary care giver

Neonates, upon admission into an NICU, are separated from their parents. Parent-neonate separation is associated with negative health consequences for a neonate such as lower IQs, anxiety, and behavioural issues. Parent separation from their neonates, has a negative impact on both parents'/caregivers' and neonate's mental health, making parent-neonate separation two-fold (Forde, et al., 2022).

Skin-to-skin care involves placing an unclothed neonate on a parent's bare chest. The skin-to skin contact, particularly with mothers, assists in regulating a neonate's temperature, breathing, pain and heart rate and has an additional advantage of improving the mother's milk supply and accelerating neonatal weight (George, et al., 2023).

A study conducted by Lisanti et al. (2020) looked at cortisol levels, a stress hormone, of maternal saliva pre and post skin-to-skin contact of critically ill neonates with congenital heart disease. Post salivary analysis of the mother after skin-to-skin contact showed significant reductions in salivary cortisol with increased self-reported attachment (Lisanti, et al., 2020).

Placing a critically ill neonate, with crucial equipment attached to them, on a parent's chest may be a daunting task to neonatal nurses as they may feel that the neonate is safer in the ICU crib. Lisanti et al. (2020) states that the pros outweigh the cons in terms

of reduction in maternal stress and increased mother-to-neonate attachments. Lisanti et al. (2020) suggests that more research goes into safe holding techniques of neonates in an NICU; this needs to be a multidisciplinary effort to improve skin-skin practices in an NICU.

3.10.4.2.6 Correct management of supplemental oxygen

Supplemental Oxygen can be described as therapeutic oxygen being delivered to a neonate via specialised respiratory equipment, ranging from nasal prongs to mechanical ventilators. The majority of neonates in an NICU need respiratory support via mechanical ventilation, therefore neonatal nurses need to be competent and knowledgeable on how to manage a neonate on mechanical ventilation and avoid complications related to mechanical ventilation.

One of the many skills that neonatal nurses need to practice when managing a neonate on mechanical ventilation, to avoid complications such as hypoxia and blindness of the neonate suggested by Harris et al. (2020), is Neonatal oxygen saturation targeting, which was explained earlier under prevention of hypoxia (section 3.10.3.4).

Another skill to optimise oxygenation of a neonate on supplemental oxygen, suggested by Cheraghi et al. (2020), is correct positioning of the neonate. Cheraghi et al. (2020) looked at the effect of various neonatal positions on oxygen saturation, respiration and heart rate. The positions favoured that resulted in optimum oxygen saturation were prone and left-lateral positions.

Lastly, mechanical ventilation weaning is a vital skill needed for neonates on mechanical ventilation, as the collective goal is for neonates to be ventilated for as short a time as possible to avoid complications such as damage to the lungs and developmental problems (Bol, et al., 2020). Bol et al.'s (2020) study looked at protocolised versus non-protocolised weaning to reduce time spent on mechanical ventilation. The results of this study showed that protocolised weaning processes are favourable in reducing neonatal ventilation time, therefore, weaning protocols should be up-to-date and easily available to staff working in NICUs.

Khanjari et al. ((2022) support the minimal time of a neonate on mechanical ventilation, and further explain that neonatal nurses should take the lead when it comes to

mechanical ventilation weaning due to their continuous bedside presence. Khanjari et al. (2022) supports the use of protocolised weaning guidelines and training of neonatal nurses on the use of guidelines to improve performance and knowledge of NICU nurses on mechanical ventilation weaning.

3.10.4.2.7 Effective non-pharmacological pain management

Non-pharmacological pain management in neonates refers to non-traditional methods used to manage pain such as vocal soothing, skin-to-skin contact, warming, parental involvement, and use of oral sucrose when interacting with a neonate. The nature of an NICU exposes neonates to a range of invasive treatments that cause pain; mismanagement of pain has negative long-term effects on a neonate's mental health and development (Zwimpfer, et al., 2021). Literature supports the use of pharmacological pain interventions in conjunction with non-pharmacological pain measures to reduce neonatal pain (Maciel, et al., 2019).

Zwimpfer et al. (2021) support the use of vocal soothing by nurses when interacting with the patients, however, they found that gentle vocal interactions lessened when nurses where performing procedures that elicited pain. The authors report that literature has shown that non-maternal voice exposure improved stability of heart rate, oxygen saturation and lessened crying intervals, whereas maternal vocal soothing has more of a positive effect on neonatal feeding and positive neurodevelopmental outcomes.

Due to the increased risk of irregular glucose metabolism in neonates, glucose monitoring is often done routinely by neonatal nurses. This is an invasive technique and requires pricking of a heel. Balci et al. (2021) found that heel warming and use of an automatic lancet to prick a heel were effective in reducing pain, this was determined by shorter crying intervals when doing so.

Parental presence has a notable effect on the reduction of pain in neonates and should be encouraged by neonatal nurses, particularly the use of skin-to skin practice in an NICU by parents. Concerns for patient safety, however, impede the practice; this impediment could be overcome if more research is done on the effect of skin-to-skin practice on pain reduction (Eissler, et al., 2021).

Chang et al. (2020) conducted a comparative study looking at the effects of four non-pharmacological interventions on term neonates undergoing heel pricks. The interventions were as follows: administration of oral sucrose; use of pacifiers; skin-to-skin contact and breastfeeding. The results of the study showed that all four interventions decreased pain levels in the experimental group, with the administration of oral sucrose proving superior to the other interventions.

It is the responsibility of neonatal nurse to advocate for both pharmacological and non-pharmacological pain management in neonates, as neonates are unable to vocalise their pain. Pain assessments appropriate for neonates must be conducted routinely to aid pain control (Popowicz, et al., 2021).

3.10.5 Theme 4: Promotion of Family-Centred Care

The concept of Family-Centred Care (FCC) is a concept formally introduced into NICU settings in the nineties. It is a model of care that supports the involvement and partnership of parents and medical team in the care of a neonate (Vetcho, et al., 2020). In the neonatal context, FCC is considered the gold standard, as it has a combined positive effect by increasing parental satisfaction and physical and cognitive development of a neonate (Larocque, et al., 2021).

Articles sourced from the mapping review supported the adoption of the FCC model into NICUs and highlighted the role of neonatal nurses in the various aspects of family-centred care.

3.10.5.1 Effective communication with families of neonates

In 1992, a clinician by the name of Helen Harison brought together a group of parents and medical staff to initiate discussions on how obstacles to implementation of FCC could be addressed. What arose from those discussions were 10 principles of family-centred neonatal care. The first principle being encouraging open and honest communication and information sharing between families and the medical team (Celenza, et al., 2017).

Nurses, together with the other medical team staff members, play a vital role in sharing detailed and comprehensive details of a neonate's condition and treatment processes. With a neonate being vulnerable in terms of not being able to communicate, parents

must be well-informed in order to make well thought out choices regarding their neonate's care (Reid, et al., 2021).

The majority of the articles sourced from the mapping review centring around FCC stressed the importance of communication with the parents in terms of discharge preparation of a neonate. Preparing parents/guardians for the discharge of a neonate from an NICU is a primary responsibility of nurses to ensure a smooth transition from the hospital to home. Parents/guardians need to be knowledgeable on the possible effects of prolonged hospitalisation to action efficient referrals and be competent in the skills needed post discharge (Hariati, et al., 2022). Hariati et al. (2022) in their study, which looked at nurses' perceptions regarding discharge preparation of neonates, found that nurses were willing to share information and prepare parents/guardians for discharge, however, they lacked the skills to do so. The study showed there was a lack of structured guidelines to facilitate the process. Stelwagen et al. (2020) support Hariati et. al (2022) in the process of empowering parents to take the lead over decisions and actions affecting their neonate's health. Stelwagen's study recommends that neonatal nurses and other allied workers set up formal teaching opportunities for parents and look to the parents as the primary caregivers.

Regarding parental mental health, Tambunan et al.'s (2020) study examined the quality of mothers' coping strategies for stress and its relationship with maternal knowledge of low-birth-weight infants. The study found a significant correlation between knowledge acquired about their neonates during hospitalisation and coping strategies to control their level of stress; the two factors showed a positive pattern, which further encouraged the role of neonatal nurses in continuous knowledge sharing to parents (Tambunan, et al., 2020).

3.10.5.2 Involvement and support of families in the care of the neonate:

Family Integrated Care (FiCare) is a concept that stems from the principle of FCC on participation/involvement of parents/guardians in the care of their neonates. The goal of this concept is to improve parent/guardian interaction with their neonate and instil parental/guardian confidence when caring for their neonates in NICU (Bradford-Duarte & Gbinigie, 2020).

Parental/guardian involvement has garnered vast support from researchers within neonatology, as it is not only beneficial for the parents but has positive contributing factors towards Infant Mental Health.

Infant mental health is defined as developing the capacity to ensure optimal social and emotional regulation of a developing neonate and supports the implementation of FiCare in assisting with this regulation (Browne, 2021). Poor maternal attachment due to NICU hospitalisation contributes to poor infant mental health, a consequence that manifests into adult mental health conditions, such as anxiety and depression (Givrad, et al., 2021). Neonatal nurses need to be sensitive to the effects of poor attachment on infant mental health with the support of unit guidelines on the implementation of FiCare guidelines to allow for FiCare buy-in (Gordon, et al., 2021) and (Driver, et al., 2021).

For FiCare to be successful within an NICU, parents/guardians need to be supported by neonatal nurses. Studies on parental experiences in Neonatal Units have shown that parent-neonatal care needs to be facilitated by nurses, however, there is a lack of buy-in, resulting in poor initiation of FiCare (Zhang, et al., 2021).

Eeles and Gibbs (2020) recommend the use of a nurse guide to assist nurses to support FiCare. The guide helps to integrate families into the care of a neonate by outlining the care-giving activities expected from parents, which are taught and supervised by the neonatal nurses (Eeles & Gibbs, 2020).

3.10.5.2.1 Creation of a therapeutic environment for a dying neonate

The unfortunate reality of NICUs for some neonates is death, due to the acuity of patients admitted. In instances where medical treatments are no longer helpful, neonatal palliative care is provided. This specialised care is underpinned by the following core values: compassion, dignity, respect, collaboration with the family, symptom treatment and psychological support for the parents (Beltran & Hamel, 2021).

Neonatal nurses have a responsibility to create a therapeutic environment for a dying neonate and its family during such a sensitive time; this can be done with effective collaboration with the family. A skill that can promote this practice is the exhibition of effective verbal and non-verbal communication by neonatal nurses and allowing a

platform for constant presence and voicing of concerns (Machado, et al., 2020) and (Razeq, et al., 2020). Machado et al. (2020) support the use of protocols when delivering sensitive information such as SPIKES. SPIKES is a six-step protocol that guides healthcare professionals in delivering sensitive or bad news with clarity and empathy. It includes preparing the setting, understanding the patient's knowledge and preferences, delivering information compassionately, addressing emotions, and outlining a clear plan for next steps. However, further studies are needed to adapt and develop protocols specifically for the NICU context.

3.10.5.2.2 Effective management of challenges or barriers to Family-Centred Care due to COVID-19

Due to the timeframe when the mapping review was conducted, articles on the COVID-19 epidemic surfaced and focused on challenges the pandemic placed on FCC and how some of these challenges were mitigated. While COVID-19, a respiratory infection, had more detrimental effects on the adult population, the naivety of the neonatal immune system afforded neonates protection against the inflammatory immune response (Green, et al., 2020).

Neonates were not totally immune to the infection; however, their symptoms were far less serious than the adult population. The challenge for neonatal nurses came regarding the isolation of neonates from family members, especially the mothers, which negatively affected the maternal-neonatal bond and neonatal nutrition (Montes, et al., 2020).

Literature supporting the continuation of breastfeeding and giving of expressed breastmilk to neonates admitted into an NICU and motivated for the use of donor milk in instances where maternal milk could not be accessed. The use of technology blossomed during the pandemic, and the use of telehealth increased to allow for parents to get updates on their neonates as well as see them through video calling (Sokou et al., 2022).

3.11 TIME FRAME OF MAPPING REVIEW

The mapping review took the researcher six months. The researcher received Assessor Approval for the study on the 14/01/2022, the mapping review was the started on the 15/01/2022 and completed on the 30/06/2022.

3.12 SUMMARY OF FINDINGS

As mentioned in the introduction of this chapter, a mapping review is an emerging type of literature review. Despite its recent debut in the world of literature reviews, the researcher found that this type of review was beneficial as evidenced by the large number of articles included for synthesis. A total of one-hundred and nine articles (N=109) were analysed, which produced four (N=4) main themes that spoke to best practices required to care for compromised neonates.

The common thread among many articles was policy development to ensure compliance to best practices in neonatal settings and strengthening of staff training. Implementation of policies and staff training go hand-in-hand, as staff need to be educated on how to implement policies in their units and understand the benefits of policy implementation.

According to Babaie et al. (2023), policy implementation in NICUs enhances quality of care, support for family involvement and promotes staff development (Babaie, et al., 2023).

3.13 CONCLUSION

This chapter concludes the mapping review. In this chapter the following were discussed: selection of journals for the mapping review, selection of articles chosen for the mapping review, themes derived from the articles selected and literature surrounding the themes both from the selected articles and articles outside of the pre-selected journals. The next chapter discusses the formulation of Neonatal Intensive Competencies, using the themes derived from the mapping review and alignment of themes with SANC's Generic Competency Framework for an Advanced Nursing Practitioner.

Chapter 4: ANALYSIS PHASE OF THE ADDIE MODEL: FORMULATION AND RANKING OF COMPETENCIES WITH THE EXPERT GROUP

4.1 INTRODUCTION

The previous chapter presented the mapping review conducted by the researcher and the findings of the mapping review presented by themes. The aim of this chapter is to describe the formulation of neonatal nursing intensive care competencies derived from the identified best practices required to care for compromised neonates.

This chapter also explains how the neonatal nursing competencies were used to conduct a ranking exercise with experts within nursing education and neonatal intensive care. Both these activities form part of the analysis step of the ADDIE model, which involves a training needs analysis.

4.2 USE OF SANC'S GENERIC FRAMEWORK FOR ADVANCED NURSE PRACTITIONERS TO DEVELOP NEONATAL INTENSIVE CARE COMPETENCIES

Neonatal intensive care competencies in this study refer to the attributes, knowledge and skills needed by professional nurses working in a Neonatal Intensive Care Unit.

Nurses working in specialised units, such as neonatal intensive care, must have a specialised skills set tailored to manage the high complexity of care required by a neonate, understanding of the uniqueness of neonates' physiology and be cognisant of the importance of the presence of a care giver in health promotion (Alfieri, et al., 2017).

In a position paper written by SANC titled "Advanced Practice Nursing SANC's Position Paper/statement" in March 2012, SANC acknowledged that nurses in South Africa are trained at both entry and higher education level, and there is a need for advanced nurse practitioners who possess an in-depth knowledge of their chosen field.

The Council of International Neonatal Nurses has expressed that neonatal intensive care nursing is a highly specialised field and requires all nurses working in this field to

have uniform competencies and qualifications. However, in the South African context this is difficult to achieve as South African nurses have varied competencies due to the differences in training, and as a result nurses complete their programmes with assorted levels of knowledge and skills.

The South African Nursing Council (SANC) no longer recognises neonatal nursing or neonatal intensive care nursing as a speciality and has added general and intensive care neonatal training to the advanced midwifery speciality (Maree, et al., 2020). This addition creates limited time spent on neonatal speciality training, and more focus is on the midwifery aspect of the specialisation. Even if speciality training of neonatal intensive care nursing was made more accessible, a shortage of professional nurses in the country remains, which adds to the burden of a shortage of specialised nurses.

In May 2014, SANC formulated a generic competency framework for advanced nurse practitioners. The document is divided into 5 domains, which speak to an advanced nurse specialist, and each domain is further divided into its individual core competency and then specific competency. The SANC generic framework for advanced nurse practitioners, as mentioned earlier, was used as SANC has not yet developed specific competencies for neonatal nursing or neonatal intensive care nursing.

A core competency refers to fundamental skills knowledge and attitudes that all nurses must possess to provide safe and effective care (Mrayyan, et al., 2023). This definition aligns with the definition provided for a neonatal intensive care competency for this study.

A specific competency in nursing can be defined as performing a certain skill set or procedure competently, which includes exhibiting the traits of critical thinking, successful communication techniques, competency in clinical skills, teamwork, ethical responsibility and ongoing learning (Sadeghi, et al., 2023).

The findings of the mapping review were presented in a summarised narrative and subjected to deductive logic to formulate competency statements.

The researcher aligned the themes and corresponding categories from the mapping review with SANC's Generic Competency Framework for Advanced Nurse Practitioners to develop neonatal intensive care competencies.

Themes and corresponding categories derived from the mapping review were identified as neonatal best practices to care for compromised neonates, as these themes were created from up-to-date evidenced based literature.

4.2.1 Grouping of themes derived from the mapping review to align with SANC's Generic Competency Framework for Advanced Nurse Practitioners to create neonatal nursing intensive care core competencies with correlating sub-competencies

The Domains that best aligned with the themes and categories from the mapping review were Domains 2 and 3. Domain 2 is entitled "Care Provision and Management", and Domain 3 is entitled "Personal Development and Quality of Care". The researcher, along with her supervisors, studied the core competency and specific competency linked to the identified domains.

There were 3 core and specific competencies identified under Domain 2 and 3 by the researcher and supervisors that encompassed the themes and corresponding categories derived from the mapping review, which were:

1. Domain 2

   Core Competency: Implementation

   Specific Competency: "Implements a range of advanced procedures, treatments and interventions in accordance with the developed care plan and best practice standards."

2. Domain 3

   Core Competency: Quality Improvement

   Specific Competency: "Uses appropriate assessment tools to identify actual and potential risks to safety and security, takes appropriate action and reports concerns where necessary to relevant authority."

3. Domain 2

   Core Competency: Therapeutic Communication and Relationships

Specific Competency: “Initiates, develops and continues therapeutic relationships using a range of advanced communication and interpersonal skills.”

4.2.1.1 Development of neonatal intensive care nursing competency 1 and 2 through alignment with the core competency under Domain 2 of the SANC Competency Framework for Advanced Nurse Practitioners

The first core competency identified from SANC’s competency framework was implementation and it’s linked specific competency was “Implements a range of advanced procedures, treatments and interventions in accordance with the developed care plan and best practice standards.” (The South African Nursing Council’s Generic Competency Framework for Advanced Nurse Practitioners, 2012).

Implementation is a principle that belongs to the nursing process; it entails the delivery of nursing care in a methodological, goal-orientated way (Yilak, et al., 2022).

The best suited theme derived from the mapping review that fitted under the core competency of implementation was: Clinical Management of Neonatal Conditions and Prevention of preventable neonatal conditions, as both management and prevention of neonatal conditions entails the implementation of an array of nursing actions governed by best practice nursing standards and guided by a well-constructed nursing care plan.

The researcher, together with her supervisors, re-formulated the specific competency to incorporate the themes and corresponding categories derived from the mapping review. The first and second competencies formulated are as follows:

Competency 1: Implements a range of advanced procedures, treatments and interventions in accordance with the developed care plan for the management of the following conditions:

- Neonatal Abstinence Syndrome
- Hyperbilirubinemia
- Respiratory Distress Syndrome
- Persistent Pulmonary Hypertension

- Necrotising Enterocolitis
- Gastroschisis
- Omphalocele
- Congenital Heart Defects
- Intraventricular Haemorrhage
- Hypothermia
- Hypoxia
- Infection
- Hypoglycaemia.

Competency 2: Implements a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the prevention of the following conditions:

- Intraventricular Haemorrhage
- Hypothermia
- Hypoxia
- Infection
- Hypoglycaemia.

4.2.1.2 Development of neonatal intensive care nursing competency 3 derived from the core competency Quality Improvement under Domain 3

The second core competency identified from the SANC competency framework was Quality Improvement and it's linked specific competency was "Uses appropriate assessment tools to identify actual and potential risks to safety and security, takes appropriate action to and reports concerns where necessary to relevant authority." (The South African Nursing Council's Generic Competency Framework for Advanced Nurse Practitioners, 2012).

Quality Improvement in nursing entails the identification of issues in caring for patients and using knowledge to address identified issues to care for patients effectively and safely (Janes & Delves-Yates, 2023).

The best suited theme from the mapping review that fitted under the core competency of Quality Improvement was: Best Neonatal Practices, as best neonatal practices are centred around evidence-based practices to ensure the safety and health promotion of neonates.

The researcher and supervisors again amalgamated the core competency of Quality Improvement from SANC's Advanced Nurse Practitioner Competency Framework and the theme Best Neonatal Practices, derived from the mapping review, to formulate the third neonatal nursing intensive care competency, which reads as follows:

Competency 3: Nurse uses appropriate assessment to identify actual and potential risks to safety and security, takes appropriate action to ensure the following:

- Maintenance of skin integrity
- Early initiation of breastmilk
- Safe and correct administration of medication
- Promotion of a neuroprotective environment by the implementation of quiet time
- Effective initiation of neonatal resuscitation
- Execution of safe administration of a blood transfusion
- Correct management of a neonate on phototherapy
- Promotion of skin-to-skin contact with primary caregiver
- Correct management of neonate- on supplemental oxygen
- Effective non-pharmacological pain management.

4.2.1.3 Development of neonatal intensive care nursing competency 4 derived from the core competency Therapeutic Communication and Relationships under Domain 2

The third core competency identified from SANC's competency framework was Therapeutic Communication and Relationships and it's linked specific competency was "Initiates, develops and discontinues therapeutic relationships using a range of advanced communication and interpersonal skills." (The South African Nursing Council's Generic Competency Framework for Advanced Nurse Practitioners, 2012).

Therapeutic Communication is an essential part of nursing that centres around the emotional well-being of patients and their families. Nurses use therapeutic communication to support patients and their families and when relaying information to them. Respect for privacy, use of open-ended questioning, active listening, silence and reflection are some of the techniques used when actioning therapeutic communication.

Relationships in nursing refers to nurse-family relationships. The fostering of good nurse-family relationships is a fundamental role of nurses and has also been shown to boost the emotional and physical well-being of families (Reis, et al., 2010).

Families in NICUs play a vital role in a neonate's admission and health outcomes, and therefore neonatal nurses must build therapeutic relationships with the families. This allows for integration of care between nurses and families.

The researcher and supervisors brought together the core competency of Therapeutic Communication and Relationships from the SANC Advanced Nurse Practitioner Competency Framework and the theme Promotion of Family-Centred Care, derived from the mapping review, to formulate the fourth neonatal nursing intensive care competency, which reads as follows:

Competency 4: Nurse Initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates:

- Effective communication with families of neonates
- Involvement of families in care of a neonate
- Support of families of a neonate
- Creation of a therapeutic environment for the family of a dying neonate
- Effective management of challenges or barriers to Family-Centred Care due to COVID-19

Table 4-1: Process of developing neonatal nursing intensive care competencies

Themes from the mapping review	**Corresponding Categories from the mapping review**	**Grouping of themes and corresponding categories derived from the mapping review to align with SANC's Generic Competency Framework for an Advanced Nurse Practitioner to create Neonatal Nursing Intensive Care Competencies**
Clinical Management of Neonatal Conditions	Common conditions in the neonatal intensive care unit: - Neonatal Abstinence Syndrome - Hyperbilirubinemia - Respiratory Distress Syndrome - Persistent Pulmonary Hypertension - Necrotising Enterocolitis - Gastroschisis - Omphalocele - Congenital Heart Defects - Intraventricular Haemorrhage - Hypothermia - Hypoxia - Infection - Hypoglycaemia	**Competency 1**: Implements a range of advanced procedures, treatments and interventions in accordance with the developed care plan for the management of the following conditions: - Neonatal Abstinence Syndrome - Hyperbilirubinemia - Respiratory Distress Syndrome - Persistent Pulmonary Hypertension - Necrotising Enterocolitis - Gastroschisis - Omphalocele - Congenital Heart Defects - Intraventricular Haemorrhage - Hypothermia - Hypoxia - Infection and Hypoglycaemia

Themes from the mapping review	Corresponding Categories from the mapping review	Grouping of themes and corresponding categories derived from the mapping review to align with SANC's Generic Competency Framework for an Advanced Nurse Practitioner to create Neonatal Nursing Intensive Care Competencies
Prevention of Neonatal Conditions	- Knowledge of preventable neonatal intensive care conditions - Warning signs of preventable neonatal intensive care conditions Preventable conditions: - Intraventricular Haemorrhage - Hypothermia - Hypoxia - Infection - Hypoglycaemia	**Competency 2**: Implements a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the prevention of the following conditions: - Intraventricular Haemorrhage - Hypothermia - Hypoxia - Infection - Hypoglycaemia
Best Neonatal Practices	Acute care and Continuous care Skills identified from the mapping review that require competency to ensure Best Neonatal Practices: - Maintenance of skin integrity - Early initiation of breastmilk - Safe and correct administration of medication - Promotion of a neuroprotective environment by the implementation of quiet time - Effective initiation of neonatal resuscitation	**Competency 3**: Nurse uses appropriate assessment to identify actual and potential risks to safety and security, and takes appropriate action: - Maintenance of skin integrity - Early initiation of breastmilk - Safe and correct administration of medication - Promotion of a neuroprotective environment by the implementation of quiet time - Effective initiation of neonatal resuscitation

Themes from the mapping review	Corresponding Categories from the mapping review	Grouping of themes and corresponding categories derived from the mapping review to align with SANC's Generic Competency Framework for an Advanced Nurse Practitioner to create Neonatal Nursing Intensive Care Competencies
	- Execution of safe administration of a blood transfusion - Correct management of a neonate on phototherapy - Promotion of skin-to-skin contact with primary caregiver - Correct management of neonate- on supplemental oxygen - Effective non-pharmacological pain management	- Execution of safe administration of a blood transfusion - Correct management of a neonate on phototherapy - Promotion of skin-to-skin contact with primary caregiver - Correct management of neonate- on supplemental oxygen - Effective non-pharmacological pain management
Promotion of Family-Centred Care	- Effective communication with families of neonates - Involvement of families in the care of a neonate - Support of families of a neonate - Creation of a therapeutic environment for the family of a dying neonate - Effective management of challenges to Family-Centred Care due to COVID-19	**Competency 4**: Nurse Initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates to ensure: - Effective communication with families of neonates - Involvement of families in care of a neonate - Support of families of a neonate - Creation of a therapeutic environment for the family of a dying neonate - Effective management of challenges or barriers to Family-Centred Care due to COVID-19

4.3 IDENTIFIED EXPERTS USED FOR THE RANKING EXERCISE

4.3.1 Selection and background of experts for the ranking exercise

The researcher chose experts in the field of neonatology, neonatal intensive care nursing and nursing education.

4.3.1.1 Participant A: Neonatologist

Participant A, a neonatal intensive care consultant has been working at a neonatal intensive care unit at an academic hospital in a senior position for six years. A medical consultant is a medical doctor who has gained experience and studied a specialised field who then plays a supervisory role in medical units and directs the junior doctors on decisions and care plans for patients.

A neonatologist must first study to become a paediatrician after qualifying as a medical doctor and then further their studies via a sub-speciality into neonatology. Neonatologists are trained to care and manage the intricacies that a sick neonate displays and be knowledgeable on specific conditions and treatments plans needed to manage a sick neonate (The Colleges of Medicine of South Africa, 2024).

4.3.1.2 Participant B: Neonatal Nurse Specialist and Nurse Educator

Participant number B has had twenty-two years clinical experience in neonatal intensive care units, and ten years' experience as a nurse educator. Within the 10 years of lecturing Participant B has lectured in undergraduate training and post-graduate training of nurses in Child Nursing Science at a public Nursing Education Institution.

Participant B holds the following academic qualifications: Bachelor of Nursing (Education, Administration and Neonatal Nursing); Post graduate diploma in Critical Care and Child Nursing Science.

4.3.1.3 Participant C: Neonatal Nurse Specialist and Nurse Educator

Participant C has had five years' clinical experience in a neonatal intensive care unit, and twenty-five years in academia where she trained undergraduate nurses, post graduate nurses in neonatology and supervised numerous masters and PhD students within the fields of neonatal nursing and paediatrics.

Participant C is a well-known author within the field of neonatal nursing and has published many articles in high-ranking Journals such as The Journal of Neonatal Nursing.

Participant C holds the following academic qualifications: Bachelor of Nursing Science; Postgraduate Diploma in Child Nursing; Postgraduate Diploma in Neonatal Nursing; Bachelor of Arts in Nursing Science; Postgraduate certificate in Higher Education; Master of Nursing Science and Doctor of Philosophy.

Participant C serves as a board member for a Neonatal Association.

4.3.1.4 Participant D: Neonatal Nurse Specialist and Nurse Educator

Participant D has twenty-eight years' clinical experience in neonatal intensive care, and eight years' experience as a nurse educator in a private Nursing Education Institution.

Participant D holds the following academic qualifications: General diploma in nursing and midwifery, Advanced Diploma in medical and surgical nursing, Diploma in nursing education, Master's in Nursing Science, Diploma in neonatal nursing, Diploma in paediatric intensive care nursing and is assessor and moderator trained.

4.3.1.5 Participant E: Experienced neonatal nurse

Participant E has twenty-eight years' clinical experience in neonatal intensive care, within both the private and public sector. Participant E is the most senior nurse in terms of years of experience within an NICU and has worked in and serves as a second in charge to the unit manager as well as holds an informal clinical facilitator position in the unit.

Participant E holds the following qualifications: General diploma in nursing and midwifery, Diploma in community health, Advanced Diploma in nursing education and nursing administration.

4.3.1.6 Participant F: Neonatal Nurse Educator

Participant F has had six years' clinical experience in adult medical wards, five years' experience as a nurse educator in a private Nursing Education Institution followed by ten years' experience in a managerial post as Head of Department at a Nursing Education Institution.

Participant F holds the following academic qualifications: Bachelor of Nursing Science (Education, Administration and Occupational Health); Master's in Nursing Science.

4.3.1.7 Participant G: Neonatal Nurse Educator

Participant G has had twelve years of clinical experience in adult medical, surgical and High Care units and paediatric general, medical and surgical units. Participant G has had twelve years' experience as a Nurse Educator at a private Nursing Education Institution where she is primarily involved in the training of undergraduate nurses.

Participant G holds the following qualifications: Diploma is Nursing; Bachelor of Nursing (Management and Education); Assessor and Moderator post graduate diploma and Master's in Nursing Science.

4.3.2 Sample of Participants for Ranking Exercise

Seven (N=7) participants took part in this phase of the study.

4.4 RANKING EXERCISE HELD WITH THE EXPERT GROUP

4.4.1 Description of a Ranking Exercise

The basic application of a ranking exercise is an approach used during data collection, whereby a group of knowledgeable participants are guided by a facilitator to produce responses using specific data set (Ager & Sparling, 2013). The researcher used the neonatal intensive competencies formulated as the data set for the individual experts to rank from most important to least important.

The data set provided to participants of the study required the participants to rank the individual data items from the data set from highest to lowest importance, each individual item was allocated a number according to it's ranking (Finch, 2022).

The researcher used the individual neonatal intensive care nursing competencies along with the corresponding neonatal conditions and skills linked to the competency as the individual data items to be ranked by the experts. Each item was given a number, a total score was produced by adding all the numbers of the individual item ranked individually by the participants. The higher the total score, the higher the individual item ranked among all the experts.

4.4.2 Co-ordination of the Ranking Exercise

The ranking exercise was done over three occasions to accommodate the experts' availability. Most experts attended the main session; however participants C and D were not able to make it due to work commitments. Participants C and D opted for one-on- one meetings at a time that best suited them; both participant C and D along with the other expert participants completed the ranking exercise individually.

A Microsoft Teams meeting was set up for participant C on 29/03/2023 at 19:00. An electronic document was sent to participant C containing the competencies for ranking; the document was completed correctly and sent back to the researcher. Participant C allocated a number to the individual core and sub-competencies, with the higher number indicating higher importance.

A face-to-face meeting was set up with Participant D on 12/02/2023 at 10:00 at a neutral setting in the North of Johannesburg, here the researcher was able to hand out the competencies for physical ranking.

Participants A, B, E, F, and G and met collectively face to face on the 01/03/2023. The researcher, similar to the interaction with Participant D, was able to physically hand out the competencies to rank.

Each expert participant, except for Participant C, was given four colour coded bags labelled with a neonatal intensive care competency, and within the bag were the corresponding neonatal conditions and skills linked to the neonatal intensive care competency. Each neonatal condition and skill related to a neonatal intensive care competency was individually printed on laminated flash cards.

Competencies were ranked by ordering the coloured competency bags.

A3 cardboard paper with the corresponding colour of the bag was given to the experts to lay out their condition/skill rankings from highest to lowest importance; the condition/skill at the top of the list was given the highest number.

4.4.3 Ranking Exercise

4.4.3.1 Colour coding of competencies

Each expert participant, except for Participant C, was given four colour coded bags labelled with the Neonatal competency and within the bag were corresponding

conditions/skills linked to the competency. Each condition/skill was individually printed on laminated flash cards. They were also given colour coded A3-sheets of paper for the condition/skill ranking exercise.

Bag 1 (Purple) neonatal intensive care competency 1: Implements a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the management of the following conditions:

Corresponding neonatal conditions placed in bag 1:

- Hypoxia
- Respiratory Distress Syndrome
- Hypoglycaemia
- Hypothermia
- Congenital Heart Defects
- Persistent Pulmonary Hypertension
- Necrotising Enterocolitis
- Infection
- Intraventricular Haemorrhage
- Omphalocele
- Gastroschisis
- Hyperbilirubinemia
- Neonatal Abstinence Syndrome.

Bag 2 (Blue) neonatal intensive care competency 2: Implements a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the prevention of the following conditions:

Corresponding neonatal conditions placed in bag 2:

- Hypoxia

- Hypoglycaemia

- Hypothermia

- Infection

- Intraventricular Haemorrhage.

Bag 3 (Red) neonatal intensive care competency 3: Nurse uses appropriate assessment to identify actual and potential risks to safety and security, and takes appropriate action:

Corresponding skills placed in bag 3:

- Effective initiation of neonatal resuscitation

- Safe and correct administration of medication

- Effective non-pharmacological pain management

- Promotion of a neuroprotective environment by the implementation of quiet time

- Execution of safe administration of a blood transfusion

- Early initiation of breastmilk

- Correct management of a neonate on phototherapy

- Promotion of skin-to-skin contact with primary caregiver

- Maintenance of skin integrity

- Correct management of neonate- on supplemental oxygen.

Bag 4 (green) neonatal intensive care competency 4: Nurse initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates:

Corresponding skills placed in bag 4:

- Effective communication with families of neonates

- Involvement of families in care of the neonate

- Support of families of the neonate

- Creation of a therapeutic environment for the family of the dying neonate

- Effective management of challenges or barriers to Family-Centred Care due to COVID-19.

4.4.3.2 Ranking of core competencies by experts

The researcher first asked all the experts to rank the neonatal intensive care competencies from most to least important by organising the coloured bags in order of importance from most to least. The researcher gave the highest score to the bag ranked most important. Four bags labelled with the core competency were handed out, therefore the highest score given to the most important bag was four.

The results were as follows from highest ranked to lowest ranked core competency:

1. A nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the prevention of neonatal conditions.
2. Nurses uses appropriate assessment to identify actual and potential risks to safety and security of neonates.
3. A nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the management of neonatal conditions.
4. Nurse initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates.

Table 4-2: Results of Ranking of neonatal intensive care competencies by experts

Participant	Purple Bag 1	Blue bag 2	Red bag 3	Green Bag 4
A	2	3	4	1
B	3	4	2	1
C	3	2	4	1
D	3	4	1	2
E	2	4	3	1
F	2	3	4	1
G	4	2	3	1
Total Scores	19	22	21	8

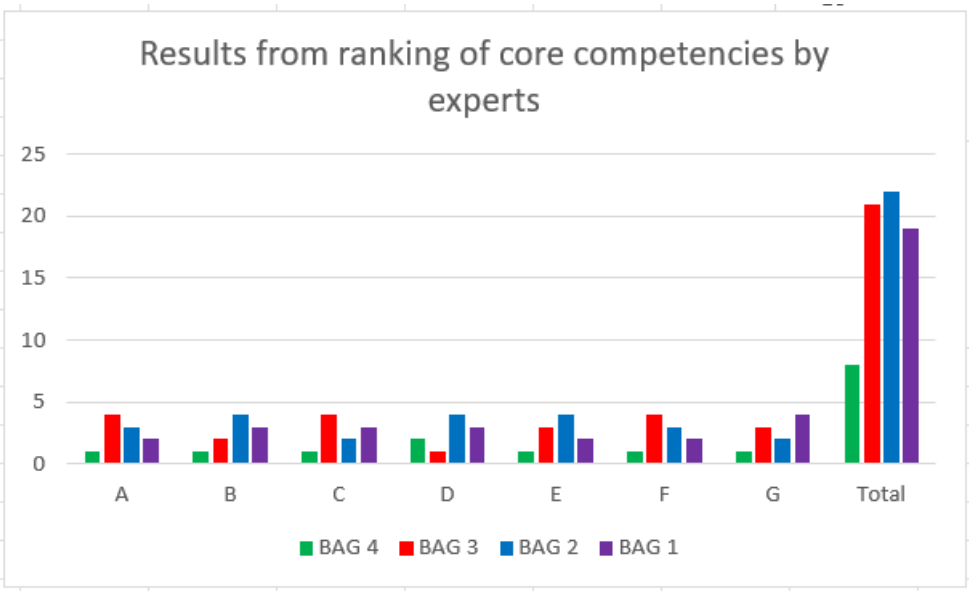


Figure 4-1: Results of Ranking of core competencies by experts

4.4.3.3 *Ranking of conditions/skills for neonatal intensive care competency by experts*

Following the ranking of the neonatal intensive care competencies, the researcher instructed the experts to rank the conditions/skills related to each competency from highest to lowest importance.

Each condition/skill was given a code to aid the migration of data onto an Excel spreadsheet, for example, condition P1 belongs to the purple bag and 1 is where it falls on the list of neonatal conditions (listed above); the number has no relevance to the ranking exercise.

4.4.3.3.1 Ranking of neonatal conditions for neonatal intensive care competency 1

There were 13 neonatal conditions under neonatal intensive care competency 1. The condition that was ranked as most important was allocated the number 13. The ranking of conditions that followed the most important followed the natural decline of numbers from 12-1.

The results were as follows from highest ranked to lowest ranked conditions/skills from neonatal intensive care competency 1:

1. Hypoxia
2. Hypothermia
3. Hypoglycaemia
4. Respiratory Distress Syndrome
5. Infection
6. Persistent Pulmonary Hypertension
7. Congenital Heart Defects
8. Intraventricular Haemorrhage
9. Necrotising Enterocolitis
10. Gastroschisis
11. Omphalocele
12. Neonatal Abstinence Syndrome
13. Hyperbilirubinemia.

Coding for competency 1 for migration to Excel:

Bag 1 (P-Purple) neonatal intensive care competency 1: Implements a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the management of the following conditions:

P1: Hypoxia

P2: Respiratory Distress Syndrome

P3: Hypoglycaemia

P4: Hypothermia

P5: Congenital Heart Defects

P6: Persistent Pulmonary Hypertension

P7: Necrotising Enterocolitis

P8: Infection

P9: Intraventricular Haemorrhage

P10: Omphalocele

P11: Gastroschisis

P12: Hyperbilirubinemia

P13: Neonatal Abstinence Syndrome.

Table 4-3: Results of Ranking of conditions from neonatal intensive care competency 1

	Participant Purple Bag							
Sub-category	A	B	C	D	E	F	G	Total
P1	13	7	11	13	13	13	12	82
P2	12	11	8	5	10	8	10	64
P3	11	5	12	11	11	12	11	73
P4	10	6	13	12	12	11	13	77
P5	9	3	7	9	4	6	5	43
P6	8	10	9	10	9	7	4	57
P7	7	8	4	2	7	4	6	38
P8	6	13	10	8	8	10	9	64
P9	5	12	5	3	1	9	7	42
P10	4	1	3	6	2	1	1	18
P11	3	4	6	1	6	2	2	24
P12	2	9	2	7	5	5	8	38
P13	1	2	1	4	3	3	3	17

4.4.3.3.2 Ranking of neonatal conditions for neonatal intensive care competency 2

There were 5 neonatal conditions under neonatal intensive care competency 2; the condition that was ranked as most important was allocated the number 5. The ranking of the conditions that followed the most important condition followed the natural decline of numbers from 4-1.

The results were as follows from highest ranked to lowest ranked neonatal condition from neonatal intensive care competency 2:

1. Hypoxia

2. Hypoglycaemia

3. Hypothermia

4. Infection

5. Intraventricular Haemorrhage.

Coding for competency 2 for migration to Excel:

Bag 2 (B-Blue) Core Competency 2: Implements a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the prevention of the following conditions:

B1: Hypoxia

B2: Hypoglycaemia

B3: Hypothermia

B4: Infection

B5: Intraventricular Haemorrhage.

Table 4-4: Results of Ranking of sub-competencies from core competency 2

	Participants Blue Bag							
Sub-category	A	B	C	D	E	F	G	Total
B1	5	3	2	5	5	5	4	29
B2	4	1	4	3	3	3	3	21
B3	3	2	5	1	4	4	5	24
B4	2	5	3	4	1	1	1	17
B5	1	4	1	2	2	2	2	14

4.4.3.3.3 Ranking of skills for neonatal intensive care competency 3

There were 10 skills related to neonatal intensive care competency 3; the skill that was ranked as most important was allocated the number 10. The ranking of skills that followed the most important skill followed the natural decline of numbers from 9-1.

The results were as follows from highest ranked to lowest ranked conditions/skills from Core Competency 3:

1. Effective initiation of neonatal resuscitation

2. Correct management of a neonate on supplemental oxygen

3. Safe and correct administration of neonatal resuscitation

4. Early initiation of breastmilk

5. Promotion of skin-to-skin contact with primary care giver

6. Execution of safe administration of blood transfusion

7. Maintenance of skin integrity

8. Effective non-pharmacological pain management

9. Promotion of a neuroprotective environment by the implementation of quiet time and Correct management of a neonate on phototherapy.

Coding for competency 3 for migration to excel:

Bag 3 (Red) Core Competency 3: Nurse uses appropriate assessment to identify actual and potential risks to safety and security, takes appropriate action to ensure:

R1: Effective initiation of neonatal resuscitation

R2: Safe and correct administration of medication

R3: Effective non-pharmacological pain management

R4: Promotion of a neuroprotective environment by the implementation of quiet time

R5: Execution of safe administration of a blood transfusion

R6: Early initiation of breastmilk

R7: Correct management of a neonate on phototherapy

R8: Promotion of skin-to-skin contact with primary caregiver

R9: Maintenance of skin integrity

R10: Correct management of neonate- on supplemental oxygen.

Table 4-5: Results of Ranking of sub-competencies from core competency 3

	Participants Red Bag							
Sub-category	A	B	C	D	E	F	G	Total
R1	9	1	10	9	10	10	10	59
R2	8	6	3	10	9	8	6	50
R3	1	7	4	7	2	6	3	30
R4	3	9	6	4	1	1	1	25
R5	7	2	1	6	8	7	2	33
R6	5	10	7	5	3	4	8	42
R7	2	4	2	2	5	5	5	25
R8	4	8	8	3	4	3	4	34
R9	6	3	5	1	7	2	7	31
R10	10	5	9	8	6	9	9	56

4.4.3.3.4 Ranking of skills for neonatal intensive care competency 4

There were 5 skills related to neonatal intensive care competency 4; the skill that was ranked as most important was allocated the number 5. The ranking of skills that followed the most important skill followed the natural decline of numbers from 4-1.

The results were as follows from highest ranked to lowest ranked conditions/skills) from Core Competency 4:

1. Involvement of families in the care of the neonate

2. Effective communication with the families of neonates

3. Support of families of the neonate

4. Creation of a therapeutic environment for the family of the dying neonate

5. Effective management of challenges or barriers to Family-Centred Care due to COVID-19.

Coding for competency 4 for migration to Excel:

Bag 4 (G-green) Core Competency 4: Nurse Initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates:

G1: Effective communication with families of neonates

G2: Involvement of families in care of the neonate

G3: Support of families of the neonate

G4: Creation of a therapeutic environment for the family of the dying neonate

G5: Effective management of challenges or barriers to Family-Centred Care due to COVID-19.

Table 4-6: Results of Ranking of sub-competencies from core competency 4

	Participants							
Sub Category	A	B	C	D	E	F	G	Total
G1	5	5	4	4	4	4	4	30
G2	4	4	5	5	5	3	5	31
G3	2	3	3	3	3	5	3	22
G4	3	2	1	1	1	2	2	12
G5	1	1	2	2	2	1	1	10

4.4.4 Summary of results from the ranking exercise

This summary focuses on the highest-ranking neonatal intensive care competency and highest-ranking neonatal conditions/skills within their respective competencies, as the purpose of the ranking exercise was to distinguish between what competencies and related conditions/skills the experts deemed important, and in that way the researcher could get a sense of what the focus should be when developing the outline for a neonatal intensive care short course.

The neonatal intensive care competency ranked the highest by the expert group was Competency 2 **"**Implements a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the prevention of conditions."

Hippocrates, the pioneer of medicine, famous for writing the Hippocratic Oath, once said that it is vital to foresee a possible disease approaching to succeed in going to war with it and is often too late after a diagnosis. Hippocrates emphasised this with a bold statement that insinuates only a great physician can nip the bud on an approaching or possible disease (Stratakis & Rivkees, 2020).

Literature on prevention of neonatal conditions (as referenced in Chapter 3:) stresses the dire consequences that may occur should warning signs of a possible condition be missed, further exacerbating neonatal morbidity and mortality rates. The literature concerning neonatal morbidity and mortality rates states that most often neonatal conditions contributing to high neonatal and mortality rates are preventable when detected early.

The results from the expert ranking exercise concerning competency 2 supports the popular phrase among health care professionals “prevention is better than cure”.

The condition Hypoxia ranked highest for competencies 1 and 2. Neonatal hypoxia in simple terms is the insufficient uptake of oxygen by cell tissues in the body. This is particularly a concern for neonates as it can lead to a condition known as Neonatal hypoxic-ischaemic encephalopathy (HIE) that can cause irreversible conditions such as cerebral palsy, epilepsy and severe cognitive disability and in serious cases death (Tetorou, et al., 2021). The experts ranked the condition of Hypoxia highly twice, for both management and prevention of this condition. This double consensus illustrates that hypoxia among neonates is a serious condition as viewed by the experts.

The skill Neonatal resuscitation ranked highest among the experts under competency 3. Neonatal resuscitation involves prompt action to attend to a critically ill neonate and must be carried out using the Neonatal Resuscitation Algorithm (Karlsson, et al., 2023). Successful neonatal resuscitation requires teamwork, co-ordination, headed by a team leader, and open communication. Failure to abide by the Neonatal Resuscitation algorithm due to poor teamwork or incompetence in neonatal resuscitation can lead to poor neonatal outcomes (Yamada, et al., 2015). The high ranking of this skill among the experts shows an agreement with current literature of the necessity that nurses working in NICUs must be competent in the skill of Neonatal Resuscitation.

The skill “Involvement of family in care of the neonate” ranked highest among the experts under competency 4. Literature presented in Chapter 3: supported the involvement of families in the care of their neonates; in Family-Centred Care terms it is known as Family Integrated care. Limited involvement of family in the care on a neonate admitted into an NICU is associated with negative neurodevelopmental and

behavioural outcomes, making family members important in the stress regulation and development of their neonates (Waddington, et al., 2021).

The high ranking of this family-centred care skill among the experts shows an agreement with current literature of the importance of Family integrated care in a Neonatal Intensive Care Unit.

4.5 CONCLUSION

This chapter discussed the development of neonatal intensive care nursing competencies using the mapping review and SANC's Generic Competency Framework for Advanced Nurse Practitioners. The chapter concluded with a discussion of the ranking exercise, using the developed competencies, with the chosen experts.

The next chapter, Chapter 5: discusses the development of a survey, using the formulated neonatal intensive care nursing competencies, targeted toward professional nurses working in four academic hospitals. The chapter concludes with the discussion of the responses from the participants who completed the survey.

Chapter 5: ANALYSIS PHASE OF THE ADDIE MODEL: CONTEXT OF TRAINING SITES AND DEVELOPMENT OF A SURVEY FOR PROFESSIONAL NURSES WORKING IN NICUs

5.1 INTRODUCTION

The previous chapter presented the development of neonatal nursing intensive care competencies, the ranking of neonatal intensive care competencies and their related conditions/skills by experts. This chapter describes the Neonatal Intensive Care Units where surveys were distributed and the staff qualifications of the participants in the survey. It also describes the development of the survey tool. The chapter concludes by discussing the statistical analysis of the findings from the survey.

5.2 SELECTION AND DESCRIPTION OF DATA COLLECTION SITES

The researcher chose four Neonatal Intensive Care Units, each situated in an Academic Hospital within Johannesburg. Academic Hospitals are referral hospitals due to the speciality of care they render. Speciality care for neonates at academic hospitals takes place in neonatal intensive care units with medical teams specialising in caring for critically ill neonates. The researcher chose the Neonatal Intensive Care Units at the selected hospitals as these units provide care for a range of neonatal admissions into their NICU units.

5.2.1 Description of Neonatal Intensive Care Unit in Hospital A

Neonatal Intensive Care Unit within hospital A belongs to the largest of the academic hospitals chosen for the study. The academic hospital's location in within the South of Johannesburg and its NICU receives referrals from within and outside the province due to the highly specialised care that is rendered there.

The Neonatal Intensive Care Unit in hospital A is divided into 4 sections:

1. Section A is a 44-bed ward which admits ventilated neonates over 24 hours old.

2. Section B is a 28-bed ward which admits ventilated babies from birth to 24 hours old.

3. The Transitional Section admits non-ventilated neonates who are on either room air, Continuous Positive Airway pressure or nasal prongs. It serves as a step-down facility for Section A and Section B.

4. The Surgical Intensive Care and Isolation Sections admit neonates requiring surgery and contains isolation cubicles for neonates who have cultured Candida Aureus.

In total The Neonatal Intensive Care Unit in hospital A is an 86-bed unit, where the nurse-to-patient ratio varies from 1:2 to 1:3 in Section A, Section B and the Surgical Intensive Care Unit/Isolation Sections. The transitional section has a much lower nurse to patient ratio ranging from 1:4 to 1:8.

Due to the Neonatal Intensive Care Unit in hospital A being a large unit, there are three (3) unit managers supervising the different sections and a total of 61 professional nurses working in the unit including the unit managers. Of the total of 61 professional nurses working in Unit A, there are a total of 9 professional nurses with a speciality. The breakdown of specialities is as follows:

- Child Nursing Science Speciality (N=1)
- Adult Intensive Care Specialty (N=7)
- Advanced midwifery and Neonatal Nursing Science speciality (N=1).

The remainder of the staff have the following undergraduate qualifications:

- 4-year Bachelor of Nursing Degree (N=1)
- 4-year Nursing Diploma (N=19)
- 1 year Bridging course without midwifery (N=32)

According to the unit managers' statistics the youngest professional nurse is 26 years old, and the oldest professional nurse is 64 years old. The average age of all the professional nurses in the Neonatal Intensive Care Unit in hospital A being a large unit A is 40 years old.

The Neonatal Intensive Care Unit within hospital A stands out as one of the largest and most comprehensive units in Johannesburg, offering a wide range of specialised

care that draws referrals from both within the province and across South Africa. Its structure is impressive, with a total capacity of 86 beds, divided into four distinct sections, each catering to specific patient needs based on their condition, age, and ventilatory support requirements.

The size and complexity of the Neonatal Intensive Care Unit within hospital A poses several operational challenges. For one, maintaining consistent care quality across such a large unit, with varied nurse-to-patient ratios and differing levels of staff specialisation, could be difficult. The reliance on adult intensive care specialists may indicate a need for more focused training on neonatal-specific issues to fully cater to this highly vulnerable population. The significant age gap among staff could either be an advantage in terms of experience sharing or, conversely, could reflect generational differences in the approach to care and training.

Additionally, the heavy workload implied by the large bed capacity, especially in the critical care sections, could lead to burnout if not managed carefully. This highlights the importance of effective management by the three unit managers and underscores the need for adequate staff support, both in terms of numbers and in professional growth opportunities.

5.2.2 Description of Neonatal Intensive Care Unit Hospital B

The Neonatal Intensive Care Unit within hospital B belongs to another one of the largest academic hospitals chosen for the study. Hospital B's location in within the North of Johannesburg and its NICU receives referrals from within and outside the province due to its highly specialised care.

Neonatal Intensive Care Unit within hospital B is divided into 2 sections:

1. Section 1 is the main ward and has 11 beds.

2. Section 2 is an extension of Section 1 and is a 4-bedded ward.

Both sections admit both neonates and paediatric patients up to the age of 12, and, in total, is a 15-bedded unit. Neonatal Intensive Care Unit within hospital B has a nurse patient ratio of 1:1 for an acutely critically ill neonate and for a paediatric patient. A nurse patient of 1:2 is adhered to for critically ill neonates deemed stable; the nurse-to-patient ration does not exceed 1:3.

Neonatal Intensive Care Unit within hospital B has one unit manager who supervises both sections 1 and 2 and has a total of 50 professional nurses working in the unit, including the unit manager. Of the total of 50 professional nurses working in Unit Neonatal Intensive Care Unit within hospital B, there are a total of 17 professional nurses with a speciality. The breakdown of specialities is as follows:

- Child Nursing Science Speciality (N=9)
- Adult intensive care speciality (N=8)
- Neonatal Nursing Specialist (N=1).

The remainder of the staff have the following undergraduate qualifications:

- 4-year Bachelor of Nursing Degree (N=2)
- 4-year Nursing Diploma (N=20)
- 1 year Bridging course without midwifery (N=11).

According to the unit manager's statistics, the youngest professional nurse is 23 years old and the oldest professional nurse is 62 years old. The average age of all the professional nurses in Unit B is between 40-45 years old.

The Neonatal Intensive Care Department within hospital B serves a broad range of patients, including both neonates and paediatric patients up to the age of 12. This dual focus on neonatal and paediatric care distinguishes the NICU within hospital B from the other Neonatal Intensive Care Units, as it requires specialised knowledge in handling both critically ill newborns and older children, which adds complexity to the unit's operations.

The unit's strength lies in its strict nurse-to-patient ratios and a significant number of nurses specialised in paediatric care. However, the lack of neonatal-specific expertise among the staff presents a potential gap, and addressing this with additional neonatal training could enhance the unit's ability to meet the needs of critically ill newborns. Additionally, balancing the care of neonates and paediatric patients up to 12 years of age adds to the complexity, making it essential for staff to maintain a broad set of skills and expertise across age groups.

5.2.3 Description of Neonatal Intensive Care Unit Hospital C

The Neonatal Intensive Care Unit within Hospital C belongs to the second largest paediatric hospital chosen for this study but is the smallest NICU compared to the other three NICU Units. The hospital's location is in the west part of Johannesburg.

The Neonatal Intensive Care within hospital C comprises one section and is a 10 bedded unit that admits neonates from within the hospital's labour unit and outlying step-down facilities.

The nurse-to-patient ration is 1:1 and depending on the acuity of the patient can go up to 1:2.

The NICU within hospital C has 27 professional nurses, including the unit manager. Of the total of 27 professional nurses working in The Neonatal Intensive Care Unit within Hospital C, there is only one professional nurse with a speciality (N=1) and that is the unit Manager who has a speciality in Child Nursing Science. The breakdown of professional nurses and their qualifications are as follows:

- 4-year Nursing Diploma (N=15)
- 1 year Bridging course without midwifery (N=11)

According to the unit manager's statistics the youngest staff member is 27 years old and the oldest is 55 years old. The average age of professional nurses working in the NICU within hospital C is between 34-40 years old.

The unit is the smallest unit of the selected study sites and the staff to patient ratio is well maintained. The challenge for this unit lies in the lack of staff specialisation as compared to the other study sites.

5.2.4 Description of Neonatal Intensive Care Unit Hospital D

The Neonatal Intensive Care Unit within Hospital D belongs to one of the largest paediatric hospitals chosen for the study. The hospital's location is within the North of Johannesburg and receives referrals from within and outside the province and neighbouring countries due to its highly specialised care.

The Neonatal Intensive Care Unit within hospital D is divided into 2 sections:

1. Section 1 is a 10 bedded ward.

2. Section 2 is an extension of Section 1 and is a 6-bedded unit.

Both sections admit neonates and, in total, is a 16 bedded unit. The Neonatal Intensive Care Unit within Hospital D has a nurse patient ratio of 1:1 for an acutely critically ill neonate. A nurse patient of 1:2 is adhered to for high care neonates deemed stable, not on a ventilator.

The unit has 29 professional nurses including the unit manager, who supervises both section 1 and 2. Of the total of 29 professional nurses working in Unit, there are a total of 5 professional nurses with a speciality. The breakdown of specialities is as follows:

- Child Nursing Science Speciality (N=5).

The remainder of the staff have the following undergraduate qualifications:

- 4-year Bachelor of Nursing Degree (N=5)
- 4-year Nursing Diploma (N=9)
- 1 year Bridging course without midwifery (N=10).

According to the unit manager's statistics the youngest professional nurse is 25 years old and the oldest professional nurse is 63 years old. The average age of all the professional nurses in Unit D is between 30-40 years old.

The unit is a highly specialised unit as it is within the largest paediatric hospital and admissions into the unit are for complicated patients that seek its specialised care. It is for this reason that there is a need to upskill staff in the unit as currently, out of 29 professional nurses, there are only five nurses with specialities.

5.3 PROFESSIONAL NURSE QUALIFICATIONS

Table 5-1: Depiction of professional nurse qualifications in the four identified NICUs

		Basic Qualification			Specialist Qualification			
Hospital	**No. of PNs**	**Degree**	**Diploma**	**Bridging**	**Child Nursing**	**Adult ICU**	**Neonatal 6 month course**	**Advanced Midwifery**
A	61	1	19	32	1	7	0	0
B	50	2	20	11	9	8	1	0
C	27	0	15	11	1	0	0	0

		Basic Qualification			Specialist Qualification			
Hospital	**No. of PNs**	**Degree**	**Diploma**	**Bridging**	**Child Nursing**	**Adult ICU**	**Neonatal 6 month course**	**Advanced Midwifery**
D	29	5	9	10	5	0	0	0
Total no.	**167**	**8**	**63**	**64**	**16**	**15**	**1**	**0**
Total %		**5%**	**38%**	**38%**	**9.6%**	**9%**	**1%**	**0%**

The table provides a breakdown of nursing qualifications across four hospitals (A, B,C and D), showing both basic and specialist qualifications. There are one-hundred and sixty (N=167) nurses in total across all hospitals. According to the statistics illustrating the basic qualifications, 5% of nurses (8 nurses) have a degree in Nursing, 38% of nurses (63 nurses) hold a diploma in Nursing and 38% of nurses (64 nurses) have completed a bridging program.

Prior to the move of nursing education to higher education, there were three avenues towards becoming a professional nurse. Both the degree in nursing and diploma in nursing were 4-year courses, however, if the degree route was taken, the graduate would leave on an NQF 8 as opposed to a diploma graduate who would leave on a NQF level 6. The variation in NQF level affected post graduate trajectory, only the degree nurse qualified to embark on a master's and then a Doctorate in Philosophy degree. The diploma nurse could further studies by specialising in a field of nursing by undertaking a post-graduate diploma, this was also available to degree nurses but would not bump up the NQF level for either student. Both qualifications included registration as a midwife at SANC, as within these two avenues undergraduate midwifery training was done, which entailed a small portion of basic neonatal care.

With SANC's attempts to increase the number of professional nurses in South Africa, the enrolled nurse, also known as a staff nurse, had the opportunity to become a professional nurse through a two-year bridging program. It is important to note that this avenue of training did not include midwifery, translating to current nurses with a bridging degree having no previous training on basic neonatal care, let alone neonatal intensive nursing care.

Specialist Qualifications are as follows, 9.6% of nurses (16 nurses) are specialised in child nursing; 9% of nurses (15 nurses) have adult ICU specialisation; 1 nurse (1%)

has completed a neonatal 6-month course, and no nurse holds an advanced midwifery qualification.

This table reflects a relatively high percentage of nurses with a diploma in nursing and Bridging qualifications, but fewer with specialist qualifications. As mentioned earlier, if a professional nurse obtained a basic qualification that included midwifery, the nurse could specialise in a field that she/he chose. Only child nursing specialists, advanced midwifery nursing specialists and those who did a 6-month short course on neonatal nursing would have done advanced neonatal nursing training. The low representation of such specialities in the identified NICUs reflects that there is only a small fraction of nurses who have had formal training in advanced neonatal care.

With the transition of nursing education into higher education, the bridging course has been terminated and the four-year diploma nursing course has now become a three-year course with no midwifery training. This paints a dire picture on the number of professional nurses, let alone nurses, who qualify for speciality training South Africa.

5.4 DEVELOPMENT OF A SURVEY

Dillman (2007) and Barry et al. (2011) emphasises that experts who are knowledgeable in the content of a survey should review the initial items to determine the items' clarity and the relevance to the objects being measured. The researcher compiled the survey under the guidance of her supervisors.

The developed neonatal nursing intensive care competencies were used as the basis for the survey. The survey was divided into three parts:

Part 1: Management and Prevention of common Neonatal Conditions

Part 2: Best practices in Neonatal Care

Part 3: Promotion of family-centred care.

All three parts were tabulated as follows:

Column 1: Was titled Competency and contained the formulated neonatal intensive care competency accompanied by the conditions/skills required to accomplish the competency.

Column 2: Consisted of a Likert scale where professional nurses were asked to rate the conditions/skills required to accomplish the competency on a scale of importance from 3-0. 3 indicating very important, 2 indicating Important, 1 indicating slightly important and 0 indicating not important.

Column 3: Provided space for requested reasons of why each condition/skill (sub-competency) was given a particular rating; the professional nurses were only to provide reasons if they rated the condition/skill (sub-competency) either 2 or 3. The following reasons were formulated by the researcher and supervisors:

- A. Need to use it frequently.
- B. Lack of confidence relating to this competency.
- C. My colleagues have limited knowledge of the competency.
- D. It will make a positive impact towards the care of the neonate.

5.4.1 Use of a Likert Scale for the developed survey

Scale development is an important tool in research and an asset for collecting and analysing data (Barry, et al., 2011). A Likert scale was chosen for the developed survey.

A Likert scale is a set of items presented to participants to illustrate their level of agreement on a particular topic. Participants are required to exhibit their agreement from strongly disagree to agree for a particular statement on a scale from 0-3. The information provided reveals the participants disposition on the particular topic, which in turn creates analysable data (Joshi, et al., 2015).

The professional nurses who participated in this phase of the study were asked to rate competency specific conditions and skills on a scale of importance from 3-0. 3 indicated very important, 2 indicated important, 1 indicated slightly important and 0 not important. The professional nurses were then asked to select from the provided reasons why they deemed a particular condition or skill as 3 or 2; reasons were not required for 1 and 0. The provided reasons were given alphabetically and the participants were asked to give a reason from A-D. Reason A was “need to use it frequently”, reason B was “lack of confidence relating to this competency”, reason C was my “colleagues have limited knowledge of the competency” and reason D was “it will make a positive impact towards the care of the neonate”.

5.5 DISTRIBUTION AND COLLECTION OF SURVEYS

5.5.1 Distribution and collection of surveys

The researcher organised a meeting with the unit managers of all four study sites, to explain the study and formulate a data collection plan that would best suit the professional nurses in the selected units. Each unit has four shifts in total and the researcher targeted all four shifts per unit, therefore each unit had four distribution dates.

Prior to the distribution dates, the unit managers agreed to meet with the staff members in their units to inform them that the researcher would be entering their units and handing out the information sheets.

The researcher initially tried to use a survey box for the collection of surveys, however, staff in all units preferred the researcher to collect the completed surveys after their shifts were over as they were busy and would forget to complete the survey.

The distribution and collection of surveys details for all selected units were as per Table 5-2 below:

Table 5-2: Distribution and collection of surveys details for all selected units

Name of Hospital	Meeting with unit manager	Date and time of distribution of surveys	Date and time of collection of surveys
Hospital A	3/4/2023	5/04/2023 at 19:30pm 6/04/2023 at 19:30pm 10/04/2023 at 19:30pm 12/04/2023 at 07:00pm	6/04/2023 at 06:30 7/04/2023 at 06:30 11/04/2024 at 06:30 12/04/2024 at 18:45
Hospital D	22/2/2023	17/04/2023 at 07:00 18/04/2023 at 19:00 24/04/2023 at 07:00 25/04/2023 at 19:00	18/04/2024 at 19:00 19/04/2023 at 06:30 25/04/2023 at 19:00 26/04/2023 at 06:00
Hospital C	23/2/2023	31/05/2023 at 07:00 8/06/2023 at 19:30	1/06/2023 at 19:00 9/06/2023 at 06:30

Name of Hospital	Meeting with unit manager	Date and time of distribution of surveys	Date and time of collection of surveys
		9/06/2023 at 07:00 10/06/2023 at 19:30	9/06/2023 at 19:00 11/06/2023 at 06:30
Hospital B	23/3/2023	14/06/2023 at 07:00 15/06/2023 at 07:00 20/06/2023 at 07:00 21/06/2023 at 07:00	14/06/2023 at 19:00 16/06/2023 at 19:00 20/06/2023 at 19:00 21/06/2023 at 19:00

5.6 SURVEY RESULTS

5.6.1 Response rate of surveys

A total of one hundred and sixty (N=160) surveys were distributed to all study sites. Of the one hundred and sixty (N=160) surveys distributed a total of one hundred and fourteen completed (N=114) surveys were handed back to the researcher. There was a total population of one hundred and sixty (N=160) professional nurses at the study sites at the time of data collection. A response rate of 71.25% was achieved. This was calculated by dividing the number of completed surveys by the total number of surveys distributed to the chosen sample (Fincham, 2008).

5.6.2 Varied response rates per item on the survey

The survey had a total of thirty-three items to be ranked. If ranked either 2 (important) or 3 (very important) the participants were asked to provide a reason why those items were deemed important or very important. There was a discrepancy between the number of the response rates per item, due to some participants not answering on a specific item. Based on the advice of the external statistician, the researcher chose not to exclude surveys with minimal missing data.

5.6.3 Screening and cleaning of data

Prior to data analysis it is important for a researcher to clean up the data set to avoid errors that may impact statistical results (Pallant, 2020). The researcher utilised an external service provider to assist with capturing the data onto an Excel spreadsheet.

Each survey was given an alphabetic letter indicating the hospital from which it came and a number that reflected at the top of each page of the survey. The labelled surveys were then scanned to the service provider for data capturing. Once the Excel spreadsheet was completed, the researcher thoroughly checked the data captured before consulting with an external statistician. One hundred and fourteen surveys (N=114) were analysed using descriptive statistics.

5.7 STATISTICAL ANALYSIS

Ali and Bhaskar (2016) describe statistical analysis as giving meaning to numbers, by looking for trends, patterns, and relationships amongst the set of quantitative data. The researcher utilised the services of an external statistician to assist with statistical presentation of the quantitative data derived from the data captured on the Excel spreadsheet and interpretation of the data in line with the research objectives. The software program used for statistical analysis was Statistical Package for the Social Sciences (SPSS). This software program is a popular choice amongst statisticians and researchers as it is user friendly and is programmed to handle large data sets with multiple variables (Rahman & Muktadir, 2021).

Statistics commonly can be divided into descriptive statistics and inferential statistics. Descriptive statistics are used to give a general summary of participant responses by means of frequencies, means and standard deviations, while inferential statistics use specific statistical tests to calculate the statistical significance of the data collected (Kaliyadan & Kulkarni, 2019).

5.7.1 Descriptive statistics

5.7.1.1 Frequencies of data

The frequency of data refers to the number of times a data value occurs. This section focuses on how many participants per hospital answered each of the thirty-three items asked, and the percentage of participants that deemed the item important or very important. The statistician amalgamated the 2 responses into a statistical value.

Table 5.1 Frequencies of rating of sub-competencies

Item deemed important or very important	Hospital	Number of responses per hospital	Percentage
The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the development care plan for the management for the following neonatal conditions:			
Neonatal Abstinence Syndrome	C D B A	17 16 23 30	81.0% 80.0% 74.2% 85.7%
Total Response and average		86	80.4%
Hyperbilirubinemia	C D B A	20 21 31 35	95.2% 91.3% 96.9% 92.1%
Total Response and average %		107	93.9%
Respiratory Distress Syndrome	C D B A	20 23 32 38	95.2% 100% 100% 100%
Total Response and average %		113	99.1%
Persistent Pulmonary Hypertension	C D B A	20 23 31 38	95.2% 100% 96.9% 100%
Total Response and average %		112	98.2%

Item deemed important or very important	Hospital	Number of responses per hospital	Percentage
Necrotising Enterocolitis	C	21	100%
	D	23	100%
	B	31	96.9%
	A	38	100%
Total Response and average %		113	99.1%
Gastroschisis	C	18	90.0%
	D	23	100%
	B	32	100%
	A	37	94.4%
Total Response and average %		110	97.3%
Omphalocele	C	15	75.0%
	D	22	95.7%
	B	31	100%
	A	35	92.1%
Total Response and average %		103	92%
Congenital Heart Defects	C	21	100%
	D	23	100%
	B	32	100%
	A	37	97.4%
Total Response and average %		113	99.1%
Intraventricular Haemorrhage	C	21	100%
	D	22	95.7%
	B	31	100%
	A	37	97.4%
Total Response and average %		111	98.2%

Item deemed important or very important	Hospital	Number of responses per hospital	Percentage
Hypothermia	C	19	90.5%
	D	21	87.5%
	B	29	93.5%
	A	35	92.1%
Total Response and average %		104	91.2%
Hypoxia	C	21	100%
	D	20	87%
	B	31	100%
	A	38	100%
Total Response and average %		110	97.3%
Infection	C	20	95.2%
	D	23	95.8%
	B	31	100.0%
	A	38	100%
Total Response and average %		112	98.2%
Hypoglycaemia	C	21	100%
	D	22	95.7%
	B	30	96.8%
	A	38	100%
Total Response and average %		111	98.2%
The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the development care plan for the prevention for the following neonatal conditions:			
Item deemed important or very important	**Hospital**	**Number of responses per hospital**	**Percentage**

Intraventricular Haemorrhage	C D	19 24	90.5% 100%

	B A	29 35	100% 100%
Total Response and average %		107	98.2%
Hypothermia	C D B A	18 21 29 32	90% 87.5% 100% 91.4%
Total Response and average %		100	92.6%
Hypoxia	C D B A	20 22 29 33	100% 91.7% 100% 94.3%
Total Response and average %		104	96.3%
Infection	C D B A	19 23 29 35	95% 95.8% 100% 100%
Total Response and average %		106	98.1%
Hypoglycaemia	C D B A	20 21 28 34	100% 87.5% 96.6% 97.1%
Total Response and average %		103	95.4%

Item deemed important or very important	Hospital	Number of responses per hospital	Percentage
Nurse uses appropriate assessment to identify actual and potential risks to safety and security of neonates by the following actions:			
Maintenance of skin integrity	C D B A	20 22 31 35	95.2% 95.7% 100% 94.6%
Total Response and average %		108	94.6%
Early initiation of breastmilk	C D B A	20 21 30 36	95.2% 91.3% 95.8% 97.3%
Total Response and average %		107	95.5%
Safe and correct administration of medication	C D B A	21 23 31 37	100% 100% 100% 100%
Total Response and average %		112	100%
Promotion of a neuroprotective environment by the implementation of quiet time	C D B A	20 22 31 35	95.2% 100% 100% 94.6%
Total Response and average %		108	97.3%
Effective initiation of neonatal resuscitation	C D B	21 23 31	100% 100% 100%

Item deemed important or very important	Hospital	Number of responses per hospital	Percentage
	A	37	100%
Total Response and average %		112	100%
Execution of safe administration of a blood transfusion	C D B A	20 22 31 37	95.2% 100% 100% 100%
Total Response and average %		110	99.1%
Correct management of a neonate on phototherapy	C D B A	19 21 31 37	90.5% 95.5% 100% 100%
Total Response and average %		108	97.3%
Promotion of skin-to-skin contact with primary care giver	C D B A	10 19 27 31	47.6% 90.5% 87.1% 83.8%
Total Response and average %		87	79.1%
Correct management of a neonate on supplemental oxygen	C D B A	21 22 31 37	100% 100% 100% 100%
Total Response and average %		111	100%
Effective non-pharmacological pain management	C D B	17 22 30	81% 100% 96.8%

Item deemed important or very important	Hospital	Number of responses per hospital	Percentage
	A	34	91.9%
Total Response and average %		103	92.8%
Nurse initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates by:			
Effective communication with families of neonates	C D B A	21 21 29 35	100% 95.5% 100% 100%
Total Response and average %		106	99.1%
Involvement of families in the care of the neonate	C D B A	19 22 23 35	90.5% 100% 79.3% 100%
Total Response and average %		99	92.5%
Support of families of the neonate	C D B A	21 22 28 31	100% 100% 96.6% 88.6%
Total Response and average %		102	95.3%
Effective management of challenges or barriers to Family-Centred Care due to COVID-19	C D B A	18 12 21 23	85.7% 66.7% 72.4% 69.7%

Item deemed important or very important	Hospital	Number of responses per hospital	Percentage
Total Response and average %		74	73.3%
Creation of a therapeutic environment for the family of the dying neonate	C D B A	21 22 29 31	100% 100% 100% 88.6%
Total Response and average %		103	96.3%

5.7.1.2 Discussion on Frequencies of data from the Likert scale

5.7.1.2.1 The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the development care plan for the management for the following neonatal conditions

The neonatal conditions that ranked the highest for all four hospitals under this main competency were: Respiratory Distress Syndrome (N=99.1%), Necrotising Enterocolitis (N=99.1%) and Congenital Heart Defects (N=99.1%).

Respiratory distress syndrome is a condition that affects premature neonates as their lungs are immature and cannot adapt to extra-uterine life due to the immaturity of the lungs. This condition requires NICU admission if serious and is a major contribution to neonatal morbidity and mortality (Al-Momani, 2020). Necrotising Enterocolitis is a condition affecting 5-7% of premature infants. It is characterised by inflammation, infection, and perforation of the lining of the stomach in severe cases. In severe cases, where perforation of the stomach lining has occurred, surgical intervention is required (Alganabi, et al., 2019). Congenital Heart Defects are the most common congenital disorders diagnosed among 0.8%-1.2% of livebirths worldwide (Wu, et al., 2020).

There is a correlation between the survey results and literature concerning common neonatal conditions that warrant NICU admission in that they both agree that

respiratory distress syndrome, necrotising enterocolitis and congenital heart defects are common conditions among neonates.

The neonatal condition that ranked the lowest for all four hospitals was management of Neonatal Abstinence Syndrome (N=80.4%). Neonatal Abstinence Syndrome is a condition that affects neonates who have been exposed to toxic substances, such as opioid drugs, in utero; it is an emerging health problem in countries such as the United States, which are facing opioid pandemics (Wine, et al., 2023). Once born, a neonate exposed to drugs, such as opioids, in utero goes through withdrawal symptoms such as seizures, excessive crying, poor feeding, and problems with breathing, which warrants an NICU admission.

South Africa's opioid use is not at the same level as countries such as the United States, but is on the rise, particularly the use of the drug nyaope, which is a recreational drug used among many South Africans in impoverished areas (Harker, et al., 2020).

NICUs in the public sector may not admit many babies currently with Neonatal Abstinence syndrome, but this is likely to change as the use of nyaope in the country increases.

Abuse among women in South Africa of over the counter and prescription drugs, such as opioids, benzodiazepines and stimulants is increasing (Harker, et al., 2022). This adds to the risk of babies born with Neonatal Abstinence Syndrome.

The results of each condition under the main competency of management of identified common neonatal conditions were very similarly ranked and the calculated average score for all conditions ranked under this competency was N= 95.6%. This high percentage shows a consensus among all four hospitals that management of identified common neonatal conditions is an important/very important competency for a nurse working in NICU to have.

5.7.1.2.2 The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the development care plan for the prevention for the following neonatal conditions

The conditions that ranked the highest for all four hospitals under this main competency were: Prevention of Intraventricular Haemorrhage (N=98.2%) and prevention of Infection (N=98.1%).

Intraventricular haemorrhage, in simple terms, is bleeding in the brain that ultimately causes brain injury and poor neurodevelopmental outcomes, particularly for a preterm neonate. Preterm neonates, especially those born before 25 weeks, are at high risk for IVH as their blood vessels are immature and prone to rupture (Tsao, 2023).

A neonate who is admitted into an NICU, irrespective of gestational age, is at high risk of acquiring a hospital acquired infection as their immune systems are still immature and developing (Johnson, et al., 2021).

The condition that ranked the lowest for all four hospitals was prevention of Hypothermia (N=92.6%). Hypothermia is defined as continuing drop in neonates body temperature below 36.5˚C leading to detrimental effects from metabolic stress to death (Nebiyu, et al., 2021).

The results of each condition under the main competency of prevention of identified common neonatal conditions were very similarly ranked and the calculated average score for all sub-competencies ranked under this competency was N= 96.2%. This high percentage shows a consensus among all four hospitals that prevention of identified common neonatal conditions is an important/very important competency for a nurse working in NICU to have.

5.7.1.2.3 Nurse uses appropriate assessment to identify actual and potential risks to safety and security of neonates, takes appropriate action

The skill that ranked the highest for all four hospitals under this main competency were: safe and correct administration of medication (N=100%), effective initiation of neonatal resuscitation (100%) and correct management of a neonate on supplemental oxygen (N=100%).

Safe and correct administration of medication is imperative in an NICU setting, due to vulnerability of the population it caters for. Medication dosages must be correctly and carefully administered to avoid toxicity as a slight overdose of medication can cause harm to the neonate as they are weight challenged (Clifton-Koeppel, et al., 2021).

The goal of neonatal resuscitation is to re-establish spontaneous breathing and satisfactory cardiac output of a neonate. It entails a series of actions to meet its goal, such as effective CPR technique, fluid, and emergency drug administration. Correct administration of neonatal resuscitation is vital to ensure the survival of neonates in an NICU (Utomo, et al., 2023).

In an NICU setting the most common form of supplemental oxygen is mechanical ventilation. This mode is invasive to a neonate, as it requires intubation, and prolonged stay on mechanical ventilation can cause harm in the form of damage to lung tissue and infection. The primary goal is to limit a neonate's time on mechanical ventilation. However, to optimise this nurses working in an NICU need to be competent in the nursing management of a neonate on mechanical ventilation. This management entails a culmination of nursing care such as oxygen saturation targeting, setting of alarm limits for vital signs to ensure a stable hemodynamic status, clearing of the airway, ideal positioning, adherence to infection control policies within the NICU setting, ensuring adequate nutritional status and skin-to-skin care with the primary care-giver (Rocha, et al., 2018).

The skill that ranked the lowest for all four hospitals under this main competency was: promotion of skin-to-skin contact with primary care giver (N=79.1%). Skin-to skin care, otherwise known as kangaroo care, is one of the core principles in family-centred care in an NICU as it is linked to weight gain, increased production of breastmilk and infant-parent bonding (Bedetti, et al., 2023). Current literature supports the use of skin-to-skin contact in an NICU, however, it has yet to be practiced extensively in NICUs in South Africa. Reluctance towards adopting this practice can be attributed to lack of NICU kangaroo care policies in South Africa.

The highest ranking and lowest ranking skills under this competency depend on each other for optimum neonatal care to decrease hospital stay in an NICU.

The results of each ranked skill under the main competency concerning appropriate actions the nurse must take to ensure safety of a neonate were very similarly ranked and the calculated average score for all skills ranked under this competency was N= 95.6%. This high percentage shows a consensus among all four hospitals that all skills identified to secure the safety of neonates are important/very important competencies for a nurse working in NICU to have.

5.7.1.2.4 Nurse initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates

The skill related to Family-Centred Care (FCC) that ranked the highest for all four hospitals under this main competency was: effective communication with families of neonates (N=99.1%).

Effective communication with families of neonates admitted into NICU by various healthcare professionals responsible for their care is pivotal to ensure parents' satisfaction of care and contributes to reduced stress levels of parents (Wreesmann, et al., 2021). The reflection of the high percentage for this skill among the professional nurses in all four hospitals reflects an understanding that the principle of Family-Centred Care is important to implement in an NICU.

The FCC skill that ranked the lowest for all four hospitals was effective management of challenges or barriers to Family-Centred Care due to COVID-19 (N=73.3%). The mapping review was conducted in 2022 post Covid-19; however, the researcher came across various articles on management of families during the pandemic in all four pre-selected journals and therefore included it as an FCC skill under the competency related to Family-Centred Care. The lower percentage could be attributed to the time the survey was distributed which was in 2023 where there were no longer restrictions for families visiting their neonates in NIC units.

The results of each FCC skill under the main competency concerning family-centred care were very similarly ranked and the calculated average score for all sub-competencies ranked under this competency was N= 91.3%. This high percentage shows a consensus among all four hospitals that implementation of family-centred care in an NICU was identified as an important/very important competency for a nurse working in NICU to have.

5.7.1.3 Discussion on Frequencies of data from the reasons provided of why competency related conditions/skills were deemed important/very important

The second part of the survey requested the participants to give reasons as to why they deemed certain conditions/skills as important/very important from a list of reasons provided.

A-Need to use it frequently

B-Lack confidence relating to this competency

C-My colleagues have limited knowledge of the competency

D-It will make a positive impact towards the care of a neonate in ICU.

The researcher analysed the frequency of reasons given per hospital and the total frequency of reasons given for all four hospitals. A pattern was observed between the frequencies of reasons given for all four hospitals, in that each condition/skill requiring a reason followed the following ranking in terms of frequencies.

Reason most given for each condition/skill rated 2 and 3 was D, the second reason most given for each condition/skill rated 2 and 3 was A. The researcher found variation between reasons B and C for each condition/skill rated 2 and 3, however, the frequency was substantially lower compared to the frequencies of reasons A and D.

Reasons B and C both eluded to lack of knowledge of conditions/skills of either the participant answering the survey or their colleague. Nurses reporting on incompetencies proves challenging in that it is looked at as exposing one's weakness or fear of negative consequences rather than an opportunity for improvement, a culture that needs to be corrected by managers (Zolkefli, 2021). The researcher did explain to the participants that the survey was completely anonymous.

The high frequency of reasons A and D alludes to the fact that the participants who answered the surveys agreed that the competency related conditions/skills ranked need to be used frequently in an NICU and furthermore that possessing the competencies and sub-competencies would make a positive impact towards the care of a neonate in an Intensive Care Unit.

5.7.1.4 Discussion on Frequencies of data using mean and standard deviation values

The mean is the average of provided values and is calculated by adding all provided values and dividing it by the total number of provided values. Standard deviation is calculated to determine the variation of data around the mean. Statistically, standard deviation is an important variable to calculate as it provides an indication of variation between participant responses (Lee, et al., 2015).

The statistician used the numbering of the Likert scale to create a numerical range to calculate the mean and standard deviation of participant responses per condition/skill to be ranked.

0- Not Important (0.00-0.75)

1- Slightly Important (0.76-1.50)

2- Important (1.51-2.25)

3- Very Important (2.25-3.00)

Inspection of the standard deviations shows some variation or some differences with certain hospitals, however, despite some variation amongst hospitals, in general there was consensus across all four hospitals that the conditions/skills under their respective competencies were deemed important/very important.

5.7.2 Inferential Statistics

5.7.2.1 Comparison of ranking of sub competencies per hospital

A Chi-squared test of independence was performed to statistically investigate if the distributions differed per condition/skill to be ranked between 0-3, throughout all four hospitals.

0- not important

1- slightly important

2-important

3- very important.

A Chi-squared test of independence is a hypothesis test that is used to determine where there is a relationship between the frequency of distributions (Pallant,2016).

The main value that is calculated is called Pearson Chi-Square value or p-value. If the p-value is less than 0.05 this shows a statistically significant difference between participant responses/ratings, and one must reject the null hypothesis that the frequency distributions between hospitals are the same. If the p-value is more than 0.05 one must accept the null hypothesis that frequency distributions between hospitals are the same.

Out of the thirty-three (N=33) items that were ranked thirty (N=30), p-values were higher than 0.05 therefore the data shows that the evidence tends to support the null hypothesis. The researcher has sufficient confidence in the null hypothesis to conclude that the distributions as much as they differ slightly are not large enough to say they are statistically significant from one another.

The following conditions/skills had a p-value less than 0.05:

- Management of Gastroschisis p= less than 0.0.1
- Prevention of IVH p=0.01
- Skin-to-skin contact with primary caregiver p=less than 0.01.

When looking at the data set for the conditions/skills mentioned above there is a variation in ranking between important and very important, whereas the remaining 30 conditions/skills have less variation between the two rankings with more participants rating the conditions/skills very important for those sub competencies. The p-value less than 0.05 for Management of Gastroschisis, Prevention of IVH and Skin-to-skin contact with primary caregiver shows that there was more of a variation of responses for these three sub-competencies.

This could be attributed to units not deeming gastroschisis very important and rather important as they may not admit many neonates with this condition. As mentioned in Chapter 3:, skin-to-skin contact with a primary caregiver is not practised in public NICUs, therefore the concept of skin-to-skin in an NICU may be foreign to the nurses. Finally, according to Gross et al. (2021) prevention of IVH may not be known as a preventable condition to staff working in an NICU.

5.7.3 Reliability

Reliability in quantitative research refers to consistency of what is to be measured. In the field of statistics, it is difficult to give an exact calculation of reliability, however, an estimate can be calculated through different methods (Heale & Twycross, 2015). A Cronbach Alpha is a popularly used test to ascertain internal consistency of an instrument. The Cronbach Alpha result is a number between 0 and 1 and an acceptable reliability score is one that is higher than 0.7.

The statistician conducted a Cronbach Alpha calculation to test the homogeneity among the conditions/skills per competency to be ranked. The Cronbach Alpha score based on the conditions/skills to be ranked was calculated as 0.790; this illustrates that internal consistency was achieved and that conditions/skills to be ranked showed a homogenous relationship.

5.8 SUMMARY OF RESULTS

Upon analysis of all the identified NICUs in terms of structure and staff profiles, the standout challenge is the lack of specialised nurses working in these units. As mentioned earlier, the International Council for Nurses recognises neonatal nursing as a speciality, as professional nurses working in these units must care for complex clinical cases for a vulnerable population group.

Prior to data collection the researcher engaged with the professional nurses in all four units and the desire to enhance training was verbalised by a significant number of professional nurses. The desire to embark on speciality training that would be recognised by SANC came out strongly, as this not only comes with enhancement of training but has a remuneration factor involved.

Currently, the majority of staff in the four identified units do not qualify to enter speciality training, however, this should not be a determining factor to enhance staff training. NICUs demand specialised care, and it is imperative that professional nurse working in these units are equipped with the skills, knowledge and attitudes to care for compromised infants.

Results from the survey indicate that professional nurses in the four identified NICUs regarded the management and prevention of specific neonatal conditions as either

very important or important. Similarly, the skills required by professional nurses in neonatal best practices and Family-Centred Care were also rated as very important or important. The primary reason provided by the nurses for the significance of these practices was their positive impact on the quality of care provided to neonates in an NICU.

Staff agreement on the significance of the knowledge and skills required to achieve a neonatal intensive care competency can aid the process of a specific training needs analysis with the intention of structuring educational programs that are tailor-made to enhance staff training within NICUs (Mirlashari, et al., 2016).

5.9 CONCLUSION

This chapter provided a detailed description of NICUs across the four hospitals studied, an analysis of staff qualifications, and the development process of the survey distributed to professional nurses working in these NICUs. Additionally, it outlined how the survey was administered and provided a comprehensive overview of the descriptive and inferential statistical results obtained from the survey. Chapter 6: begins the description of the design phase of the ADDIE model commencing with the Focus Group Discussion and individual interviews.

Chapter 6: DESIGN PHASE OF THE ADDIE MODEL: FOCUS GROUP DISCUSSION AND INDIVIDUAL INTERVIEWS

6.1 INTRODUCTION

The previous chapter presented a detailed description of NICUs across the four hospitals studied, an analysis of staff qualifications, the development of a survey for professional nurses working in four NICUs in Gauteng and the results of the survey. This chapter discusses the Focus Group Discussion/Individual Interviews with experts; this forms part of the design phase of the ADDIE Model. The design phase consists of identifying the structures and processes involved when designing an educational programme, planning assessments and determining instructional strategies.

6.2 FOCUS GROUP DISCUSSION AND INDIVIDUAL INTERVIEWS HELD WITH THE EXPERTS

Five experts participated in a Focus Group Discussion after they completed the individual ranking exercise, and two individual interviews were conducted with two experts. The purpose of the discussion and interviews was to explore expert views on the structure and processes of the desired course. Themes and sub-themes that emanated from the discussion and interviews were incorporated into the development of the outline of the neonatal intensive care short course.

6.2.1 Collective findings and discussion from all interviews held with experts

The researcher used Braun and Clarke's (2006) thematic analysis technique to formulate themes from the data emanating from the two individual expert interviews and the Focus Group Discussion with five of the experts. Each expert was allocated a letter of the alphabet for the researcher to decipher individuals' contributions during the interviews and FDGs.

Each session was initiated with the following central question: "What factors should be considered in developing and offering an on-line/blended learning course?" Probing questions followed and were determined by the participants' responses.

Table 6-1: themes and sub-themes arising from the interviews with the experts

Main themes	Sub-theme
1.Course design	1. Course components 2. Learning considerations
2. Course structure	3. Mode of learning 4. Administration of the course

6.2.1.1 Theme 1: Course Design

Course design entails selection of topics, review of teaching strategies and being cognisant of the type of learner the course is designed for and accommodation of a learner's individual capacity to learn (Alkathiri, 2021).

The experts offered suggestions, when considering the course design for a Neonatal Nursing Intensive Care short course for singly qualified nurses, in terms of course components and learning needs. Expert contributions were significant as it established the context for the course outline.

Literature shows that course design has an impact on student evaluation of the course and facilitator performance. Quality course design brings in positive results of student evaluation and enhances facilitator performance (Levinsson, et al., 2024).

The researcher took the suggestions from the experts regarding course design and incorporated implemented the suggestions when designing the course outline.

6.2.1.1.1 Sub-theme 1 Course components

In the sub-theme "course components" experts suggested possible topics to add to the course over and above content that was covered in the ranking exercise. The experts also added suggestions regarding strategies for assessments to include in the course and stressed the importance of clinical accompaniment during commencement of the course.

The following suggestion areas were highlighted under the sub-theme Course components:

- Topics to include in the course

- Suggested assessments and structure
- Clinical Accompaniment.

6.2.1.1.1.1 Topics to include in the course: Unique characteristics of a neonate

It is important to note that a neonate's physiology is unique - different to that of a child or adult. The constant physiological evolution of a neonate to assist with its adaptation to extra-uterine life is a factor that contributes to the uniqueness of a neonate (Elshazzly, et al., 2023). Preterm neonates are unique in that their organs are underdeveloped when born, making them vulnerable to associated complications. Experts believe that neonatal intensive care nurses need to be aware of the unique characteristics of a neonate to better understand their distinct physiology.

"The basics on what makes a newborn different from a child or an adult needs to taught." (Participant C)

"Especially to differentiate between the preterm infant and the normal newborn infant and know that they're not just small adults, what's the difference?" (Participant C)

"Nurses without a speciality in a particular field of practice may not possess this specialised knowledge and may find it difficult to distinguish between that of a neonate and an adult which indirectly affects the level of care provided to the neonate." (Participant B)

6.2.1.1.1.2 Topics to include in the course: Adaptation of a neonate to extra-uterine life

The neonatal period is known for its considerable physiological changes, the transition from intrauterine life to extra-uterine life is crucial to survival of a neonate, with the successful adaptation of respiratory and cardiovascular systems being the determinants of neonatal survival (Doherty, et al., 2023).

One expert expressed concern regarding their experience of neonatal intensive care nurses' knowledge on a neonate's adaptation to extra-uterine life, and how this knowledge deficit translates into their practice.

"And I am of the opinion that they (the nurses) simply do not understand what happens from intrauterine to extra-uterine life. They don't have that proper knowledge of what

happens before birth… And then they don't really understand. But what are the adaptations that the baby is going through and not only immediately after birth, but also that first month and so if there's a problem with nutrition, they (nurses) don't understand why this is a problem." (Participant C)

The organs of neonates have to undergo a rapid transition to adapt to their new outside environment. Some neonates, particularly premature neonates, may need support to assist with this adaptation and successful transition of this process requires precise knowledge and management of the intrauterine extra-uterine exchange (Morton & Brodsky, 2016).

Knowledge of the adaptation of a neonate to extra-uterine life is key for nurses working in an NICU to understand as it guides their care and management of a neonate in an NICU.

6.2.1.1.1.3 Topics to include in the course: Anatomy and Physiology of a neonate

What makes a neonate unique is its anatomy and physiology, and neonatal nurses need to have a sound understanding of these two components to render optimum care. Participant C and D suggested introducing singly qualified nurses to basic anatomy and physiology and then narrow it down to the neonate.

" I think it is very, very important to give them (nurses) a straight course on anatomy and physiology beforehand. And it would have to be at the level of about standard nine and ten, and maybe just a little bit above that, because many of them (nurses) have been in schools where they were able to choose subjects such as life orientation, and basic arithmetic, or something. In fact, if they had chosen basic arithmetic, it would have been great. Life orientation and commerce, instead of doing biology and science. So, when you are trying to tell them about the aorta, I ask them, "Show me where your aorta is". They don't know." (Participant D)

"Adding Anatomy and Normal Physiology followed by what is the adaptation that the neonate has to go through. So, if they've (the nurses) got that background and understand it they can reason out for themselves what should be done." (Participant C)

Singly qualified nurses, who are working in NICU have not received midwifery training, would not have basic knowledge of the anatomy and physiology of a neonate, as this

is covered in midwifery teaching. Optimum care of a neonate requires a nurse to have sound knowledge of anatomy and physiology of a neonate. This calls for the gap in knowledge to be attended to for positive neonatal health outcomes.

6.2.1.1.1.4 Suggested assessments and structure

In nursing education, assessments are conducted to determine if a nursing student has gained the knowledge and skills needed to care for a patient and to determine a nurse's safety and competency when rendering care. Assessments in nursing range from theoretical assessments, which are knowledge based, to clinical assessments where competency of a skill/skills are assessed (Aase, et al., 2022). Assessments are critical in nursing education as they are indicators of a nurse's safety and fitness to practice.

Participant F suggested that assessments to be included in the course must be able to assess critical thinking and clinical judgement.

"Because how are we assessing critical thinking skills? And that needs to be included in your assessment, how are we assessing communication abilities?" (Participant F)

Critical thinking in nursing is a skill that requires a nurse to sieve through known knowledge and make a judgement based on the knowledge identified for a particular situation. Clinical Judgment in nursing is the ability to use critical thinking to make decisions regarding the care of a patient (Christodoulakis, et al., 2023).

A suggestion relating to the pass mark of theoretical assessments and layout of a clinical exam was given by Participant D.

"Well, we must do theory assessments, because we must know that they have studied what you taught them. And there must be a pass mark and 30% is not it, because remember that if there is a 50% pass mark, it's the 50% that they don't know that is dangerous for the patient. And if they only know 50% now, next year they'll know 40, and the following year 30." (Participant D)

"To assess a complete patient, from beginning. I tell them always, "Tell me your story. Your patient's story", to try and get them to tell me right from when the mother thought she would be pregnant. That's what I want to know in the patient's story, right up to, what happened at birth? How did you get from labour ward to here, and what's

happened? How did we get to today? And then they (the nurse) need to tell us the patient's problems, and then they (the nurse) need to tell us, what do we want to achieve with this patient and how are we going to achieve it? And then they (the nurse) tells you all about their nursing care. So, that is how I've done it." (Participant D)

Educational practices in nursing must ensure that, at the end of educational training, students must be knowledgeable and competent in caring for patients. Student assessments aid an educator to get a sense of where a student is at regarding competency and integration of knowledge. With the absence of assessments, one may not know if knowledge and skill has been achieved.

6.2.1.1.1.5 Clinical Accompaniment

The South African Nursing Council (SANC) defines clinical accompaniment as "structured or unstructured and planned or unplanned process by a lecturer, clinical facilitator or preceptor who accompanies the student to facilitate directed assistance and support at the clinical facility, to ensure the achievement of the programme outcomes" (SANC,2021).

Clinical accompaniment serves as an educational strategy to narrow the theory-practice gap and increase student satisfaction as students feel more supported when in the presence of their clinical supervisors in clinical settings (Kgafele, et al., 2015).

Clinical accompaniment of postgraduate nursing students can additionally instil a motivation to learn, ensure safe practices and enhance students understanding of their learning experiences (Yiend, et al., 2016).

The experts echoed similar sentiments in the following statements:

"I find that the students who do best are well accompanied clinically, and that clinical supervisors correlates with the theory presentations. And those are the students that do best, because I find that the students who just learn what you teach them online then just get left by the wayside when it comes to clinical work if they are not well supported clinically." (Participant D)

"And the other thing, just to say, to emphasise what you have said because now you will be teaching them or facilitating them online, what about in the clinical? I think this course must also have provision for clinical facilitators." (Participant B)

The experts suggested that there should be congruency between the facilitator teaching the theory and the clinical facilitator teaching in the same course.

"And part of that I think is crucial for whoever is doing the theory, and the person who is in the practice that they are talking the same language…And very often you find that there's a problem with the language that the one who's got the theory is speaking in a different language than that of the one in practice." (Participant C)

The experts emphasised that there should be careful selection of clinical facilitators for the course as this would ensure that neonatal intensive care nurses practice evidenced based practices.

"You teach them certain procedures like, for instance, suctioning. And with a neonate you should never ever instil saline into the ET tube. Yet the old nurses will always say, "Well, this is how we've always done it". They will then take the newly taught person that you're doing your best within class, and they will say, "Okay, when you suction, just put in some saline and you'll get more secretions out". You cannot put saline into the ET tube, because you will cause atelectasis of the alveoli." (Participant D)

Lack of clinical accompaniment is a large contributor to a theory-practice gap in nursing practice, as there is a discrepancy between what is taught and what is practiced on the clinical platform. The implementation of evidenced based practice has been stressed by the experts, and the importance of quality clinical support.

6.2.1.1.2 Sub-theme 2: Learning Considerations

The experts under the theme "learning considerations" focused on two aspects, the first being negative clinical observations of nurses in an NICU and the second being barriers to learning.

6.2.1.1.2.1 Learning considerations: Observations in an NICU

Nurses are governed by a scope of practice outlining their responsibilities. The scope of practice is tailored according to the seniority of a nurse, stipulating what actions can and can't be done. The more senior the nurse the more expanded the scope of practice. Over and above the scope of practice, nurses must abide by the code of ethics when caring for patients, and in cases of nursing negligence the ethical principle of beneficence comes to light, which is a principle that simply means do no harm. Non-

compliance to the scope of practice and code of ethics is punishable by law (Jacoby & Scruth, 2017).

The South African Nursing Act no.33 of 2005 states that one of the main functions of a professional nurse is to ensure the safe implementation of nursing care. Experts during the interviews voiced their concerns regarding observations of nurses in an NICU, as according to their observations in a clinical setting the practice of patient safety is not being adhered to and one must be aware of current negative practices to address them when facilitating a course.

"It (Neonatal resuscitation skills) is really lacking, the resuscitation skills are not great, I don't think, the baby will survive if the doctor doesn't jump in on time, like simple things like holding the mask and making sure there is no leak. You will just be having air leaking, but they do attempt to initiate resuscitation, but I think the resuscitation skills are lacking." (Participant A)

"There are a lot of people that are just here to earn the money, the passion of nursing is completely gone. They (nurse) can hear the alarm, but they are tired or they are just chatting to their friends. And I have worked a lot with trained people and so it is not like they don't know, but they disappear, they've got social problems, they (nurse) are out of the ward all of the time, they don't have that passion that we have." (Participant E)

"Something like maybe the incubator is malfunctioning or it is overheating and they open the window and they go about with their business, giving medication and then you come back the baby is [Inaudible] so the fact that you cannot open the windows and go, if you need to cool the baby down, maybe give it like fifteen minutes, you cannot go for thirty minutes, you will come back and find the child cold. So I think maybe there is a lack of understanding hypothermia can kill. We have had a few who have died from an incubator overheating then they open the incubator, go around, come back and the child is cold, pulmonary haemorrhaging, that's it." (Participant B)

"I think there is also a lack of compassion." (Participant F)

The negative clinical observations highlighted by the experts is a concern that must be addressed, and the root cause of such observations needs to be investigated. From the statements provided by the experts the common factor is possibly lack of insight

during the care of neonates in terms of knowledge needed to care for such a vulnerable population. If nurses are aware of the consequences of certain actions, this awareness could mitigate negative clinical observations.

6.2.1.1.2.2 Learning Considerations: Contextual barriers to learning

The neonatal intensive care course is intended for singly qualified nurses with no speciality. The potential students are adult learners who will study on the course part-time. Due to potential students being part-time students, the course aims to take a blended approach to aid flexibility of learning.

Work commitments, family responsibilities and access to learning material or centres pose as deterrents to successful adult learning (Baharudin, et al., 2013).

The experts highlighted possible educational challenges that these potential students may encounter when undertaking the course, with the intention of making the researcher aware of possible obstacles to learning.

"And if it is going to be a blended method it needs to involve absolutely students' age, time, as well as their resources because we have seen you know they are employed, they are working, they come on the programme but they are not able to actually pursue or they discontinue or they terminate. The throughputs remain low because they do not complete the programme because they are having to not be able to do it whether they needed a laptop, whether they needed data, so those human sides of the student's environment need to be considered as a priority for this online-blended method." (Participant F)

"They (nurses) are fatigued." (Participant G)

"Language barrier is very big" (Participant D)

There is a dire shortage of nurses in South Africa, which leads to large patient to staff ratios. Nurses in South Africa, particularly in the public sector, have to work under the constraints of low resourced environments, which leads to high staff turnover and burnout (van Wyk & Naicker, 2023). Despite this, SANC is now making Continuous Professional Development (CPD) compulsory to aid in the professional development of staff.

The shortage of staff makes access to funded face-to face full time or part-time study difficult, as staff would have to be away from the unit to attend class. Educators need to investigate alternative methods to facilitate CPD despite the constraints. Educators must also note that English is not the main language for the majority of the nursing workforce in South Africa; this factor must be taken into consideration when designing educational courses.

6.2.1.2 Theme 2: Course Structure

During the interviews and Focus Group Discussions the experts were asked about the course structure in terms of didactic administrative factors involved in structuring of the course.

6.2.1.2.1 Sub-theme 3: Mode of learning

The mode of learning refers to the ways in which education is delivered. Use of technology in education is growing at a rapid pace; current students need to be able to incorporate the use of technology and online resources to aid their learning. Blended learning allows for learner flexibility in cases where attendance to physical classes is not possible (Saiz-Manzanares, et al., 2020).

The experts supported the use of blended learning as a mode to deliver the course.

"And if you're going hybrid, you can actually have quite a large context who's going to slot in and who's going to be involved." (Participant C)

"So you will be requiring them to be doing this course whilst they are in full-time employment, so online-blended learning definitely is the way to go because they can study in their own time and you can sort of give specific guidance on how you will be able to tell them, you are going to use four hours a week to go through this week's module and what not. And they can access it in their own time and do it as opposed to you saying come on a Tuesday and on a Tuesday the unit is crazy and they cannot even get out of the unit…So, maybe I am jumping in saying you need to factor in the time and when they can access it and when they can do it and make sure that you accommodate them as much as possible to do especially the theoretical part online in their own time in a very user-friendly programme that will enable them to engage fully." (Participant G)

"So then you can consider the hybrid model as being theory online and the practical in another format." (Participant C)

The COVID-19 pandemic catapulted the implementation of online learning globally as students could not attend face-to face learning due to the restrictions that came with the pandemic. Nursing Education Institutions in South Africa prior to the pandemic relied on more face-to-face interactions than online learning. Lesson learnt from online learning was the allowance of flexibility of learning (Namulondo, et al., 2023). Namulondo et al. (2023) explain that the rapid movement of face-to-face learning to online learning did bring about many challenges as it required resources in terms of digital equipment, data usage or Wi-Fi access and staff who were competent in navigating online platforms.

Post the COVID-19 pandemic, a hybrid approach was implemented in most Nursing Education Institutions in South Africa in the form of blended learning, which is a combination of face-to face learning and online teaching. Ndayisenga et al. (2021) support the use of blended learning in nursing education and see this mode of learning as being capable of stimulating higher cognitive skills, delivering deeper learning and as beneficial in acknowledging application in a clinical setting.

The statements provided by the experts support the use of blended learning in the development of a neonatal intensive care short course to accommodate nurses who can't afford the opportunity to miss work and to allow flexibility of learning. The researcher must bear in mind that not all nurses are technologically competent as not all nurses have been exposed to online or blended learning. It is the responsibility of a course designer to ensure that a course is user-friendly to facilitate learning.

6.2.1.2.2 Sub-theme 4: Administration of the course

The experts offered suggestions regarding the administration of the course in terms of student selection, recognition of the course, course duration, course credits and costing.

6.2.1.2.2.1 Student selection

Participant C suggested the course be open to all medical disciplines not only nurses working in Neonatal Intensive Care Units.

“And so to include or open it for young doctors who's just coming into practice and are expected to work in in neonatal units.” (Participant C)

Participant B suggested professional nurses having a minimum working time in a neonatal intensive care unit before being able to take the course as a selection criterion.

“Having work that six months in neonatal ICU, having worked that, six months fullest; that’s the other thing that we must also consider.” (Participant B)

Expert statements above show the need for educational training on neonatal intensive care among all disciplines not only to nurses, and to keep the training relevant possible participants should be working in an NICU.

6.2.1.2.2.2 Recognition of the course

For an increase in uptake of the course, the experts mentioned that the course has to hold recognition in either the form of contribution to the continuous professional development of a nurse or recognition of the course from SANC.

“So, for us, we’ve benefited from being part of the previous and being known as a neonatal and a paediatric specialist person You are recognised by other people but currently those that do is; they are not necessarily recognised beyond the hospital group that they are working for. Or whoever offered them that short course is part of the continued professional development of that particular hospital, outside, when they leave that hospital where they did it, that’s it. It’s not recognised and as I say it’s a what’s in it for me.” (Participant G)

“So, if we look at South African Nursing Council, if we look at published institutions’ lists that are currently on the existing database, I don’t see any recognised neonatal ICU programme or advanced diploma in neonatal ICU that these potential candidates can actually progress into and I think that must be considered as factors when designing this online programme because it will influence who actually joins the programme… Because a lot of people will say is this programme accredited? And if it is not accredited, they are not interested.” (Participant F)

“Credit it by saying is it just going to be a short course for your own development, that I am not too sure at this point.” (Participant E)

Motivation and recognition are key factors in why students want to further their studies or upskill themselves. Experts believe that the intended course must add value to potential students in terms of SANC recognition. The SANC has a strong stance on CPD and has made it mandatory for all nurses to obtain 15 CPD points to enable them to re-register (SANC, 2021). With this requirement the researcher intends to develop the course with CPD accreditation as a goal.

The researcher will apply for accreditation of the short course for recognition by SANC for CPD purposes, once the SANC CPD system has been formalised.

6.2.1.2.2.3 Course duration and credits

The experts were in support of offering the course as a short course for the period of 6-12 months.

"Credit it by saying is it just going to be a short course for your own development, that I am not too sure at this point…A short course by definition is less than 120 credits. So, even if it is 119 credits it is a short course." (Participant E)

C There was support for a short course intended to meet the needs of the nurses and designed in as cost-effective manner as possible in terms of the time needed to gain required competencies.

6.3 DICUSSION OF FINDINGS FROM THE FGD/INDIVIDUAL INTERVIEWS

The expert contributions underscore the necessity for a well-structured course that addresses the unique physiological characteristics of neonates and the specific needs of nurses working in Neonatal Intensive Care Units (NICUs). The identified themes emphasise the importance of incorporating relevant course components, such as anatomy and physiology, adaptation of neonates to extra-uterine life, and critical assessment strategies that promote critical thinking and clinical judgment.

Clinical accompaniment emerged as a vital component in bridging the gap between theoretical knowledge and practical application, enhancing student engagement and competency in real-world settings. The experts highlighted that effective clinical supervision not only supports students but also fosters a culture of evidence-based practice among nursing staff.

Furthermore, awareness of contextual barriers to learning is crucial for designing a course that accommodates the diverse needs of adult learners. Factors such as work commitments, language barriers, and resource availability must be considered to ensure successful course completion and learner satisfaction.

The insights gathered from the FGD and individual interviews provided a comprehensive framework for developing a neonatal intensive care short course that is responsive to the challenges faced by nurses in South Africa. By implementing these recommendations, nursing educators can enhance the quality of education provided to neonatal nurses, ultimately leading to improved patient care outcomes in this vulnerable population. The commitment to continuous professional development will further ensure that nursing staff are equipped with the necessary knowledge and skills to provide high-quality care in NICUs.

6.4 CONCLUSION

This chapter offered a detailed description of the focus group discussions (FGD) and individual interviews with the experts. The next chapter, Chapter 7, explains how triangulated data was utilised to create the outline for a neonatal intensive care short course.

Chapter 7: DEVELOPMENT PHASE OF THE ADDIE MODEL: COURSE OULINE DEVELOPMENT

7.1 INTRODUCTION

The previous chapter presented the findings from the expert focus group discussions (FGD) and individual interviews, focusing on the experts' views on the structures and processes for the intended course. This chapter provides a step-by-step description of how the outline for the neonatal intensive care short course was developed using the ADDIE model as the instructional design framework. Data collected from phases 1 and 2 of the research was triangulated and used in the course development process.

7.2 USE OF THE ADDIE MODEL TO DEVELOP THE COURSE OUTLINE

The researcher used the ADDIE model to guide the research process of the entire study. The model was used as the underlying framework of the study and to guide the design of the desired course.

The researcher followed the five distinct phases of the ADDIE model to assist with the development of the outline for the neonatal intensive care short course. The researcher used the description of each phase provided by Peterson (2003) as a guide to conducting each phase.

7.2.1 Analysis

In this phase of the ADDIE model, designers identify the learning needs, goals, objectives, target audience, and any constraints or limitations. The goal of this phase is to gather all relevant information to understand the current situation and determine the desired outcomes of the desired course.

As part of the learning needs analysis of this phase the researcher identified competencies of learners that need to be accomplished at the end of the course. The researcher conducted a mapping review to identify neonatal nursing intensive care competencies (refer to Chapter 3). Neonatal nursing intensive care competencies derived from the mapping review were aligned with the South African Nursing Council’s competencies for an advanced nursing practitioner. These competencies

were then utilised as material for a ranking exercise with expert participants followed by a Focus Group Discussion (refer to Chapter 4: and Chapter 6:respectively). The analysis phase focuses on identification of a target audience and identification of their learning needs. The researcher achieved this by requesting professional nurses, working in Neonatal Intensive Care Units, to complete a survey that entailed ranking of competencies and sub-competencies they deemed very important/important/slightly important and not important (refer to Chapter 5).

The researcher's intended goal and objectives of the course were to ensure professional nurses working in an NICU be equipped to provide effective, safe nursing care to neonates, which entails being competent not only in knowledge but in skills and appropriate attitudes.

Whilst collecting data from the mapping review, experts, and professional nurses the researcher identified various constraints. These constraints appeared in the form of lack of educational opportunities for nurses working in NICUs to improve their competence whilst caring for critically ill neonates.

It is important to note that the South African Nursing Council does not recognise Neonatal Nursing as a standalone speciality; the care of a critically ill neonate is covered under the speciality of advanced midwifery and neonatal nursing science and Child Nursing Science but is not a sole course. With the alignment of nursing programmes to current NQF levels, and the SA Nursing Council's insistence that they have a midwifery qualification, the majority of nurses currently do not qualify to pursue a postgraduate diploma, which limits the number of nurses attaining specialities in various fields, including advanced midwifery and/or child nursing science. This is evident in the statistics from the South African Nursing Council website: in 2022, only 101 nurses (N=101) completed their specialty in post-basic child nursing science, and 335 nurses (N=335) completed their specialty in advanced midwifery and neonatal nursing science. When compared to the vast number of registered nurses in South Africa who lack specialty qualifications, these figures highlight the alarmingly low rate of specialist nurse graduations each year, underscoring a critical gap in the availability of specialised care.

A compounding constraint, identified whilst the researcher spent time in the units as an observer during the collection of data, was the observed shortage of staff in each

unit, poor working conditions due to the shortage of staff, high acuity of patients as well as a high staff turnover per unit.

According to the World Bank website, the neonatal mortality rate in South Africa in 2021 was 11 deaths per 1000 live births. While the statistics presented showed a decline in neonatal mortality rates for the past five years there seems to have been a plateau from 2015 to 2021. Nieuwoudt et al. (2022) attribute the main causes of neonatal deaths in South Africa to prematurity, intrapartum hypoxia and infection/ Nieuwoudt et al. (2022) go further to state that modifiable factors such as improved neonatal care can mitigate the main cause of death neonatal in South Africa.

In 2021, the South African Nursing Council (SANC) released a document entitled “Continuing Professional Development Framework for Nurses and Midwives in South Africa October 2021.” The document stipulates that Continuous Professional Development (CPD) is a mandatory process for all nurses registered with the South African Nursing Council. This is in order to maintain and improve knowledge, attitudes, and skills within their relevant place of work. In the above-mentioned document, under the section entitled “requirements”, it states that a minimum of 15 CPD points need to be acquired each year for the renewal of the Annual Practicing Certificate (APC).

In another document released by the South African Nursing Council, entitled “Criteria and Process for Recognition of Continuing Professional Development (CPD) Providers”, the Council explains two avenues for organisations/institutions to offer CPD programmes. The first is to make an application to the Council to be a CPD provider and the second, if not accredited by the Council, is for the organisation to provide proof that the CPD activities have been developed by experts and that the relevant learning platform is accessible to potential students.

With SANC’s pending requirement for CPD points to be a requirement for annual license renewal, the researcher chose to develop an accessible course designed to attain CPD points and will apply to SANC for recognition as such.

The researcher took into consideration data gathered during the data collection phases, the intended goal and objectives for a neonatal intensive care course, constraints experienced by nurses working in NICUs, modifiable factors to decrease the neonatal mortality rate in South Africa and the need for continuous professional

development of nurses as justification for designing an outline for a neonatal intensive care short course.

7.2.2 Design

The design phase of the ADDIE model involves selecting the appropriate curriculum design for the course, identification of learning objectives and determining how these objectives will be met through appropriate assessments.

As mentioned in the Analysis phase the researcher's intention for the programme is to equip nurses working in NICUs to provide effective, safe nursing care to neonates, which entails being competent not only in knowledge but in skills and appropriate attitudes; this intention led to the decision to have a competency-based curriculum.

A competency-based curriculum is an educational approach that focuses on defining specific, measurable competencies or learning outcomes that learners are expected to achieve by the end of the course. This type of curriculum is non-traditional in the sense that rather than placing importance on the amount of time spent in class or completion of assignments it places focus on the primary importance of demonstrating proficiency of predetermined skills, knowledge, and attitudes (Echols, et al., 2018).

Ideally, the end goal of a competency-based curriculum in nursing education is to equip learners with a package to ensure application of knowledge on a specific subject, competent performance of skills required and encouraging a positive professional attitude in all aspects of care (Chuenjitwongsa, et al., 2016).

The outline for the programme originated from the competencies formulated from the mapping review, which were aligned with SANC's competencies for an advanced nurse practitioner, expert ranking exercise of the competencies followed by a FGD centring around the question "What factors should be considered when offering a blended course?" and finally results from the survey completed by potential students.

The researcher, along with the supervisors of this study who are experts in the field of nursing education, triangulated the data collected from the above-mentioned data sources to formulate four overarching modules for the course.

1. Introduction to Neonates.

2. Management and Prevention of Common Neonatal Conditions.

3. Family-Centred Care in Neonatal Intensive Care Units.

4. Unique Environment of Neonatal Intensive Care Units.

A competency-based curriculum encapsulates distinct features or characteristics that the developer must take into consideration when designing an educational course.

7.2.2.1 Distinct characteristics of a competency-based curriculum

7.2.2.1.1 Clear Learning Outcomes

Competency-based curricula are built around clearly defined learning outcomes or competencies that students are expected to achieve by the end of the course. Clear learning outcomes were developed for each module and are reflected in Table 7-1below.

Table 7-1: Competencies per module

MODULE 1: Introduction to Neonates	
Competency/Learning Outcome:	Practice according to the National Integrated Guidelines of Neonatal Care 2023.
Sub-competencies:	
Knowledge	• Familiarity with the role of a Neonatal Nurse in an NICU. • Knowledge of the unique features of a neonate. • Understanding of the adaptation of a neonate to extra-uterine life. • Familiarity with the content of the National Integrated Guidelines of Neonatal Care 2023.
Attitudes	• Appreciation for the vulnerability and resilience of neonates. • Commitment to providing individualised, developmentally appropriate care.

Skills	• Proficiency in providing specialised care for a neonate in an NICU. • Ability to recognise signs of distress or illness in neonates and initiate appropriate interventions.
MODULE 2: Management and Prevention of Common Neonatal Conditions	
Competency/Learning Outcome:	Demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with a development care plan for the management and prevention of neonatal conditions.
Sub-competencies:	
Knowledge	• Understanding of common neonatal conditions. • Knowledge of evidenced-based interventions and treatments of common neonatal conditions. • Familiarity with risk factors and preventative measures.
Attitudes	• Commitment to promoting the health and well-being of neonates through management and preventative measures. • Openness to learning and adopting new evidence-based practices in neonatal care.
Skills	• Competence in monitoring and assessing neonates for signs of common conditions. • Proficiency in implementing treatment protocols and interventions for common neonatal conditions. • Ability to educate families about signs, symptoms, and management of common neonatal conditions.

MODULE 3: Family-Centred Care in Neonatal Intensive Care Units	
Competency/Learning Outcome:	Develops and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates.
Sub-competencies:	
Knowledge	• Understanding of the principles and benefits of family-centred care in an NICU. • Knowledge of the psychological impact of having a neonate in an NICU on families and the neonate. • Familiarity with the strategies for supporting family involvement and participation in neonatal care. • Awareness of the potential stressors and challenges faced by neonates and families in an NICU.
Attitudes	• Dedication to fostering partnerships with families and involving them as partners in neonatal care. • Sensitivity and empathy towards the emotional needs and experiences of families in NICUs.
Skills	• Ability to communicate effectively and empathetically with families in an NICU setting. • Competence in providing psychological support, counselling, and education to families. • Proficiency in facilitating parent-infant bonding and attachment in an NICU environment. • Skill in advocating for family-centred policies and practices in an NICU setting.

MODULE 4: Unique Environment of Neonatal Intensive Care Units	
Competency/Learning Outcome:	• Demonstrates ability to provide care tailored to the unique needs of neonates in an intensive care environment.
Sub-competencies:	
Knowledge	• Understanding of the equipment, technology, and monitoring devices used in an NICU. • Knowledge of infection control practices and protocols specific to an NICU environment. • Familiarity with safety measures and precautions for neonates in an NICU.
Attitudes	• Commitment to maintaining a safe, clean, and supportive environment for neonates and families in an NICU. • Flexibility and adaptability in responding to the dynamic and high-stakes nature of NICU care. • Respect for interdisciplinary collaborations and teamwork in an NICU setting.
Skills	• Competence in operating and troubleshooting NICU equipment and technology. • Ability in adhering to infection control protocols. • Ability to prioritise and manage multiple tasks and responsibilities in a fast-paced NICU environment.

7.2.2.1.2 Flexibility

Flexibility is a characteristic in a competency-based curriculum that is implemented to ensure that students work through the course at their own pace, while mastering each competency as they move to the next competency. To ensure flexibility of the course, the researcher chose a blended learning approach. Blended learning is a modern

educational approach that combines traditional forms of face-to-face teaching and online learning strategies. This teaching strategy is gaining popularity among educators as it creates a learning environment that can accommodate various learning styles of students (Platonova, et al., 2022).

All theoretical content will be made available online on the learning platform Moodle. Moodle is a learning management system that assists in structuring and uploading content and creating engaging online activities. Theoretical content will be uploaded on Moodle as follows:

Each module will have a main theme and under each module will be topics relating to the specific module. Under each topic, content in the form of pre-recorded lectures, online discussion forums, online quizzes, mini assignments, and file of resources applicable to the topic. The variety of learning activities is to ensure accommodation of diverse learning styles and abilities.

The face-to-face component of the course will be the clinical component. This will consist of three compulsory days of face-to-face attendance. Neonatal Nursing best practices identified in the mapping review will form the foundation of these three days. Demonstration of skills relevant to neonatal intensive care nursing will be conducted followed by supervised practice by the student. The final day will entail a simulated clinical scenario encompassing all skills demonstrated where students will be put into groups and participate in a simulation scenario set up to mimic an NICU, followed by a facilitated de-briefing session.

7.2.2.1.3 Focus on Application and Integration

Competency-based curricula place strong emphasis on the application of knowledge, attitudes, and skills in real-world contexts. Learning activities and assessments are designed to encourage critical thinking, problem solving and integration of knowledge within different contexts. The researcher took this into consideration when designing the learning activities for each topic Learning activities will form part of the formative assessments but will not count for marks, however, they must be completed successfully to pass the course.

Each topic will have a pre-recorded presentation and learning activities linked to the topic. Application of knowledge will be in the form of discussion format with preset

questions to initiate the discussion, engaging with academic articles, and videos made by the facilitator illustrating his/her understanding of the content. All completed student activities will be uploaded on the learning platform to enable the facilitator to monitor progress and provide feedback to the students.

Additionally, to elicit critical thinking a simulation day will be created encapsulating all skills demonstrated and practiced, which is a teaching technique that allows for application into a real-world context as it has the capability to mimic real life scenarios.

7.2.2.1.4 Competency based assessment

Learning outcomes/competencies within a competency-based curriculum must have measurable standards to ascertain whether the students have achieved proficiency in the relevant competency. This is achieved through competency-based assessments.

All learning activities under each topic will form part of the formative assessments. These activities will not be mark-bearing; however, they will be monitored by the facilitator in terms of feedback per activity.

A portfolio of evidence (POE) will form part of one of the summative assessments. The first part of the POE requires students to sign off skills in the ward that will be demonstrated during the clinical days and end off with their application of specific nursing care for an identified condition. The second component of the POE involves students selecting neonates diagnosed with five specific conditions and completing a table categorized under the following headings: knowledge of the condition, skills performed, attitudes demonstrated, and family-centred care.

The second form of assessment will be a theoretical examination. This examination will be based on modules 1-4. The emphasis of this examination is on application of knowledge covered in the course. The assessment will be open to all students from the commencement of the course to three weeks after the course has ended to enable the students to complete the assessment when they feel ready to do so, thus adhering to the characteristic of flexibility of a competency-based curriculum.

7.2.2.1.5 Continuous Improvement and Feedback

Competency-based education is often continuous with ongoing assessment and feedback informing instructional design and curriculum refinement. This continuous

improvement cycle helps ensure that the curriculum remains relevant and effective (Chuenjitwongsa, et al., 2016).

The researcher will adhere to the characteristic of feedback by conducting online check-in sessions during each module. These sessions will be held online in the form of a Microsoft Teams meeting. The researcher will ensure that the sessions are recorded to accommodate students who are unable to make the session. Besides the online check ins, the researcher will be available on email should queries arise from students regarding content of the course.

After completion of the course the researcher will set up a student evaluation for the students to complete, based on content of the course and facilitation. This feedback from students will inform the researcher of areas that need to be approved.

7.2.3 Development

The development phase of the ADDIE model requires a developer to reflect on the previous phases of the ADDIE model and involves creating learning material based on the plans formulated from the previous phases. An analysis of responses from the ranking exercise by the experts and the results of the surveys completed by the professional nurses to elicit their responses to competencies and sub-competencies they deemed important was done. The ranking exercise responses were converted into percentages by calculating the total score per item multiplied by the number of participants, divided by the total possible score (maximum multiplied by the number of responses) and multiplied by one hundred.

Once the ranking exercise results were converted into percentages, the researcher created a comparative table to illustrate the comparison between the ranking exercise results and the results of the survey per item ranked.

Table 7-2: Results in percentages of the ranking exercise and survey responses

Main Competency	Sub competency	% from ranking exercise	% from surveys all hospitals	Average of the two scores
Nurse initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates	Effective communication with families of neonates	85.7%	99.1%	92.40%
	Involvement of families in the care of the neonate	88.6%	92.5%	90.55%
	Support of families of the neonate	62.9%	95.3%	79.10%
	Creation of a therapeutic environment for the family of the dying neonate	34.3%	96.3%	65.30%
	Effective management of challenges or barriers to Family-Centred Care due to COVID-19	28.6%	73.3%	50.95%
Nurse uses appropriate assessment to identify actual and potential risks to safety and security	Effective initiation of neonatal resuscitation	84.3%	100.0%	92.15%
	Safe and correct administration of medication	71.4%	100.0%	85.70%
	Effective non-pharmacological pain management	42.9%	92.8%	67.85%
	Promotion of a neuroprotective environment by the implementation of quiet time	35.7%	97.3%	66.50%

Main Competency	Sub competency	% from ranking exercise	% from surveys all hospitals	Average of the two scores
	Execution of safe administration of a blood transfusion	47.1%	99.1%	73.10
	Early initiation of breastmilk	60%	95.5%	77.75
	Correct management of a neonate on phototherapy	35.7%	97.3%	66.50%
	Promotion of skin-to-skin contact with primary care giver	48.6%	79.1%	63.85%
	Maintenance of skin integrity	44.3%	96.4%	70.35%
	Correct management of a neonate on supplemental oxygen	80%	100.0%	90%
The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the prevention of neonatal conditions	Hypoxia	82.9%	96.3%	89.60%
	Hypoglycaemia	60%	98.2%	79.10%
	Hypothermia	68.6%	92.6%	80.60%
	Infection	48.6%	98.1%	73.35%
	Intraventricular Haemorrhage	40%	98.2%	69.10%
	Hypoxia	90.1%	97.3%	93.70%

Main Competency	Sub competency	% from ranking exercise	% from surveys all hospitals	Average of the two scores
The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the development care plan for the management of neonatal condition	Respiratory Distress Syndrome	70.3%	99.1%	84.70%
	Hypoglycaemia	80.2%	98.2%	89.20%
	Hypothermia	84.6%	91.2%	87.90%
	Congenital Heart Defects	47.3%	99.1%	73.20%
	Persistent Pulmonary Hypertension	62.6%	98.2%	80.40%
	Necrotising Enterocolitis	41.8%	99.1%	70.45%
	Infection	70.3%	98.2%	84.25%
	Intraventricular Haemorrhage	46.2%	98.2%	72.20%
	Omphalocele	19.8%	92.0%	55.90%
	Gastroschisis	26.4%	97.3%	61.85%
	Hyperbilirubinemia	41.8%	93.9%	67.85%
	Neonatal Abstinence Syndrome	18.7%	80.4%	49.55%

Looking at the average percentage of the two scores, the researcher and supervisors contemplated a 70% cut off for inclusion in the course, which meant sub-competencies that scored an average score of less than 70% were not to be included in the content of the program. The sub-competencies that scored less than 70% were:

- The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the development care plan for the management of neonatal conditions: Omphalocele, Gastroschisis, Hyperbilirubinemia, Neonatal Abstinence Syndrome

- The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the prevention of neonatal conditions: Intraventricular Haemorrhage
- Nurse uses appropriate assessment to identify actual and potential risks to safety and security of neonates: correct management of a neonate on phototherapy, promotion of skin-to-skin contact with primary care giver, promotion of a neuroprotective environment by the implementation of quiet time.
- Nurse Initiates, develops, and continues therapeutic relationships using a range of advanced communication and Interpersonal skills with families of neonates: effective management of challenges or barriers to Family-Centred Care (FCC) due to COVID-19.

Upon closer inspection of these sub-competencies there was a marked difference in percentages between the experts and the surveyed nurses, in that the experts' percentages of these sub-competencies were much lower than the percentages of the surveyed nurses, which reduced the average score.

As the course is intended to meet the needs of the learners who are the professional nurses working in NICUs, the decision was to include all content despite some obtaining lower percentages. There was an adjustment to the skill on management of FFC due to COVID-19, as the height of the pandemic is currently over. For purposes of the course this competency was changed to effective management of challenges or barriers to FCC.

Themes that emerged from the FGD with the experts were included in the development and content of the course respectively. These themes centred around administration of the course, barriers to learning, adaptation of neonates to extra-uterine life, unique features of neonates, factors to consider when working in an NICU, assessment methods and adding a clinical component to the course.

The National Integrated Guidelines for Neonatal Care (2023) focus on providing a standardised approach to neonatal care across South Africa. These guidelines were developed to address the urgent need for improving neonatal health outcomes by standardising practices in the care of newborns, particularly those at risk of complications. They emphasise key areas like neonatal resuscitation, infection

prevention, nutrition, and the management of prematurity and other common neonatal conditions.

The Department of Health created these guidelines to improve survival rates and reduce neonatal mortality by ensuring that healthcare providers follow evidence-based practices. The guidelines also aim to bridge the disparities in neonatal care between different regions and health facilities, ensuring every newborn receives high-quality, consistent care.

Prior to populating topics under the identified four overarching modules, the researcher had to determine length and credits of the course, which forms part of the administration of the course. Bearing in mind the barriers to learning experienced by professional nurses in terms of available time they must put aside for their continuous professional development, the researcher chose to offer the course as a short course. According to the Council of Higher Education in South Africa, a credit bearing short course must be presented as less than 120 credits and be offered over a period of three to six months.

The researcher, with guidance from data sourced in the various data collection phases, populated each module with relevant topics. When designing the topics and activities per topic the researcher continuously visited the competency, knowledge, attitudes, and skills of the module to ensure content aligned with the criteria for a competency-based curricula.

7.2.3.1 Development of the outline for Module 1: Introduction to Neonates

The following topics form module 1:

- Introduction to neonatal intensive care nursing:

  Students are introduced to the role of a neonatal intensive care nurse in Neonatal Intensive Care Units and the competencies that are required to work within a specialised unit.

- Adaptation of neonates to extra-uterine life:

  In this topic foetal circulation and how normal physiological processes occur for neonates to adapt to extra-uterine life is discussed.

- Unique features of neonates:

Neonates, particularly pre-term neonates, have unique features compared to adults. Body systems of neonates are discussed and how these are compromised if a neonate is born prematurely.

The following are focus of interest areas:

- Thermoregulation of a neonate
- Impact of immaturity of vital organs
- A neonate's immune system

- Orientation to the National Integrated Neonatal Care Guidelines 2023:

The module ends with an orientation to the newly formed Neonatal Care Guidelines developed by the South African Department of Health and applicable to neonatal intensive care nursing. These guidelines are referred to often during this course to add to the evidenced based care that needs to be implemented in an NICU.

7.2.3.2 Development of the outline for Module 2: Management and Prevention of Common Neonatal Conditions

The following topics form module 2:

- Medical Conditions:

The following neonatal conditions are discussed under this topic:

- Neonatal Abstinence Syndrome
- Hyperbilirubinemia
- Respiratory Distress Syndrome
- Persistent Pulmonary Hypertension
- Prevention and Management of Intraventricular Haemorrhage
- Prevention and Management of Hypoxia
- Prevention and Management of Infection
- Prevention and Management of Hypoglycaemia

- Surgical Conditions:

The following neonatal conditions are discussed under this topic:

- Necrotising Enterocolitis
- Gastroschisis
- Omphalocele

- Congenital Cardiac Conditions:

  The following cardiac congenital conditions are discussed under this topic:
  - Patent Ductus Arteriosus
  - Ventricular Septal Defect
  - Atrial Septal Defect
  - Ventricular Atrial Defect

7.2.3.3 Development of the outline for Module 3: Family-Centred Care in Neonatal Intensive Care Units

The following topics form module 3:

- Effective communication with families of neonates:

  Family-centred principles of communication and information sharing are covered under this topic, placing emphasis on types of methods that can be utilised when adhering to the principles and how to mitigate barriers to the implementation of FCC.

- Involvement and support of families in the care of a neonate:

  Family-centred principles of collaboration and participation are the focus of this topic and how implementation of these principles influence family and Infant Mental Health.

- Effective management of challenges or barriers to Family-Centred care

  The primary focus of this topic is identifying and addressing barriers to family-centred care (FCC) in neonatal settings. Emphasising respect, collaboration, and empowerment, effective management ensures families actively participate in their infant's care, promoting positive outcomes for both family well-being and infant health.

- Creation of a therapeutic environment for the family of a dying neonate:

  Family-centred care principles of respect and dignity, environment, social and emotional support are the focus of this topic, specifically to families with seriously ill neonates or neonates undergoing palliative care.

7.2.3.4 Development of the outline for Module 4: Unique Environment of Neonatal Intensive Care Units

The following topics form module 3:

- Use of technology in NICUs:

  Correct use and troubleshooting of the following NICU equipment are covered: mechanical ventilator, oscillator, cardiac monitor, intensive care neonatal crib, intravenous pump, cooling machine and phototherapy lights.

- Working within a multidisciplinary team:

  Roles of various medical professionals working within an NICU and how best to utilise their expertise are discussed under this topic.

- Infection Control practices in Neonatal Intensive Care Units:

  Infection Control Practices specific to Neonatal Intensive Care Units are covered under this topic.

7.2.3.5 Credit allocation per topic and length of course

The researcher, along with the supervisors, allocated credits to each topic, which was determined by the feasibility of the time needed for each topic to be covered effectively. The clinical component as well as the Portfolio of Evidence were also allocated credits. After credits were allocated the total credits for the course amounted to 18 credits (180 notional hours). Bearing in mind the notional hours needed to complete the course, the researcher calculated that the theoretical component should be offered over 15 weeks with a week's break during week 10. The 15 weeks needed to complete the course, plus the 3 days needed for conducting the clinical component means that it is feasible to completes the course in three months.

Table 7-3: Breakdown of notional hours and weeks of the course

Introduction to Neonates: (4 credits) Module 1	**MONTH**	**hours**	**Management and Prevention of common neonatal conditions: (3 credits) Module 2**	**MONTH**	**hours**	**Family Centred Care in Neonatal Intensive Care Units: (4 credits) Module 3**	**MONTH**	**hours**	**Unique Environment of Neonatal Intensive Care Units: (3 credits) Module 4**	**MONTH**	**hours**
Week 1: Introduction to neonatal intensive care nursing	1	5	Week 4 & 5: Medical Conditions	1	25	Week 8: Effective communication with families of neonates	2	5	Week 13: Use of technology in NICUs	3	10
Week 1: Adaptation of neonates to extra-uterine life	1	5	Week: 6 Surgical Conditions	1	10	Week 9: Involvement and support of families in the care of a neonate	2	10			
Week 2: Unique features neonates	1	5	Week 6: Congenital Conditions	1	5	**Week 10 Break**			Week 14: Working within a multi-disciplinary team	3	10
Week 2 & 3: Orientation to the Integrated Neonatal Care Guidelines 2023 Chapters	1	25				Week 11: Effective management of challenges or barriers to Family-Centred care	2	5	Week 15: Infection Control practices in Neonatal Intensive Care Units	3	10
						Week 12: Creation of a therapeutic environment for the family of the dying neonate	2	10			
Facilitator Check in		2			2			2			2
Self-Directed Learning		38			38			28			28
Total hours per module		40			40			30			30
Total Hours of all Modules	140 Hours										
Portfolio of Evidence 2 credits	20 Hours										

Note: “Hours” refers to notional hours. Note 2: 1 credit= 10 notional hours

7.2.3.6 Processes

Quality assurance is an important aspect to consider during the development phase of an educational course. Quality assurance checks are conducted to ensure that material meets the desired standards for accuracy, relevance, clarity, and effectiveness.

The researcher designed the outline of the course (see above sections 7.2.3.1 to 7.2.3.4) and requested for the experts used in phase 1.2 to evaluate the course outline. A Delphi method was used for the expert review of the course outline, which is discussed in further detail in Chapter 8.

The course outline was evaluated by the experts and will serve to develop the detailed course for implementation.

7.2.4 Implementation

The implementation phase of the ADDIE is where the developed course material is put into action. This phase of the ADDIE model will form part of the researcher's post-doctoral work and does not form part of this study.

The intended course will be administered by Wits Academic Advanced. This entity will assist the researcher with uploading course content onto the learning platform, Moodle, and assist the researcher with the application for CPD points for the course. All resources needed for the completion of the course will be made available to students after they have registered. Wits Academic Advanced will aid in the registration process, payments, and course access.

This course will not be recognised by the South African Nursing Council or the Department of Health for the purposes of Occupational Specific Dispensation. However, the course will bear CPD points. Once course requirements are met, students will receive a certificate with the name of the course, number of CPD points acquired and the offering institution's logo. The offering institution will apply for CPD accreditation with SANC.

As a start, various hospitals within Gauteng will be approached by the researcher to assist with funding of professional nurses for the course. Once interest in the course

grows various hospitals outside of Gauteng will be approached with the same intention for funding of professional nurses working in NICUs.

Selection requirements for the course require a professional nurse to be working in a Neonatal Intensive Care Unit. First preference will be given to professional nurses who are singly qualified. Those with midwifery will not be given preference as they would have had some training on basic neonatal care during their midwifery programme. The second requirement will be attendance of a one-day workshop on orientation to the online learning platform Moodle, which will be organised by the researcher.

7.2.5 Evaluation

Evaluation is crucial in determining that the competencies of the course have been met and highlight the strengths and weakness of the course.

As part of post-doctoral work, the researcher will attempt to establish the effectiveness of this programme. This may include a longitudinal study where outputs and educational outcomes are researched, and an attempt will be made to measure clinical outcomes, although this may be more challenging.

7.3 CONCLUSION

This chapter described the processes the researcher used to develop the outline of a neonatal intensive care short course using the ADDIE model. The next chapter focuses on the verification of the course outline by the experts used in phase 1.2 through the Delphi technique. This chapter forms part of the development phase of the ADDIE Model.

Chapter 8: DEVELOPMENT PHASE OF THE ADDIE MODEL: VERIFICATION OF THE COURSE OUTLINE

8.1 INTRODUCTION

In the previous chapter the process of development of the outline of a neonatal intensive care short course was discussed. In this chapter, the verification process, with the use of a Delphi study, of the outline of the neonatal intensive care short course by the experts used in phase 1.2 is discussed.

8.2 DEFINITION OF A DELPHI STUDY AND EXPLANATION OF ITS USE IN THIS STUDY

A Delphi Study, often referred to as the Delphi technique by researchers, is a flexible approach used to gather views from experts on a particular topic (Barrett & Heale, 2020). Barrett and Heale (2020) go on to explain the unique characteristics of this approach. The umbrella approach to the Delphi technique is based on a series of rounds where experts are questioned on their opinions on a specific area more than once until a consensus above 70% is reached by experts (Kilroy & Driscoll, 2006). Consensus for the Delphi used in this study was set at 90% to ensure a higher percentage of agreement among the experts regarding their opinion of the course outline.

The main characteristic of the Delphi technique is the formulation of the questionnaire to be sent per round. The initial questionnaire is sent off to experts to gather their views on a specific topic. The questionnaires that follow are then based on the responses received from the first and consecutive rounds until consensus is met. All questionnaires are answered anonymously; this allows participants to answer freely without concern of their responses being viewed negatively by the researcher.

The Delphi technique is a widely used tool to research topics in healthcare education, particularly in curriculum development. In this study, a Delphi study was used to evaluate the outline of a neonatal intensive care short course by experts in the field of medical neonatology, neonatal nursing and nursing education. For this study, the Delphi study required two rounds to meet a consensus of 90%.

The initial questionnaire (Appendix S) was accompanied by the outline of the neonatal intensive care short course. It began with questions addressing the course outline, followed by module-specific inquiries. Response options included "yes," "partially," and "no," with experts instructed to provide comments for any responses marked as "partially" or "no."

The subsequent questionnaire (Appendix T) aimed to address comments made by the experts pertaining to the content and structure of the course, where experts answered “partially”. None had answered “no”. All comments made were addressed by the researcher by means of an explanation. The researcher then asked the experts to re-rate the question in view of the explanation by answering “yes” or “no”. Some changes were made to the original course outline based on comments and suggestions.

Round one and two of the Delphi results are reported as simple statistics. Comments made by the experts and the researcher’s response to each comment is mentioned under the results of each round.

A summary of the Delphi study process is presented in Figure 8-1 below.

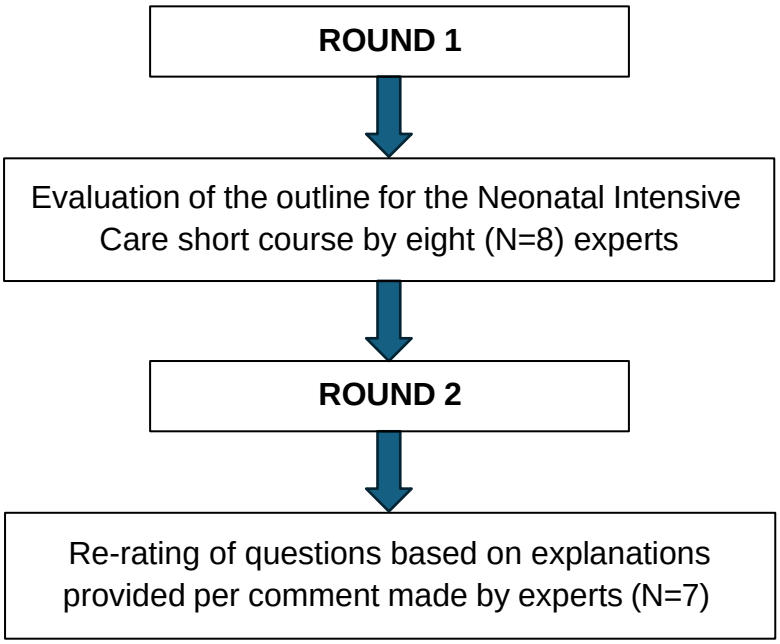


Figure 8-1: Summary of the Delphi study process

8.3 RELEVANCE OF THE RESEARCH QUESTION TO A DELPHI STUDY

The research question for this study was: How can singly qualified nurses working in neonatal ICU's best be supported to gain additional knowledge required to care for compromised neonates?

Offering an opportunity for experts to evaluate the course outline proved valuable as comments and suggestions made were with the intention to strengthen the course and thus improve the course outcomes for potential students.

8.4 STEPS OF THE DELPHI PROCESS

Chuenjitwongsa (2017) describes the Delphi process as a series of steps that must be taken to ensure sound results and agrees with Barrett and Heale (2020) in terms of the aim of the Delphi process, which is to reach a meaningful consensus among subject experts on a particular subject.

8.4.1 Defining and recruiting experts

Experts who participate in a Delphi study are called panellists. The selection process of selecting a panellist to participate in a Delphi study is of paramount importance to ensure sound qualitative strength of recommendations or consensus. There are no set criteria for the selection of panellists, however the researcher should ensure that the panel members are experts in their field and are homogeneous in nature to increase the reliability on a particular study objective (Nasa, et al., 2021).

The experts chosen for the Delphi study were the same experts used in the ranking exercise and are described in detail in Chapter 4:. The experts chosen were homogeneous in nature as they are all healthcare professionals working in a neonatal intensive care setting or higher education institution:

1. Participant A: Medical Consultant and Neonatologist

2. Participant B: Neonatal Nurse Specialist and Nurse Educator

3. Participant C: Neonatal Nurse Specialist and Nurse Educator

4. Participant D: Neonatal Nurse Specialist and Nurse Educator

5. Participant E: Neonatal Nurse Specialist

6. Participant F: Neonatal Nurse Educator

7. Participant G: Neonatal Nurse Educator.

8.4.2 Developing the questionnaires

A Delphi questionnaire is developed from primary data that the researcher has collected and can be distributed either in a paper-based or electronic format (Cheunjitwongsa, 2017). The initial questionnaire (Appendix S) used in round one of the Delphi was centred around evaluating the course outline for a short course in neonatal intensive care nursing that was developed based on data collected from different phases: A mapping review, expert ranking exercise followed by a FGD and two individual interviews and results that emanated from surveys from professional nurses working in NICUs from four (4) hospitals within the Gauteng province. The second questionnaire (Appendix T) was formulated based on the comments/suggestions made by the experts pertaining to the course outline structure and feasibility.

Research Electronic Data Capture (REDCap) was used to set up both questionnaires (Appendix S and Y) for this phase of the study. REDcap is a software program developed by Vanderbilt University to capture data for clinical research and create databases and projects. It is Health Insurance Portability and Accountability Act (HIPAA) compliant, meaning it is highly secure, and it is user friendly. REDcap software allows the use of research instruments such as online surveys and forms as research capture tools (Harris, 2018).

8.4.2.1 Development of initial questionnaire

The first six questions of the initial Delphi questionnaire (Appendix S) asked the experts' opinion, in the form of "yes", "partially" or "no", of the overall course outline in terms of the course outline's adherence to clear learning objectives, accommodation to all learning styles, application of theory, meeting the criteria for a competency-based curriculum and focus on the integration of knowledge, skills and attitudes - the three pillars of a competency-based curriculum - and alignment of assessment methods to the desired outcomes. The experts were asked to provide a comment for where they answered "partially" or "no". The course outline was attached to the questionnaire in

the form of a Portable Document Format (PDF) for easy reference for experts to refer to when answering the questions.

The questions that followed were then separated under each of the following modules:

Module 1: Introduction to the Neonate

Module 2: Management and prevention of common neonatal conditions

Module3: Family-Centred Care in the Neonatal Intensive Care Unit

Module 4: Unique Environment of the Neonatal Intensive Care Unit

Questions under each module took on the same format in terms of choice of answer, which was “yes”, “partially” or “no” and experts were asked to provide a comment if they answered “partially” or “no”. Questions under each module were the same to allow for consistency of the questionnaire (Appendix S). The questions under each module were as follows:

1. Does the module have sufficient resources? (A list of resources was provided to the participants)

2. Are the learning activities sufficiently varied to maintain a student’s interest?

3. Is the content under this module related to neonatal intensive care nursing?

4. Is the credit value appropriate for the planned learning?

The questionnaire (Appendix S) concluded with asking the experts for additional comments they would like to make that were not addressed in the overall questionnaire. In total there were 27 questions in the questionnaire .

The questionnaire (Appendix S) was sent via email in the form of an electronic link to the experts on the 15/05/2024 and the researcher received all seven completed questionnaires back by the 18/06/2024.

Table 8-1below illustrates the results received from round one of the Delphi study. The consensus percentage was calculated based on the frequency of the answer “yes” for each expert.

8.4.2.2 Results and calculation of consensus from round 1 of the Delphi

Table 8-1: Results and calculation of consensus from round 1 of the Delphi

	YES	**PARTIALLY**	**NO**
QUESTIONAIRE 1	16/27 (59%)	11/27 (41%)	0/27 (0%)
QUESTIONAIRE 2	27/27 (100%)	0/27(0%)	0/27 (0%)
QUESTIONAIRE 3	26/27 (96%)	1/27 (4%)	0/27 (0%)
QUESTIONAIRE 4	20/27 (74%)	7/27 (26%)	0/27 (0%)
QUESTIONAIRE 5	25/27 (93%)	2 /27 (7%)	0/27 (0%)
QUESTIONAIRE 6	27/27 (100%)	0/27 (0%)	0/27 (0%)
QUESTIONAIRE 7	21/27 (78%)	6/27(22%)	0/27 (0%)
CONSENSUS	59 + 100 + 96 + 74 + 93 + 100 + 78 = 600 600 ÷ 7 = **86%**		

8.4.2.3 Development of second questionnaire

The researcher developed the questionnaire for round 2 of the Delphi based on the comments and suggestions made by the experts for the questions they answered as “partially”. In the second questionnaire catered to the experts and their answers given (Appendix T): the question where the answer was given as “partially” was repeated and the comment made by an expert was provided; an explanation was provided by the researcher in response to the comment made and the question was asked again in view of the response made. Options given to the experts to re-rate the questions were “yes” or “no”.

The second questionnaire was sent out on the 12/08/2024 and the researcher received all completed questionnaires by the 06/09/2024. A 100% consensus was

reached among the experts for the second round of the Delphi. Table 8-2 below illustrates the comments/suggestions made by the experts and the response to the comments/suggestions made by the researcher, which were implemented in the course outline. Questionnaires 2 and 6 did not have any comments/suggestions to address as the consensus results of these questionnaires were 100%, therefore, they do not feature in the table below.

8.4.2.4 Results from round 2 of the Delphi per questionnaire

Table 8-2: Results from round 2 of the Delphi per questionnaire

Comments/suggestions made by experts on certain questions	**Response to comments/suggestions made by experts**
QUESTIONNAIRE 1	
Question: Does the course outline focus on integration of knowledge, skills and attitudes? **Comment:** "It is difficult to see how the integration is done"	A three-day skills face-to-face workshop will form part of the neonatal intensive care short course, focused on specific skills needed when working in a NICU. During this workshop students will be enabled to integrate the knowledge, skills and attitudes taught during the course. In addition, much of the theoretical modules contain case studies and problem-solving exercises, which will aid in the consolidation of skills taught**.**
MODULE 1: INTRODUCTION TO THE NEONATE	
Question: Does this module have sufficient resources? **Comment:**	In the business consultation with the University access to the library as part of student registration fees will be discussed.

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
"Some of the journals are not open access and therefore not accessible, and important resources such as WHO documents are not included"	Additional resources which were not on the original course outline from the World Health Organisation's guidelines for essential newborn care have been added to the course.
Question: Are the learning activities for this module sufficiently varied to maintain a student's interest? **Comment:** “I do not see how the students will receive feedback of the activities done”	All student activities across modules 1-4 will be monitored by a facilitator and comments will be made online per upload made. There will be monthly facilitator check-ins and facilitator contact details will be made available for students to contact the facilitator should any queries come up.
Question: Is the content under this module related to neonatal intensive care nursing? **Comment:** "Some aspects are addressed, but concepts of developmental care and kangaroo care are not addressed as dedicated approaches to care, including in the NICU. There is also no attention to feeding, fluids or electrolytes.”	All clinical skills highlighted above will be addressed during the 3-day clinical skills workshop and integrated into the theoretical teachings.
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS	
Question: Does this module have sufficient resources? **Comment:**	In the business consultation with the University access to the library as part of student registration fees will be discussed.

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
" Some of the journals prescribed are not open access, which implies that those who are not registered users will not have access to it. I also think it is important to add the WHO resources.”	There will be an addition of resources which was not on the course outline previously from the World Health Organisation's guidelines for essential newborn care. In order for a student to enter into the short course they have to be registered with an affiliated university.
Question: Is the content under this module related to neonatal intensive care nursing? **Comment:** "Those listed are relevant, but asphyxia and acidosis are missing, which are some of the most common conditions"	The conditions of asphyxia and both respiratory and metabolic acidosis will be covered under the topic: Prevention and management of hypoxia in neonates.
MODULE 3: FAMILY-CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT	
Question: Does this module have sufficient resources? **Comment:** "Same comment as previous two modules"	In the business consultation with the University access to the library as part of student registration fees will be discussed. There will be an addition of resources which was not on the course outline previously from the World Health Organisation's guidelines for essential newborn care. In order for a student to enter into the short course they have to be registered with an affiliated university.

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
Question: Is the content under this module related to neonatal intensive care nursing? **Comment:** "Involving the family in developmental care and kangaroo care should be high priorities, but are not addressed"	Involving the family in developmental care and kangaroo care will be covered during the facilitator presentation under the topic "Involvement and support of families in the care of a neonate"
MODULE 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE	
Question: Does this module have sufficient resources? **Comment:** " Same comment as other modules"	In the business consultation with the University access to the library as part of student registration fees will be discussed. There will be an addition of resources which was not on the course outline previously from the World Health Organisation's guidelines for essential newborn care. In order for the student to enter into the short course they have to be registered with an affiliated university.
Question: **CLINICAL COMPONENT** Do you agree with the structure of the three planned clinical days? **Comment:** "Neuroprotective promotion is much more than handling techniques and cannot be taught in 30 minutes. An hour for mechanical ventilation is very little, and there is no attention paid to CPAP?"	The registered students will have a Portfolio of Evidence (POE) that will supplement the 3 clinical teaching days. Theoretical teaching of handling techniques will be covered under the topic "Prevention and Management of Intraventricular Haemorrhage" and theoretical teaching of CPAP will be covered under "management of respiratory distress syndrome".

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
	Nursing of a neonate on a CPAP will be added to the POE. There is an activity in Module 1 where students must record themselves setting up for an admission into NICU, this video will be critiqued by the facilitator.
Question: **CLINICAL COMPONENT** Are the skills that will be demonstrated and practiced appropriate for the course? **Comment:** "It is not very clear why mechanical ventilation is included which is an advanced skill, but more commonly used skills such as CPAP and intravenous access are not included. Keep in mind that students tend to get confused if they are taught HBB and neonatal resuscitation according to the resus algorithm-rather decide which one is most appropriate and focus on that one."	Private and Public NICUs differ in that public NICUs have a majority of mechanically ventilated neonates in their units therefore to accommodate both private and public nurses mechanical ventilation will be a priority skill. Management of a neonate on a CPAP will be added to the POE and will be covered theoretically under the topic "Management of respiratory distress syndrome" I agree with your comment on HBB and neonatal resus; to avoid confusion neonatal resuscitation will be given priority.
Question: Comments you would like to make about the course outline that were not addressed **Comment**: It is important to also address the basic or essential care of neonates and the application thereof in the NICU and not only selected advanced care, e.g. developmental	Agreed. The above-mentioned aspects will be covered under the topic "Involvement and support of families in the care of the neonate" and emphasised on day 2 of the skills workshop under "Early Initiation of breastmilk"

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
care, kangaroo care, breastfeeding, bonding, etc.	
QUESTIONNAIRE 3	
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS	
Question: Is the content under this module related to neonatal intensive care nursing? **Comment:** "e.g. On the cardiac system it will be advisable to classify the defects as acyanotic v/s cyanotic so that the learner will understand the effect of the shunting and how it leads to either of the classification. Thus the learner will easily state the condition that falls to a particular type of defect group"	This content will form part of the facilitator presentations under the topic "Congenital Cardiac Conditions". The table in the course outline will have an additional column labelled acyanotic and cyanotic, students will have to classify the cardiac defect either acyanotic or cyanotic and stipulate the reason why.
Question: Comments you would like to make about the course outline that were not addressed: **Comment:** "Genetics should be incorporated as some of the conditions that need palliative care are chromosomal"	Agreed. Clinical examples of neonatal chromosomal conditions and contributing factors to chromosomal conditions will be discussed during the facilitator presentation under the topic "Creation of a therapeutic environment for the family of a dying neonate"
QUESTIONNAIRE 4	
Question: Does the course outline have clear learning outcomes/competencies? **Comment:**	**Explanation:** It is the Integrated Neonatal Care Guidelines 2023 Chapters; this will be corrected on the outline.

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
"Is it the Dissemination of National integrated neonatal care guidelines 2023 chapters, or National integrated guidelines for Neonatal care in South Africa 2024? I found this difficult to find. I found your reference at the end."	
Question: Does the course outline allow for flexibility of learning styles? **Comment:** "I think some candidates will need more time for skills to help them understand the theory"	There will be remediation offered by the facilitator for those students who need additional support.
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS	
Question: Is the credit value appropriate for the planned learning? **Comment:** "I would rather give 4 credits to module 2 and 3 to module 3"	Module credit changed according to above comment/suggestion.
Question: **CLINICAL COMPONENT** Do you agree with the structure of the three planned clinical days? **Comment:** "I would spend less time on adhesives and more time on assessment. I would also spend less time on suctioning and include an understanding of the	This will be addressed during the three-day clinical workshop and also incorporated under theoretical teaching for Module 2.

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
ventilator settings as I find most RN's copy and paste the vent obs, having no understanding of what they mean and how they can affect the baby"	
APPROPRIATENESS OF ASSESSMENTS	
Question: Do you agree with the flexibility and pass rate for the summative theoretical exam? **Comment:** "I am concerned that they may get their friends to help or do it for them"	This is a perennial problem in nursing education. It is not possible to address this in the course, however the facilitator will try to prevent this from happening by asking the Unit Manager to identify staff members who are qualified and clinically competent to sign off skills in the POE in the units in which the students are employed.
Question: Do you agree with the structure of the POE which will form part of the summative assessment? **Comment:** "Will the unit manager help decide which shift leaders are competent, not all are"	The unit managers will be asked to identify staff members who are qualified and clinically competent to sign off skills in the POE in the units in which the students are employed.
QUESTIONNAIRE 5	
Question: **CLINICAL COMPONENT** Do you agree with the structure of the three planned clinical days? **Comment:** "I would include early initiation of breastmilk on day 1 schedule. You may want to move one component e.g. the	Adjustment made on the three-day skills workshop as per comment/suggestion.

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
blood transfusion to day 2 to try and make day 1 shorter or equalize the hours between day 1 and 2"	
Question: Comments you would like to make about the course outline that were not addressed: **Comment:** "You can add the latest ILCOR guidelines as part- of resources for the Adaption of the neonate to extra-uterine life"	Agreed and important evidenced based resource, which will be added to the resources for this course.
QUESTIONNAIRE 7	
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS	
Question: Is the credit value appropriate for the planned learning? **Comment:** "The same activities have been included for each topic"	A consistent format is used for each condition to ensure consistency of teaching and learning, however some conditions will be presented by students to provide variety and there will be integration of case studies for the students to work on.
Question: Is the credit value appropriate for the planned learning? **Comment:** "Consider adding something other than populating a summary to generate interest e.g. case study or scenario"	Case studies will be incorporated at the end of facilitator presentations of neonatal conditions for students to discuss in order to assist with integration of the theory taught.

Comments/suggestions made by experts on certain questions	Response to comments/suggestions made by experts
MODULE 3: FAMILY-CENTRED CARE IN NEONATAL INTENSIVE CARE UNITS	
Question: Does the module have sufficient resources? **Comment:** “Just a thought to add an interview/video or case study of the moms/families lived experience and journey of having a neonate in an NICU”	This will be added as an activity under module 3, under the topic “Involvement of families in the care of neonates”, where students can interview either moms or their families on their experiences and journey of having a neonate in an NICU.
MODULE 4: UNIQUE ENVIRONMENT OF NEONATAL INTENSIVE CARE UNITS	
Question: Does this module have enough resources? **Comment:** "Consider specific equipment manuals and reference. Also depending on the context, the involvement of a clinical engineer?"	The facilitator will organise a presentation by a clinical engineer centring on the variation of equipment makes used in NICU and emphasis will be put on the importance of being aware that all equipment used must be guided by the specific instruction manuals. Students are to reference their specific equipment manuals depending on the make of equipment they will be setting up as part of the activities under the topic: "Use of technology in the NICU."

8.5 SUMMARY OF RESULTS

8.5.1 Resources

The feedback obtained from the experts during the first round of the Delphi study was instrumental in enhancing the quality and effectiveness of the outline for a neonatal intensive care short course. The experts identified valuable resources that had not initially been considered for inclusion in the course outline. Notably, the World Health Organisation (WHO) guidelines for essential newborn care (WHO, 2020) and the International Liaison Committee on Resuscitation (ILCOR) neonatal resuscitation guidelines (ILCOR, 2021) were highlighted as critical resources that support evidence-based practice in neonatal care.

Additionally, one expert noted an incorrect reference in the National Integrated Guidelines for Neonatal Care in South Africa (2024), which was mistakenly cited as the Integrated Neonatal Care Guidelines 2023. This correction underscores the importance of accurate referencing and ensuring that students can access the relevant resource without difficulty (Santini, 2018).

Furthermore, the need for access to relevant journals was emphasised, ensuring that facilitators have the necessary resources to deliver the course effectively. Engaging with university program administrators will be crucial to address this issue and facilitate efficient course delivery, as access to current literature is fundamental for evidence-based nursing education (Hines et al., 2022).

The feedback obtained from the experts regarding references reinforced the importance of resource credibility and accuracy. The identification of key guidelines, such as those from the WHO and ILCOR, underscores the necessity of using authoritative sources that support evidence-based practice. The correction of an incorrect reference highlighted the need for precision in citation to ensure students can reliably locate essential materials. Access to current, relevant literature and accurate resources is crucial for students and educators alike, as it underpins high-quality education and enhances the overall learning experience. Emphasising credibility and accuracy ensures that nursing students are equipped with trustworthy knowledge and are prepared to deliver competent and informed care.

8.5.2 Credits

Module 2, which focuses on the management and prevention of identified neonatal conditions, encompasses the most extensive content, addressing 13 distinct neonatal conditions. This breadth of content highlights the complexity of neonatal care, where early and effective management of conditions can significantly impact neonatal outcomes (Broom et al., 2024).

Academic credit systems are designed to quantify educational workload and ensure that students engage comprehensively with their courses (Paor, 2020). According to the SANC, one credit is the equivalent of 10 hours. Therefore, increasing the credit value will increase the time allocated for module 2.

The recommendation to increase the number of credits for this module is important, as it will ensure sufficient time for thorough coverage of the material has been provided. This adjustment enables the facilitator to explore the complexities of neonatal conditions in depth, ensuring that nursing students are well-prepared to apply their knowledge effectively in clinical settings.

8.5.3 Content

The experts provided valuable recommendations for enhancing the planned activities for students in each module. One significant suggestion was to include interviews with parents of neonates who have been hospitalised in a Neonatal Intensive Care Unit (NICU). This approach aligns with the emphasis on Family-Centred Care, which has been shown to improve both parental satisfaction and neonatal outcomes (Alsadaan et al., 2023). Integrating such qualitative experiences can foster empathy and understanding in nursing students, enhancing their ability to provide holistic care.

Additionally, the integration of case studies into each module was recommended, with a particular focus on genetics as a factor contributing to chromosomal abnormalities, which play a significant role in the need for palliative care. Palmar-Santos et al. (2023) highlight that using case studies in nursing education has proven effective for evaluating nursing students' clinical practice. This educational tool not only assesses the technical skills and knowledge students use during their training but also strengthens their critical thinking and reflective abilities as they navigate complex

clinical scenarios. This understanding is essential for nursing professionals who care for neonates requiring specialised attention.

Furthermore, differentiating between various congenital cardiac abnormalities was noted as a key topic due to its critical implications for patient management and treatment.

Topics such as Kangaroo Mother Care, developmental care, and the early initiation of breastfeeding were also highlighted as essential components of neonatal care. As evidenced by the mapping review outcomes, research consistently supports the benefits of these practices in promoting neonatal health and development. The researcher will ensure these topics are comprehensively addressed in the micro-curriculum, including the practical management of Respiratory Distress Syndrome through Continuous Positive Airway Pressure (CPAP), which was absent in the original course outline.

Furthermore, the suggestion to invite a clinical engineer to assist with content on "Use of Technology in an NICU" is notable. This inclusion can enhance students' understanding of the diverse equipment used in NICUs and underscore the importance of following specific equipment manuals to ensure safety and efficacy.

Finally, the experts highlighted an inconsistency in the 3-day skills training schedule, noting that Day 1 was 3 hours longer than Day 2. They recommended balancing the hours by redistributing certain topics, which would promote consistency and help prevent cognitive overload, a factor that Collins (2020) indicates can impede learning. These adjustments aim to keep students engaged and support the retention of essential information throughout the training.

8.5.4 Identification of potential barriers

Concerns arose regarding the process of signing off skills in the Portfolio of Evidence (POE). Specifically, challenges may occur in identifying professional nurses who are deemed competent by unit managers in the various units where potential students will be placed. Ensuring that students perform relevant skills competently under appropriate supervision and guidance is crucial, as inadequate supervision can compromise patient safety and care quality (King et al., 2020).

The importance of providing additional support for students at risk of struggling with course content was highlighted. Research shows that timely remediation and support strategies can greatly improve nursing students' knowledge, skill acquisition, and overall confidence (Ghasemi et al., 2020). By identifying early signs of difficulty, the researcher can implement targeted remediation strategies during the micro-curriculum development phase. This proactive approach aligns with best practices in nursing education, where customised support helps build both competence and resilience in learners (Wallace, 2021).

Furthermore, it is essential to establish clear criteria and structured assessments for competency verification within the POE, as a lack of standardised evaluation processes may lead to inconsistencies in skill recognition across different units. This reinforces the importance of integrating robust assessment frameworks in the curriculum to ensure that all students meet the necessary competencies for practice.

8.6 CONCLUSION

This chapter discussed the results of the Delphi study, with experts used in phase 1.2 of the study, which centred around the evaluation of the course outline for a short course on neonatal intensive care nursing. Experts provided valuable comments and suggestions to enhance the delivery of the course. The Delphi study met a 100% consensus after two rounds of questionnaires. Chapter 9, the final chapter, concludes the study with an overview and evaluation of the research study, the limitations of the study as well as recommendations for education, research and policy.

Chapter 9: OVERVIEW, IMPLICATIONS, EVALUATION, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

9.1 INTRODUCTION

In this chapter, an overview of the study, implications for clinical practice, evaluation of the study, study limitations, recommendations and conclusions are presented.

9.2 OVERVIEW OF THE STUDY

This study followed a sequential approach, intentionally structured in phases to triangulate data and enhance the credibility and validity of the findings by integrating multiple data sources, methods, and viewpoints. The goal was to integrate information and provide a richer understanding of the central question: "How can singly qualified nurses in neonatal ICUs be best supported to gain the additional knowledge required to care for compromised neonates?"

Each phase of the study was interconnected, collectively advocating for improved neonatal health outcomes in NICUs. The mapping review generated the foundational information needed to formulate essential neonatal intensive care competencies.

Expert consultations offered valuable insights, identifying which competencies and associated conditions/skills were most critical from a specialist's perspective and suggesting the best delivery methods, such as blended learning. Professional nurses working in NICUs contributed practical insights on the competencies and associated conditions/skills they considered most relevant.

Data collected in phases 1 and 2 was then used to develop the course outline for a neonatal intensive care short course, guided by the ADDIE Model. Initially, the plan was to exclude competencies that ranked lower in the expert consultations and survey results. However, after reflecting on both the ranking exercise and survey results, the researcher decided to include all identified conditions and skills required to fulfil the formulated competencies in the course content.

Notably, experts ranked the skill related to the 'Family-Centred Care competency,' specifically therapeutic communication with families of neonates, lower than other

areas. However, the majority of survey responses from professional nurses indicated that this skill was considered important or very important.

One of the skills related to the 'best practices competency' was skin-to-skin contact with the primary caregiver. Although this skill received lower rankings from the professional nurses compared to other skills and conditions, it was included in the course due to strong evidence in the literature highlighting its significant benefits for the recovery of critically ill neonates. Additionally, the skill addressing COVID-19-related barriers to Family-Centred Care was revised to encompass broader family-centred challenges, reflecting the post-pandemic context during the data collection phase.

The final phase aimed to evaluate the course outline for feasibility and constructive feedback from experts was incorporated, leading to valuable refinements in the course design.

The concluding chapter of this study serves to encapsulate the essence of the research process, providing an evaluative perspective on the study's results, limitations, and its implications for policy, education and future research. The developed outline on a neonatal intensive are short course stands as a pivotal contribution as a starting point to bridging the gap in specialised neonatal care for nurses who lack formal qualifications yet are tasked with the responsibility of caring for critically ill neonates.

9.3 IMPLICATIONS FOR CLINICAL PRACTICE

Global trends in neonatal mortality rates exhibit significant variation based on a country's economic status, with developed nations typically reporting lower rates compared to developing and underdeveloped regions. South Africa, categorised as a developing country, has managed to reduce its neonatal mortality rate to approximately 11-12 deaths per 1,000 live births. Despite this progress, the rate has remained stagnant for the past two decades. This stagnation has resulted in an increase in neonatal mortality's share of the overall under-five mortality rate, which rose to 32% in 2018 from 14% in 2002. To meet the Sustainable Development Goals (SDGs) by 2030, particularly the target of reducing under-five mortality to below 25

deaths per 1,000 live births, addressing neonatal mortality must be a national priority (Gabriels & le Roux, 2023).

Literature indicates that most neonatal deaths are preventable through improved quality of care, such as adequate antenatal services that can mitigate risks like prematurity, a common reason for NICU admissions. Regardless of the conditions that necessitate NICU care, it is imperative for professional nurses in South Africa's NICUs to be highly skilled and competent in caring for vulnerable neonates to help reverse the stagnation in neonatal mortality rates.

This study sought to answer the research question: How can singly qualified nurses working in neonatal ICUs best be supported to gain the additional knowledge required to care for compromised neonates? Singly qualified nurses in this context refer to those who have met the educational and clinical criteria set by the South African Nursing Council (SANC) to practice nursing but do not hold a qualification in a specialisation. These nurses face limitations in advancing to specialist roles due to the alignment of nursing education with higher education standards, which restricts their progression beyond their current National Qualifications Framework (NQF) level 6.

Overall academic staff qualifications across four NICUs revealed that most nurses did not possess midwifery training or specialisations in midwifery, child nursing science, or critical care nursing. This indicates that the majority of nurses at the study sites entered NICU roles without formal training in basic neonatal care, let alone neonatal intensive care.

One potential avenue for equipping these nurses with essential skills is through Continuous Professional Development (CPD). This study aimed to contribute to this by developing an outline for a neonatal intensive care short course. The course is designed to support the professional development of singly qualified nurses who lack specialist training, thereby enhancing their ability to provide high-quality care in NICUs and reducing the risk of adverse neonatal outcomes.

9.4 EVALUATION OF THE STUDY

My passion for neonatal nursing began in my first year as a professional nurse in a neonatal high care ward, where I had minimal prior experience caring for vulnerable neonates. Through hands-on experience in various neonatal units, including Kangaroo Mother Care and neonatal/paediatric ICUs, my commitment to the field deepened and led me into academia. Observing the resilience of neonates and the positive impact of maternal involvement reinforced my dedication to this specialty and highlighted the importance of specialised neonatal care.

Pursuing a Post Graduate Diploma in Child Nursing Science expanded my understanding of the complexity of neonatal care and revealed gaps in my earlier practice. This realisation, combined with insights gained during my master's studies in nursing education on effective teaching and curriculum design, inspired the focus of my PhD research: addressing the training needs of singly qualified nurses in NICUs.

Using an evidence-based methodology guided by the ADDIE Model and a mixed-methods approach, I sought to develop a targeted training programme to upskill these nurses and enhance neonatal care practices in South Africa.

I will evaluate the different phases of the study and assess whether the specific objectives for each phase were achieved.

9.5 Evaluation of the Mapping Review and Competency Formulation

Conducting the mapping review presented initial challenges, primarily due to its status as an emerging review method. However, it ultimately proved effective, yielding 109 relevant articles and revealing global engagement in neonatal care, with significant contributions from both developed and developing countries. The review highlighted the growing emphasis on evidence-based practices and Family-Centred Care (FCC). These insights were integrated into a competency framework, adapted due to the absence of a neonatal-specific framework in South Africa, providing a foundation for the formulation of competencies.

The objective was to identify best practices, as recommended in both local and international literature, for the care of compromised neonates. This objective was successfully met, as demonstrated by the extensive literature sourced from the three identified journals.

Another objective was to formulate neonatal intensive care competencies based on the identified best practices. This objective was also met, with neonatal intensive care competencies formulated and subsequently used as the foundation for developing the survey aimed at professional nurses working in NICUs.

9.5.1 Evaluation of the Ranking Exercise (Phase 1.2)

The ranking exercise provided valuable insights by highlighting how experts prioritised neonatal competencies, along with the associated conditions and skills. The variations in these rankings underscored the need for a balanced approach when developing a comprehensive course outline. This process directly addressed the objective of ranking the formulated neonatal intensive care competencies in order of importance.

9.5.2 Evaluation of Survey Distribution

Initial plans for survey collection involved physical drop-off boxes; however, discussions with NICU staff revealed that this approach would be ineffective due to workload constraints. Adapting to a more hands-on approach, where surveys were collected directly after distribution, resulted in improved engagement. Observations during this phase also highlighted critical understaffing and capacity issues, which complicated adherence to protocols. Despite these challenges, staff demonstrated a strong enthusiasm for professional development, which underscored the importance and relevance of the formulated neonatal intensive care competencies. This process directly addressed the objectives of determining the importance and relevance of these competencies for professional nurses working in NICU care.

9.5.3 Evaluation of Focus Group Discussions and Individual Expert Interviews

Focus groups and individual expert interviews provided valuable feedback on the course structure and delivery. Experts offered practical recommendations for content delivery methods, assessment strategies, and supportive measures to help overcome learner barriers, with a strong emphasis on bridging theory with clinical practice. This process directly addressed the objective of gaining expert insight on how best to design the intended course.

9.5.4 Evaluation of Course Outline Development

A competency-based curriculum was selected, aligning content from previous phases to ensure that learners could demonstrate practical skills and decision-making capabilities. The flexible ADDIE Model was used to guide the development of the course outline, enabling iterative refinement and ensuring alignment with the study's goals. This approach effectively met the objective of structuring the short course.

9.5.5 Evaluation of Course Verification

Apprehension about external evaluation was outweighed by the constructive feedback received from experts. This phase led to significant enhancements in the course, including the addition of resources, credit management insights, and refined content delivery strategies, ensuring a comprehensive and effective training program. The expert review process directly addressed the objective of evaluating the outline of the developed neonatal intensive care short course for relevance and feasibility. While the study provided valuable insights and facilitated the development of the course outline, several limitations were identified that could impact the generalisability and implementation of the findings.

9.6 STUDY LIMITATIONS

- The research design limitations may have arisen as the researcher used the ADDIE model which has not been standardised. As a result, the researcher's interpretation of the framework may differ from other studies using the ADDIE Model.
- The mapping review specifically selected literature from peer reviewed high impact journals; this was done in order to select up to date evidence-based literature. This may have excluded literature from middle- and low-income countries, which could have limited the selection of competencies.
- The sample size of the professional nurses in phase 1.3.1 was small for a survey. However, as the total sample of the nurses present at the time of the data collection was included, this limitation could not be overcome unless the study had been extended to other healthcare establishments. This may limit the generalisability of the results.
- A smaller group of experts agreed to participate than the researcher had initially envisaged. This limited the ability to gather insights from a larger group of experts on the key competencies for neonatal intensive care and how best to deliver the intended course.
- The survey tool used in phase 1.3 was generated by the researcher however a Cronbach alpha demonstrated internal consistency.
- The participants tended to respond in a similar manner when answering the question: "provide a reason for why you have deemed this competency as very important/important". The majority responded with "It will make a positive impact towards the care of a neonate in ICU" in most cases. This could be seen as response bias, which could have affected the credibility and dependability of the findings.
- There was a discrepancy between the number of the response rates per item, due to some participants not answering on a specific item. The researcher did not exclude surveys with minimal missing data on the advice of the external statistician. The decision not to exclude surveys with minimal missing data could introduce a degree of bias, as the partial responses might not fully

represent the perspectives of all participants. This could impact the generalisability of the findings.

- The use of self-reported data in phases 2 and 3 may have resulted in recall bias and social desirability bias, which in turn may have influenced the outcomes of the study.

The limitations highlighted in this study underscore critical areas for improvement and raise considerations that can guide future efforts. Building upon these findings, recommendations are presented for policy development, nursing education, and future research to enhance the impact of neonatal intensive care nurse training.

9.7 RECOMMENDATIONS

9.7.1 Recommendations for Policy development

- The success of the short course as a tool for professional development hinges on the institutional support it receives, both in terms of policy integration and educational resource allocation. It is recommended that the course is recognised as part of formal Continuous Professional Development (CPD) offerings.
- While a short course to upskill singly qualified nurses fills a current gap, policy should be developed to entrench neonatal nursing into mainstream education and speciality programs should be offered as formal postgraduate studies.

9.7.2 Nursing Education

- It is recommended that future research focus on advocating for the formal recognition of neonatal nursing by relevant stakeholders.
- The micro curriculum and the materials for the intended programme need to be fully developed.
- Alternative methods of offering courses should be explored to facilitate access and uptake, for example, microlearning.
- The intended course could be recognised for credit transfer to nurses eligible to specialise in Child Nursing Science, Advanced Midwifery or Critical Care Nursing.
- Nurses who supervise students on the intended course should be orientated on the programme to enhance buy-in and support.

9.7.3 Future Research

- Future research should assess the long-term impact of the course on neonatal health outcomes through longitudinal studies. These studies could compare neonatal mortality and health outcomes between units with a higher proportion of nurses who have completed the course and those with fewer trained nurses. This approach would help determine the course's impact while accounting for variations in training coverage among healthcare providers.
- Future research to evaluate the retention and practical application of knowledge and skills acquired by students who have completed the course should be undertaken. This could include periodic assessments and follow-up studies to measure how well participants integrate course teachings into their daily practice and the effect on neonatal care quality over time.
- Research should be conducted to assess the transferability of the intended programme to include other nursing education institutions/healthcare establishments.
- Explore the expert observations relating to aspects to poor care in the clinical setting with a view to determining the veracity of their claims.

9.8 CONCLUSION

This study addresses a critical gap in the training of singly qualified NICU nurses, whose limited specialisation impacts their ability to deliver specialised neonatal care. Using the ADDIE Model, a competency-based course was designed to assist with the enhancement of their knowledge attitudes and skills. The mapping review emphasised evidence-based practices and highlighted a global focus on Family-Centred Care, although it leaned heavily on literature from high-income countries. Expert feedback and nurse surveys reinforced the need for practical, comprehensive training that bridges theory and practice.

Limitations include potential biases from self-reported data, a small sample size, and the exclusion of some lower-income studies. Despite these, the study makes valuable contributions, offering a structured course to improve neonatal care. Recommendations for policy, nursing education, and further research include recognising the course as CPD, integrating neonatal training into curricula, and

assessing the course’s long-term impact. This supports enhanced care and aligns with global health goals to reduce neonatal mortality.

REFERENCES

Aase, I., Akerjordet, K., Crookes, P., Frøiland, C.T. & Laugaland, K.A. (2022) Exploring the formal assessment discussions in clinical nursing education: An observational study', *BMC Nursing*, 21(155). Available at: https://doi.org/10.1186/s12912-022-00934-x.

Abramowski, A., Ward, R. & Hamdan, A.H., 2023. Neonatal hypoglycemia. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov/books/NBK537105/.

Ager, A. & Sparling, T., 2013. *Participatory Ranking Methodology: A Brief Guide*. Version 3.1. Program on Forced Migration. Available at: https://watsanmissionassistant.org [Accessed 13 February 2021].

Ahmed, A., 2008. Ontological, Epistemological and Methodological Assumptions: Qualitative Versus Quantitative. Unpublished manuscript, Helwan University, Egypt.

Ajao, A. E. & Adeoye, I. A., 2019. Prevalence, risk factors and outcome of congenital anomalies among neonatal admissions in OGBOMOSO, Nigeria. *BMC Pediatrics,* 19(88), pp. 1-2. Available at: https://doi.org/10.1186/s12887-019-1471-1.

Akhtar, M.I., 2024. Research design. In *Research in Social Science: Interdisciplinary Perspectives*. Jamia Millia Islamia, New Delhi, pp. 68-84. Available at: https://www.researchgate.net/publication/308915548.

Aktaş, E., Aykanat Girgin, B., Gözen, D., Ergün, K., Pekyiğit, A., & Çetinkaya, M., 2022. Effect of left and right semi-elevated side-lying positions on feeding performance of preterm infants. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 51(1), pp.65-72. Available at: https://doi.org/10.1016/j.jogn.2021.09.006.

Aldoobie, N., 2015. ADDIE model. *American International Journal of Contemporary Research,* 5(6), pp. 68-72. Available at: https://www.aijcrnet.com/journals/Vol_5_No_6_December_2015/10.pdf.

Alem, D. D., 2020. An overview of data analysis and interpretations in research. *International Journal of Academic Research in Education and Review,* 8(1), pp. 1-27. Available at: https://www.researchgate.net/publication/365668845.

Alfieri, E., Alebbi, A., Bedini, M.G., Boni, L. & Foà, C. (2017) 'Analysis of the organisational environment: a qualitative research', *Acta Biomedica for Health Professions*, 88(3), pp. 51-58. Available at: https://doi.org/10.1186/s12912-022-00934-x.

Alganabi, M., Lee, C., Bindi, E. & Li, B. (2019) Recent advances in understanding necrotizing enterocolitis, *F1000Research*, 8(107), p. 3. Available at: https://doi.org/10.12688/f1000research.17228.1.

Alkathiri, M. S., 2021. Course design for teaching development: key considerations for faculty developers. *International Journal of Innovation, Creativity and Change,* 15(3), p. 14. Available at: https://doi.org/10.53333/IJICC2013/15304.

Allande-Cusso, R., Fernandez-Garcia, E., Gomez-Salgado, J. & Porcel-Galvez, A. M., 2022. Understanding the nurse-patient relationship: a predictive approach to caring interaction. *Collegian,* 29(5), p. 663. Available at: https://doi.org/10.1016/j.colegn.2022.04.003.

Al-Maghaireh, D.F., Khalaf, I.A., Abdullah, K.L., Chan, C.M., Basyoun, N.R. & Kawafha, M.M. (2020) The effect of an emotional support training program on acute stress disorder among mothers of preterm infants hospitalized in neonatal intensive care units, *Journal of Neonatal Nursing*, 26(5), pp. 273-277. Available at: https://doi.org/10.1016/j.jnn.2020.06.003.

Al-Momani, M. M., 2020. Admission patterns and risk factors linked with neonatal mortality: A hospital-based retrospective study. *Pakistan Journal of Medical Sciences,* 36(6), p. 1371. Available at: https://doi.org/10.12669/pjms.36.6.2281.

Alsadaan, N., Ramadan, O. M. E., Alqahtani, M., Shaban, M., Elsharkawy, N. B., Abdelaziz, E. M., & Ali, S. I. (2023). Impacts of integrating family-centered care and developmental care principles on neonatal neurodevelopmental outcomes among high-risk neonates. Children, 10(1751), pp. 1-13. Available at: https://doi.org/10.3390/children10111751.

Anbalagan, S., Falkowitz, D.M. & Mendez, M.D. (2024) Neonatal Abstinence Syndrome, in *StatPearls* [Internet]. Treasure Island, FL: StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov/books/NBK551498/.

Asai, H., Mizuno, K., Yamashita, K., Samejima, M., Yamamoto, K., Hawthorne, K.M., Furukawa, K., Hinokuma, N., & Otsuka, N. (2020) Survey of neonatal ICU nurses' knowledge of neonatal nutrition in Japan, *Journal of Neonatal Nursing*, 26(1), pp. 57-58. Available at: https://doi.org/10.1016/j.jnn.2019.08.001.

Ashghali-Farahani, M., Ghaffari, F., Hoseini-Esfidarjani, S.S., Hadian, Z., Qomi, R. & Dargahi, H. (2018) Neonatal intensive care nursing curriculum challenges based on context, input, process, and product evaluation model: A qualitative study, *Iranian Journal of Nursing and Midwifery Research*, 23(2), pp. 111–118. Available at: https://doi.org/10.4103/ijnmr.IJNMR_3_17.

August, D., Chapple, L., Flint, A., Macey, J., Ng, L. & New, K. (2020) 'Facilitating neonatal MARSI evidence into practice: Investigating multimedia resources with Australian neonatal nurses – A participatory action research project', Journal of Neonatal Nursing, 27, pp. 291-297. Available at: https://doi.org/10.1016/j.jnn.2020.12.001.

August, D.L., Kandasamy, Y., Ray, R., Lindsay, D. & New, K. (2021) Fresh perspectives on hospital-acquired neonatal skin injury period prevalence from a multicenter study: Length of stay, acuity, and incomplete course of antenatal steroids, The Journal of Perinatal & Neonatal Nursing, 35(3), pp. 275-283. Available at: https://doi.org/10.1097/JPN.0000000000000513.

Aveyard, H., & Bradbury-Jones, C. (2019). An analysis of current practices in undertaking literature reviews in nursing: Findings from a focused mapping review and synthesis. BMC Medical Research Methodology, 19, 105. Available at: https://doi.org/10.1186/s12874-019-0751-7.

Babaie, M., Nourian, M., Atashzadeh-Shoorideh, F., Manoochehri, H. & Nasiri, M. (2023) Patient safety culture in neonatal intensive care units: A qualitative content analysis, *Frontiers in Public Health*, 11. DOI: 10.3389/fpubh.2023.1065522. Available at: https://www.frontiersin.org/journals/publichealth/articles/10.3389/fpubh.2023.1065522.

Bachman, T.E., Iyer, N.P., Newth, C.J.L. & LeMoyne, R. (2023) Determining an optimal oxygen saturation target range based on neonatal maturity: Demonstration of a decision tree analytic, *Diagnostics (Basel, Switzerland)*, 13(21), p. 3312. Available

at: https://doi.org/10.3390/diagnostics13213312.

Baharudin, S. N. A., Murad, M. & Mat, N. H. H., 2013. Challenges of adult learners: a case study of full-time postgraduate students. *Procedia: Social and Behavioral Science,* 90, p. 773. Available at: https://doi.org/10.1016/j.sbspro.2013.07.15.

Balci, S., Dur, S., Ozdemir, S. & Kavuncuoglu, S., 2021. The effect of two different lancets and heel warming on duration of crying and procedure time during blood sampling: A randomized controlled study. *Journal of Neonatal Nursing,* 27(6), pp. 426-431. Available at: https://doi.org/10.1016/j.jnn.2021.06.003.

Barrett, D. & Heale, R., 2020. What are Delphi studies? *Evidenced Based Nursing,* 23(3), p. 68. Available at: https://doi.org/10.1136/ebnurs-2020-103303.

Barry, A. E., Chaney, E. H., Stellesfson, M. L. & Chaney, J. D., 2011. So you want to develop a survey: practical recommendations for scale development. *American Journal of Health Studies,* 26(2), p. 102.

Beck, C. T., 2022. Secondary Qualitative Analysis of Moral Injury in Obstetric and Neonatal Nurses. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 51(2), pp. 166-176. Available at: https://doi.org/10.1016/j.jogn.2021.12.003.

Bedetti, L., Lugli, L., Bertoncelli, N., Spaggiari, E., Garetti, E., Lucaccioni, L., Cipolli, F., & Berardi, A. (2023) Early Skin-to-Skin Contact in Preterm Infants: Is It Safe? An Italian Experience, *Children (Basel, Switzerland)*, 10(3), p. 570. Available at: https://doi.org/10.3390/children10030570.

Beltran, S. J. & Hamel, M. N., 2021. Caring for dying infants: a systematic review of healthcare providers' perspectives of neonatal palliative care. *American Journal of Hospice & Palliative Medicine,* 38(8), p. 1014. Available at: https://doi.org/10.1177/1049909120965949.

Ben Natan, M., Mahajna, M., & Mahajna, M. (2022). The role of educational programs in improving neonatal care practices. Nursing Outlook, 70(1), pp. 76-83.

Berman, E. (2017) An Exploratory Sequential Mixed Methods Approach to Understanding Researchers' Data Management Practices at UVM: Findings from the Quantitative Phase, *Journal of eScience Librarianship*, 6, e1098. Available at: https://doi.org/10.7191/jeslib.2017.1098.

Bhat, V., Moront, M. & Bhandari, V. (2020) Gastroschisis: A State-of-the-Art Review, *Children*, 7(12), 302. Available at: https://doi.org/10.3390/children7120302.

Biedenbach, T. & Jacobsson, M., 2016. The open secret of values: the roles of values and axiology in project research. *Project Management Journal,* 47(3), pp. 139-155. Available at: https://doi.org/10.1177/875697281604700312.

Bol, B., van Zanten, H., Wielenga, J., Vd Hoogen, A., Mansvelt, P., Blackwood, B., & Helder, O. (2020). Protocolized Versus Nonprotocolized Weaning to Reduce the Duration of Invasive Mechanical Weaning in Neonates: A Systematic Review of All Types of Studies. *The Journal of Perinatal & Neonatal Nursing*, *34*(2), pp.162–170. Available at: https://doi.org/10.1097/JPN.0000000000000411.

Botma, Y., Greeff, M., Makhado, L., & Mulaudzi, F. M. (2022). Research in health sciences (2nd ed.). Pearson South Africa. ISBN: 9781775956969.

Bradbury-Jones, C., Brekenridge, J., Clark, M., & Herber, O. (2019). Advancing the science of literature reviewing in social research: the focused mapping review and synthesis. *International Journal of Social Research Methodology,* 22, p. 3. Available at: https://doi.org/10.1080/13645579.2019.1576328.

Bradford-Duarte, R. & Gbinigie, H. (2020). Neonatal family integrated care: ensuring a positive parental experience. *Journal of Neonatal Nursing,* 26(5), pp. 284-290. Available at: https://doi.org/10.1016/j.jnn.2020.03.003.

Bromley, P., Govindaswamy, P., Walsh, A., Michaels, A. & Parsons, J. (2021) Examining workplace-based education strategies for the 21st century neonatal nurse: Literature review, Journal of Neonatal Nursing, 27(6), pp. 396-401. Available at: https://doi.org/10.1016/j.jnn.2021.06.012.

Broom, M., Briguglio, L., Lowe, P., Muirhead, R., Jyoti, J., Ng, L., Blay, N., Perumbil Pathrose, S., Trajkovski, S., Spence, K., Chetty, N., & Foster, J. (2024). Mapping neonatal nursing interventions that significantly impact neonatal outcomes to neonatal practice standards. Journal of Neonatal Nursing. Available at: https://doi.org/10.1016/j.jnn.2024.07.030.

Brown, K., Elliot, S., Leatherdale, S. & Robertson-Wilson, J. (2015). Searching for rigour in the reporting of mixed methods population health research: a methodological review. *Health Education Research,* 30(6), p. 812. Available at: https://doi.org/10.1093/her/cyv046.

Brown, S. A., Waldrop, J., D'Auria, J. & Haushalter, J. (2020). Improving Evaluation and Treatment of Hyperbilirubinemia in Late Preterm Infants. *The Journal of Perinatal & Neonatal Nursing,* 34(4), pp. 356-351. Available at: https://doi.org/10.1097/JPN.0000000000000523.

Browne, J. V. (2021). Infant mental health in intensive care: laying a foundation for social, emotional and mental health outcomes through regulation, relationships and reflection. *Journal of Neonatal Nursing,* 27(1), pp. 33-39. Available at: https://doi.org/10.1016/j.jnn.2020.11.011.

Bry, A. & Wigert, H. (2022). Stress and social support among registered nurses in level II NICU. *Journal of Neonatal Nursing,* 28(1), pp. 37-41. Available at: https://doi.org/10.1016/j.jnn.2021.03.010.

Burnham, L., Gambari, A., Beliveau, P., Ustianov, J., Parker, M. G., & Merewood, A. (2021). Perspectives of Nurses in Mississippi on Implementation of the Baby-Friendly Hospital Initiative. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN*, *50*(4), pp. 392–401. Available at: https://doi.org/10.1016/j.jogn.2021.02.010.

Campbell, F., Tricco, A. C., Munn, Z., et al. (2023). Mapping reviews, scoping reviews, and evidence and gap maps (EGMs): The same but different—The "Big Picture" review family. Systematic Reviews, 12, 45. Available at: https://doi.org/10.1186/s13643-023-02178-5.

Celenza, J. F., Zayack, D., Buus-Frank, M. F. & Horbar, J. D. (2017). Family involvement in quality improvement. *Clinic in Perinatology,* 44(3), p. 554. Available at: https://doi.org/10.1016/j.clp.2017.05.008.

Chang, J., Filoteo, L. & Nasr, A. S. (2020). Comparing the analgesic effects of 4 nonpharmacologic interventions on term newborns undergoing heel lance. *The Journal of Perinatal & Neonatal Nursing,* 34(4), pp. 338-345. Available at: https://doi.org/10.1097/JPN.0000000000000495.

Cheraghi, F., Yousefzadeh, M. R. & Goodarzi, A. (2019). The role and status of philosophy in nursing knowledge, insight and competence. *Journal of Clinical*

Research in Paramedical Sciences, 8(2), p. 1. Available at: https://doi.org/10.5812/jcrps.90762.

Cherem, E. O., Alves, V. H., Rodrigues, D. P., Souza, F. D. L., Guerra, J. V. V., & Maciel, V. L. (2017). Nurses' knowledge of blood transfusion in neonate. *Revista gaucha de enfermagem*, *38*(1), p.e63557. Available at: https://doi.org/10.1590/1983-1447.2017.01.63557.

Cardiff University (n.d.) *How to conduct a Delphi study*. Available at: https://www.cardiff.ac.uk/__data/assets/pdf_file/0010/1164961/how_to_conduct_a_delphistudy.pdf [Accessed 12 August 2024].

Christodoulakis, A., Sfakianakis, M. Z. & Tsiligianni, I. (2023). Suggestions for overcoming the barriers to critical thinking in nursing. *Japan Journal of Nursing Science,* 20(3), p. e12525. Available at: https://doi.org/10.1111/jjns.12525.

Chuenjitwongsa, S., Oliver, R. G. & Bullock, A. D. (2016). Competence, competency-based education, and undergraduate dental education: a discussion paper. *European Journal of Dental Education,* 22, pp. 1-8. Available at: https://doi.org/10.1111/eje.12213.

Clifton-Koeppel, R., Armbruster, D. & Coe, K. (2021). Medication safety in the neonatal intensive care unit. *Advances in Neonatal Care,* 21(6), p. 432. Available at: https://doi.org/10.1097/ANC.0000000000000956.

Colleges of Medicine of South Africa (CMSA), 2024. *Homepage*. Available at: https://cmsa.co.za/ (Accessed: 13 February 2024).

Collins, R. (2020). Clinician cognitive overload and its implications for nurse leaders. *Nurse Leader, 18*(1), pp. 44–47. Available at: https://doi.org/10.1016/j.mnl.2019.11.007.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications.

Cushing, A. (1994). Historical and epistemological perspectives on research and nursing. *Journal of Advanced Nursing,* 20(3), pp. 406-411. Available at: https://doi.org/10.1111/j.1365-2648.1994.tb02373.x.

Dawson, J., Rigby-Brown, A., Adams, L., Baker, R., Fernando, J., Forrest, A., Kirkwood, A., Murray, R., West, M., Wike, P., and Wilde, M. (2019) Developing and

evaluating a tool to measure general practice productivity: a multimethod study, *Health Services Delivery Research*, 7, pp. 13. doi: 10.3310/hsdr07130. Available at: https://doi.org/10.3310/hsdr07130.

de Armas, A. G., Marin, S. C. O. & Semenic, S. (2021). Identifying priorities for practice improvement related to breastfeeding support in a neonatal intensive care unit (NICU) in Medellin, Colombia. *Journal of Neonatal Nursing,* 27(2), pp. 94-99. Available at: https://doi.org/10.1016/j.jnn.2020.07.001.

De Vos, A.S., Strydom, H., Fouche, C.B., and Delport, C.S.L. (2017) *Intervention research*. In: De Vos, A.S., Strydom, H., Fouche, C.B. and Delport, C.S.L. (eds.) *Research at grass roots: For social sciences & human service professions*. 4th edn. Pretoria: Van Schaik Publishers, pp. 215-472.

DesMadryl, M., Mazur, K.M., VanAntwerp, K., Ziegman, C., Nemshak, M., and Shuman, C.J. (2021) Neonatal intensive care nurses' perceptions of implementing parent discharge preparation tools, *Journal of Neonatal Nursing*, 27(4), pp. 238-243.Available at: https://doi.org/10.1016/j.jnn.2020.10.003.

Desorcy-Scherer, K., Bendixen, M. M. & Parker, L. A. (2020). Determinants of the very low- birth-weight infant's intestinal microbiome. *The Journal of Perinatal & Neonatal Nursing,* 34(3), pp. 257-275. Available at: https://doi.org/10.1097/JPN.0000000000000506.

Doede, M. & Trinkoff, A. M. (2020). Emotional work of neonatal nurses in a single-family room NICU. *Journal of Obstetric, Gynecologic and Neonatal Nursing,* 49(3), pp. 283-292. Available at: https://doi.org/10.1016/j.jogn.2020.03.001.

Doherty, T.M., Hu, A. and Salik, I. (2023) Physiology, Neonatal. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov/books/NBK539840/.

Doorenbos, A.Z. (2014) Mixed methods in nursing research: An overview and practical examples, *Kango Kenkyu. The Japanese Journal of Nursing Research*, 47(3), pp. 207–217.

Driver, M., Mikhail, S., Carson, M.C., Lakatos, P.P., Matic, T., Chin, S., and Williams, M.E. (2021) Infant-family mental health in the NICU: A mixed-methods study exploring referral pathways and family engagement, *The Journal of Perinatal & Neonatal Nursing*, 35(1), pp. 68–78. Available at:

https://doi.org/10.1097/JPN.0000000000000545.

Duff, J., Curnen, K., Reed, A. & Kranz, C. (2021). Engaging parents of hospitalized neonates during a pandemic. *Journal of Neonatal Nursing,* 27(3), pp. 185-187. Available at: https://doi.org/10.1016/j.jnn.2020.11.013.

Echols, D. G., Neely, P. W. & Dusick, D. (2018). Understanding faculty training in competency- based curriculum development. *Competency-Based Education,* 3(e01162), pp. 1-9. Available at: https://doi.org/10.1002/cbe2.1162.

Eeles, A. L. & Gibbs, D. (2020). Tool to enhance relationships between staff and parents in the neonatal unit. *Journal of Obstetric, Gynaecologic & Neonatal Nursing,* 49(6), pp. 593-604. Available at: https://doi.org/10.1016/j.jogn.2020.08.007.

Eissler, A. B., Zwakhalen, S., Stoffel, L. & Hahn, S. (2021). Systematic review of the effectiveness of involving parents during painful interventions for their preterm infants. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 51(1), pp. 6-15. Available at: https://doi.org/10.1016/j.jogn.2021.08.100.

El Aziz, A. M., Ahmed, S. M. & Abolwafa, N. F. (2021). Nurses, Knowledge and Practices regarding Medication Preparation and Administration Errors Occurrence at Neonatal Intensive Care Units. *Minia Scientific Nursing Journal,* 10(1), p. 141. Available at: https://doi.org/10.21608/msnj.2021.105044.1011.

Elshazzly, M., Anekar, A.A., Shumway, K.R., et al. (2023) Physiology, Newborn. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov/books/NBK499951/.

Emmanuel, A., Kain, V. J. & Forster, E. (2021). Improving the quality of neonatal care in Nigeria through the education of maternity health workers. *Journal of Neonatal Nursing,* 27, pp. 211-215. Available at: https://doi.org/10.1016/j.jnn.2020.09.002.

Erkut, Z., Mutlu, B. & Cakici, M. (2021). The effect of 3 positions given to preterm infants during heelstick procedure on pain and durations of crying and procedure. *The Journal of Perinatal & Neonatal Nursing,* 35(2), pp. 188-195. Available at: https://doi.org/10.1097/JPN.0000000000000547.

Esser, M. S., Ngui, E. M. & Johnson, T. S. (2021). Contributing factors to diaper dermatitis and NICU length of stay. *Journal of Neonatal Nursing,* 27, pp. 358-364.

Available at: https://doi.org/10.1016/j.jnn.2021.03.006.
Fanelli, S., Bellu, R., Zangrandi, A., Gagliardi, L., Zanini, R. (2020). Managerial features and outcome in neonatal intensive care units: results from a cluster analysis. BMC Health Services Research, 20(957), p. 2. Available at: https://doi.org/10.1186/s12913-020-05796-0.

Ferreira, D. M., Girão, A. L. A., E Silva, A. V. S., Chaves, E. M. C., de Almeida, P. C., Freire, V. S., & de Carvalho, R. E. F. L. (2020). Application of a Bundle in the Prevention of Peri-Intraventricular Hemorrhage in Preterm Newborns. *The Journal of perinatal & neonatal nursing*, *34*(2), pp. E5–E11. Available at: https://doi.org/10.1097/JPN.0000000000000482.

Finch, H. (2022). An introduction to the analysis of ranked response data. *Practical Assessment Research & Evaluation,* 27(7), p. 1. Available at: https://scholarworks.umass.edu/pare/vol27/iss1/7.

Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the journal. *American Journal of Pharmaceutical Education,* 72(2), p. 43. Available at: https://doi.org/10.5688/aj720243.

Flores, C. J., Lakkundi, A., McIntosh, J., Freeman, P., Thomson, A., Saxon, B., Parsons, J., Spigiel, T., Milton, S., & Ross, B. (2020). Embedding best transfusion practice and blood management in neonatal intensive care. *BMJ open quality*, *9*(1), p. e000694. Available at: https://doi.org/10.1136/bmjoq-2019-000694.

Forbes-Coe, A., Dawson, J., Flint, A. & Walker, K. (2020). The evolution of the neonatal nurse practitioner role in Australia: A discussion paper. *Journal of Neonatal Nursing,* 26, pp. 197-200. Available at: https://doi.org/10.1016/j.jnn.2020.01.008.

Forde, D., Fang, M. L. & Miaskowski, C. (2022). A systematic review of the effects of skin-to-skin contact on biomarkers of stress in preterm infants and parents. *Advances in Neonatal Care,* 22(3), p. 223. Available at: https://doi.org/10.1097/ANC.0000000000000905.

Fu, M.-L., Lee, T.-Y. & Kuo, S.-C. (2021). Evaluation of an e-Learning breastfeeding program for postpartum mothers of moderately high-risk newborn infants admitted to the special care nursery. *The Journal of Perinatal & Neonatal Nursing,* 35(2), pp. 177-187. Available at: https://doi.org/10.1097/JPN.0000000000000546.

Fukada, M. (2018). Nursing competency: definition, structure and development. *Yonago Acta Medica,* 61, pp. 1-7. Available at: https://doi.org/10.33160/yam.2018.03.001.

Gabriels, C. & le Roux, D. M. (2023). In-hospital neonatal mortality in a level-2 hospital in Cape Town, South Africa. *South African Journal of Child Health,* 17(3), p. 129. Available at: 4. https://doi.org/10.7196/SAJCH.2023.v17i3.1964.

George, S., Showalter, D. & Graham, K. (2023). Implementing the role of neonatal assessment nurse to improve skin-to-skin and breastfeeding exclusivity. *Nursing for Women's Health,* 27(2), p. 80. Available at: https://doi.org/10.1016/j.nwh.2023.01.005.

Gerhardsson, E., Rosenblad, A., Mattsson, E., & Funkquist, E. L. (2020). Mothers' Adaptation to a Late Preterm Infant When Breastfeeding. *The Journal of Perinatal & Neonatal Nursing*, *34*(1), pp. 88–95. Available at: https://doi.org/10.1097/JPN.0000000000000463.

Geyer, N. (2016). A universal truth: Are we heading for no health care? *Sabinet African Journals,* 20(4), p. 23. Available at: https://journals.co.za/doi/pdf/10.10520/EJC-4f4b3f842.

Gholami, S., Shirinabadi Farahani, A., Alaee Karahroudy, F., Moghadam, F., Boromandnia, N. and Khanali Mojen, L. (2022) The effect of telenursing on the rate of newborn readmission, *Journal of Neonatal Nursing*, 28(1), pp. 26-30. Available at: https://doi.org/10.1016/j.jnn.2021.03.001.

Ghorbani, F. & Jabraeili, M. (2022). Beliefs and attitudes of nurses towards open visiting policy in neonatal intensive care units: A descriptive cross-sectional study in northwest Iran. *Journal of Neonatal Nursing,* 28(2), pp. 123-129. Available at: https://doi.org/10.1016/j.jnn.2021.08.009.

Gibbs, D., Odeh, N., Theron, M. & Harding, C. (2021). Level 1 neonatal nursing staff perceptions of their role: A qualitative framework analysis study investigating the complex and diverse workload undertaken by nurses in special care baby units. *Journal of Neonatal Nursing,* 27, pp. 244-250. Available at: https://doi.org/10.1016/j.jnn.2020.10.004.

Gillam-Krakauer, M., Shah, M. and Gowen Jr, C.W. (2024) 'Birth Asphyxia', in StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov/books/NBK430782/.

Givrad, S., Dowtin, L. L., Scala, M. & Hall, S. L. (2021). Recognizing and mitigating infant distress in Neonatal Intensive Care Unit (NICU). *Journal of Neonatal Nursing,* 27(1), pp. 14- 20. Available at: https://doi.org/10.1016/j.jnn.2020.09.009.

Goel, A. & Nangia, S. (2017). Meconium aspiration syndrome: challenges and solutions. *Research and Reports in Neonatology,* 7, p. 19. Available at: https://doi.org/10.1016/j.jnn.2020.09.009.

Gordon, J.M., Robidoux, H., Gaffney, K., Cirrito, B.L. and Lauerer, J.A. (2021) Conceptualizing the early detection and intervention of infant mental health disorders in neonatal nursing, Journal of Neonatal Nursing, 27(1), pp. 6-13. Available at: https://doi.org/10.1016/j.jnn.2020.10.002.

Gray, J.R. and Grove, S.K. (2021) Burns and Grove's The Practice of Nursing Research. In: Mixed methods research - Burns and Grove's The Practice of Nursing Research. s.l.: Elsevier, pp. 386-409.

Green, J., Petty, J., Bromley, P., Walker, K. and Jones, L. (2020) COVID-19 in babies: Knowledge for neonatal care, *Journal of Neonatal Nursing*, 26(5), pp. 239-246. Available at: https://doi.org/10.1016/j.jnn.2020.06.005.

Green, J., Fowler, C., Petty, J. & Whiting, L. (2021). The transition home of extremely premature babies: an integrative review. *Journal of Neonatal Nursing,* 27(1), pp. 26-32. Available at: https://doi.org/10.1016/j.jnn.2020.09.011.

Grime, MM & Wright, G. (2016), Delphi Method. in P Brandimarte, B Everitt, G Molenberghs, W Piegorsch & F Ruggeri (eds), Wiley StatsRef: Statistics Reference Online. John Wiley & Sons Inc., New York, N.Y., pp. 1-6.

Grippi, C. (2021). Factors that influence women's symptoms of postpartum depression after discharge of their preterm infants from the NICU. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 50(5), pp. 610-620. Available at: https://doi.org/10.1016/j.jogn.2021.05.003.

Grove, S. K. & Gray, J. R., 2021. *Burns and Grove's The Practice of Nursing Research.* 9th ed. Missouri: Elsevier.

Guetterman, T. & James, T. (2023) A software feature for mixed methods analysis: The MAXQDA Interactive Quote Matrix, Methods in Psychology, 8, p. 100116. Available from: https://doi.org/10.1016/j.metip.2023.100116.

Hagen, I. H., Iversen, V. C., Nesset, E., Orner, R., & Svindseth, M. F. (2019). Parental satisfaction with neonatal intensive care units: a quantitative cross-sectional study. *BMC Health Services Research*, 19(1), p. 37. Available from: https://doi.org/10.1186/s12913-018-3854-7.

Hakvoort, L., Dikken, J., Cramer-Kruit, J., Nieuwenhuyzen, K. M., van der Schaaf, M., & Schuurmans, M. (2022). Factors that influence continuing professional development over a nursing career: A scoping review. *Nurse Education in Practice*, 65, p.103481. Available from: https://doi.org/10.1016/j.nepr.2022.103481.

Handema, M., Lungu, J., Chabala, M. & Shikaputo, C. (2023). Conceptualising the philosophical underpinning of the study: a practical perspective. *Open Journal of Philosophy,* 13, pp. 257-268. Available from: https://doi.org/10.4236/ojpp.2023.132017.

Hariati, S., Febriani, A.D.B., Sutomo, R., Lusmilasari, L. and McKenna, L. (2022) Exploring Indonesian nurses' perspectives on preparing parents of preterm infants for hospital discharge: A qualitative study, Journal of Neonatal Nursing, 28(1), pp. 59-66. Available from: https://doi.org/10.1016/j.jnn.2021.07.002.

Harker, N., Lucas, W. C., Laubscher, R., Dada, S., Myers, B., & Parry, C. D. (2020). Is South Africa being spared the global opioid crisis? A review of trends in drug treatment demand for heroin, nyaope and codeine-related medicines in South Africa (2012-2017). *The International Journal on Drug Policy*, 83, p.102839. Available at: https://doi.org/10.1016/j.drugpo.2020.102839.

Harker, N., Erasmus, J., Lucas, W., Deitz, D., & Brooke-Sumner, C. (2022). I Was Present but I Was Absent: Perceptions and Experiences of the Non-Medical Use of Prescription or over the Counter Medication among Employed South African Women. International Journal of Environmental Research and Public health, 19(12), p.7151. Available at: https://doi.org/10.3390/ijerph19127151.

Harris, P. (2018). Research electronic data capture (REDCap). *Journal of the Medical Library Association,* 106(1), p. 142. Available at: https://doi.org/10.5195/jmla.2018.319.

Harris, S., Wolff, E., Beecroft, G., Troughton, R. and Austin, N. (2019) Neonatal oxygen saturation alarm compliance – under recognized source of iatrogenic harm? An audit and survey of nursing opinion', *Journal of Neonatal Nursing*, 26, pp. 1. Available at: https://doi.org/10.1016/j.jnn.2019.07.003.

Hassankhani, H., Negarandeh, R., Abbaszadeh, M. & Jabraeili, M. (2020). The role of mothers during painful procedures on neonates: A focused ethnography. *Journal of Neonatal Nursing,* 26(6), pp. 340-343. Available at: https://doi.org/10.1016/j.jnn.2020.03.002.

Hatamleh, R., Abujilban, S., Abuhammad, S., Ariag, D. M. A., & Joseph, R. A. (2021). Effect of the Helping Babies Breathe Training Program: An Experimental Study on Jordanian Midwives' Knowledge and Skills. *The Journal of Perinatal & Neonatal Nursing*, 35(2), pp.E11–E17. Available at: https://doi.org/10.1097/JPN.0000000000000485.

Haymes, E. (2020). The effects of continuous positive airway pressure (CPAP) on nasal skin breakdown. *Journal of Neonatal Nursing,* 26, pp. 37-42. Available at: https://doi.org/10.1016/j.jnn.2019.09.007.

He, J., Yimyam, S. & Namprom, N. (2022). Breastfeeding self-efficacy, social support, and breastfeeding among Chinese mothers with late preterm infants. *Journal of Neonatal Nursing,* 28(1), pp. 21-25. Available at: http://doi.org/10.1016/j.jnn.2021.07.005.

Heale, R. & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-Based Nursing,* 18(3), pp. 66-67. Available at: https://doi.org/10.1136/eb-2015-102129.

Hebballi, N. B., Kerl, C. G., Garcia, E. I., Ottosen, M. J., Kelly, K. C., Bartz-Kurycki, M. A., Tang, B., Hillman, E. A., Aneji, C. U., Tsao, K., & Austin, M. T. (2021). Barriers to Transition to Home From the Neonatal Intensive Care Unit: A Qualitative Perspectives of Parents and Healthcare Providers. *The Journal of Perinatal &*

Neonatal Nursing, 35(4), pp.340–349. Available at: https://doi.org/10.1097/JPN.0000000000000570.

Hines, S., Ramsbotham, J., & Coyer, F. (2022). A theory-based research literacy intervention for nurses: A pilot study. *Nursing Forum,* 57(6), 1052–1058. Available at: https://doi.org/10.1111/nuf.12780.

Hirsch, J. and Buela-Casal, G. (2014) The meaning of the h-index, *International Journal of Clinical and Health Psychology*, 14, pp. 161–164. Available at: https://doi.org/10.1016/S1697-2600(14)70050-X.

Horak, T. & Spellman, E. (2021). Perinatal & neonatal collaboration to optimize outcomes in extremely-low-birthweight infants. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 50(5), pp. S45-S46. Available at: https://doi.org/10.1016/j.jogn.2021.08.088.

Hu, J., Gifford, W., Zhou, Y., Zhang, Q. and Harrison, D. (2021) Nurses' perspectives on pain management practices during newborn blood sampling in China, *Journal of Neonatal Nursing*, 27(6), pp. 483-487. Available at: https://doi.org/10.1016/j.jnn.2021.06.015.

Hu, J., Xue, F., Zhou, Y., Liu, Y., Li, Q., Deng, J., & Harrison, D. (2021). Using Social Media to Disseminate Effective Pain Treatments for Newborns During Needle-Related Painful Procedures in China. *The Journal of Perinatal & Neonatal Nursing*, 35(4), pp. E50–E57. Available at: https://doi.org/10.1097/JPN.0000000000000602.

Hurley, M., Osborne, K., Baroody, F., Burgin, R., Toro, H., Hluska, N., Cappaert, M., Anderson, A., Lemus, L. and Brennan, G. (2021) High fidelity tracheostomy simulation quality improvement project, *Journal of Neonatal Nursing*, 27(5), pp. 370-374. Available at: https://doi.org/10.1016/j.jnn.2021.01.004.

Imossi, A. & Bailey, C. (2020). Use of rapid cycle deliberate practice as a promising simulation method for improving nurses' neonatal resuscitation confidence and competence. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 49(6), p. S77. Available at: https://doi.org/10.1016/j.jogn.2020.09.135,

Infanti, L. M., Casper, A. & O'Bryan, M. (2021). Evaluation of time to antibiotic administration for suspected late-onset sepsis in neonatal intensive care unit: a

quality improvement project. *Journal of Neonatal Nursing,* 27, pp. 365-369. Available at: https://doi.org/10.1016/j.jnn.2021.03.004.

International Liaison Committee on Resuscitation (ILCOR). (2021). *Neonatal resuscitation guidelines*. Available at: https://www.ilcor.org/publications. [Accessed 13/08/2024]

Irabor, B. P., & Onwudinjo, A. (2022). Ethical responses to a changing world of axiological questions. *Journal of Pan African Studies*, *9*(3), 181-194.

Jabraeili, M., Rasooly, A. S. & Farshi, M. R. (2020). The effect of supportive program on maternal self-confidence in caring of infants with gastrointestinal anomalies: A randomised clinical trial. *Journal of Neonatal Nursing,* 26(5), pp. 278-283. Available at: https://doi.org/10.1016/j.jnn.2020.05.004.

Jacoby, S. & Scruth, E. A. (2017). Negligence and the nurse: the value of the code of ethics for nurses. *Clinical Nurse Specialist,* 31(4), p. 184. Available at: https://doi.org/10.1097/NUR.0000000000000301.

Jager, S., Kavanaugh, K., Hoffman, S., Laitano, T., Jeffries, E., & Tucker Edmonds, B. (2020). Parents' Descriptions of Neonatal Palliation as a Treatment Option Prior to Periviable Delivery. *The Journal of Perinatal & Neonatal Nursing*, 34(2), pp. 178–185. Available at: https://doi.org/10.1097/JPN.0000000000000483.

James, K. L., Randall, N. P. & Haddaway, N. R. (2016). A methodology for systematic mapping in environmental sciences. *Environmental Evidence,* 5(7), p. 2. Available at: https://doi.org/10.1186/s13750-016-0059-6.

Janes, G. & Delves-Yates, C. (eds) (2022) Quality Improvement in Nursing. 1st edn. Sage Publications.

Johnson, J., Akinboyo, I. & Schaffzin, J. K. (2021). Infection prevention in the neonatal intensive care unit. *Clinics in Perinatology,* 48(2), pp. 413-429. Available at: https://doi.org/10.1016/j.clp.2021.03.011.

Jones, T. (2019). International neonatal nursing competency framework. *Elsevier,* 25, p.258. Available at: https://doi.org/10.1016/j.jnn.2019.07.007.

Joshi, A., Kale, S., Chandel, S. & Pal, D. (2015). Lickert scale: explored and explained. *British Journal of Applied Science & Technology,* 7, p. 396. Available at: http://doi.org/10.9734/BJAST/2015/14975.

Kahan, B. (2012). Using a comprehensive best practices approach to strengthen ethical health-related practice. *Sage Journals,* 13(4), p. 431. Available at: https://doi.org/10.1177/1524839912442515.

Kaliyadan, F. & Kulkarni, V. (2019). Types of variables, descriptives statistics, and sample size. *Indian Dermatology Online Journal,* 10(1), pp. 82-86. Available at: https://doi.org/10.4103/idoj.IDOJ_468_18.

Karakul, A., Doğan, P., Gümüş, İ., Yilmaz, H., & Dorum, B. A. (2022). What Neonatal Intensive Care Nurses Have Experienced in COVID-19 Pandemic in Turkey. *The Journal of Perinatal & Neonatal Nursing*, 36(1), pp.77–85. Available at: https://doi.org/10.1097/JPN.0000000000000633.

Karlsson, L., Gustafsson, U., Thernström Blomqvist, Y., Wallström, L., & Broström, A. (2023). Neonatal Resuscitation: A Critical Incident Technique Study Exploring Pediatric Registered Nurses' Experiences and Actions. *Advances in Neonatal Care: official journal of the National Association of Neonatal Nurses*, 23(3), 220–228. Available at: https://doi.org/10.1097/ANC.0000000000001063.

Kelle, U., Kuhberger, C. & Berhard, R. (2019). How to use mixed-methods and triangulation designs: An introduction to history education research. *History Education Research Journal,* 16(1), pp. 5-23. Available at: https://doi.org/10.18546/HERJ.16.1.02.

Kgafele, N. S., Coetzee, I. & Heyns, T. (2015). Clinical accompaniment let the voice of the pre-graduate student count. *Africa Journal of Nursing and Midwifery,* 17, p. S222. Available at: https://doi.org/10.25159/2520-5293/312.

Khalil, H., Campbell, F., Danial, K., Pollock, D., Munn, Z., Welsh, V., Saran, A., Hoppe, D., & Tricco, A. C. (2024). Advancing the methodology of mapping reviews: A scoping review. *Research Synthesis Methods*, 15(3), pp. 384–397. Available at: https://doi.org/10.1002/jrsm.1694.

Khasawneh, W., Sindiani, A., Rawabdeh, S. A., Aleshawi, A., & Kanaan, D. (2020). Indications and Clinical Profile of Neonatal Admissions: A Cross-Sectional Descriptive Analysis from a Single Academic Center in Jordan. *Journal of Multidisciplinary Healthcare*, 13, pp. 997–1006. Available at: https://doi.org/10.2147/JMDH.S275267.

Kim, T. H., Delahunty-Pike, A. & Campbell-Yeo, M. (2020). Effect of fathers' presence and involvement in newborn care in the NICU on mothers' symptoms of postpartum depression. *Journal of Obstetric, Gynecologic and Neonatal Nursing,* 49(5), pp. 452-463. Available at: https://doi.org/10.1016/j.jogn.2020.05.007.

King, C., Edlington, T., & Williams, B. (2020). The "Ideal" Clinical Supervision Environment in Nursing and Allied Health. *Journal of Multidisciplinary Healthcare*, *13*, pp. 187–196. Available at: https://doi.org/10.2147/JMDH.S239559.

Klock, P., Buscher, A., Erdmann, A.L., Costa, R. & Santos, S.V. (2019) Best practices in neonatal nursing care management, *Texto Contexto Enferm*, 28, e20170157. Available at: http://dx.doi.org/10.1590/1980-265X-TCE-2017-0157.

Korkmaz, G., & Esenay, F. I. (2020). Effects of Massage Therapy on Indirect Hyperbilirubinemia in Newborns Who Receive Phototherapy. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*: JOGNN, 49(1), 91–100. Available at: https://doi.org/10.1016/j.jogn.2019.11.004.

Lake, E. T., Hallowell, S. G., Kutney-Lee, A., Hatfield, L. A., Del Guidice, M., Boxer, B. A., Ellis, L. N., Verica, L., & Aiken, L. H. (2016). Higher Quality of Care and Patient Safety Associated With Better NICU Work Environments. *Journal of Nursing Care Quality*, 31(1), pp. 24–32. Available at: https://doi.org/10.1097/NCQ.0000000000000146.

Langan, M., Watson, C., O'Connor, T., Moore, Z. & Patton, D. (2020) What is the effectiveness of combining warming mattresses and plastic bags versus plastic bags only for thermoregulation in preterm infants? A systematic review, *Journal of Neonatal Nursing*, 26(1), pp. 30-36. Available at: https://doi.org/10.1016/j.jnn.2019.09.006.

Larocque, C., Peterson, W.E., Squires, J.E., Mason-Ward, M., Mayhew, K. & Harrison, D. (2021) Family-centred care in the Neonatal Intensive Care Unit: A

concept analysis and literature review, *Journal of Neonatal Nursing*, 27(6), pp. 402-411. Available at: https://doi.org/10.1016/j.jnn.2021.06.014.

Lee, D. K., In, J., & Lee, S. (2015). Standard deviation and standard error of the mean. *Korean Journal of Anesthesiology*, 68(3), pp. 220–223. Available at: https://doi.org/10.4097/kjae.2015.68.3.220.

Lee, H., Kim, D. J., & Han, J. W. (2020). Developing Nursing Standard Guidelines for Nurses in a Neonatal Intensive Care Unit: A Delphi Study. *Healthcare* (Basel, Switzerland), 8(3), p.320. Available at: https://doi.org/10.3390/healthcare8030320.

Lee, Y. J., Lee, T., Cho, E., Park, S., & Park, C. S. (2020). Association of Nurse Staffing With Nosocomial Infections of Very Low-Birth-Weight Infants. *The Journal of Perinatal & Neonatal Nursing*, 34(2), pp. E12–E18. Available at: https://doi.org/10.1097/JPN.0000000000000475.

Levinsson, H., Nilsson, A., Mårtensson, K. & Persson, S. (2024) Course design as a stronger predictor of student evaluation of quality and student engagement than teacher ratings, *Higher Education*, pp. 1-17. Available at: https://doi.org/10.1007/s10734-024-01197-y.

Lincoln, Y.S. & Guba, E.G. (1985) Naturalistic inquiry. Beverly Hills, CA: Sage Publications.

Lindsay-Sutherland, M. (2019) Exploring evidence-based practice in neonatal care. 3rd edn. Abingdon: Routledge. eBook ISBN: 9781315150451.

Lisanti, A. J., Demianczyk, A. C., Costarino, A., Vogiatzi, M. G., Hoffman, R., Quinn, R., Chittams, J. L., & Medoff-Cooper, B. (2021). Skin-to-Skin Care is Associated with Reduced Stress, Anxiety, and Salivary Cortisol and Improved Attachment for Mothers of Infants With Critical Congenital Heart Disease. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*: JOGNN, 50(1), pp. 40–54. Available at: https://doi.org/10.1016/j.jogn.2020.09.154.

Liu, J., Wu, S. & Zhu, X. (2022). Advances in the prevention and treatment of neonatal hypothermia in early birth. *Therapeutic Hypothermia and Temperature Management,* 12(2), pp.53-54. Available at: https://doi.org/10.3390/jcm12206653.

Long, K. (2020). Achieving normothermia in low-birth-weight neonates, *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 49(6), S73. Available at: https://doi.org/10.1016/j.jogn.2020.09.127.

Machado, G., Furtado, M., Oliveira, N., Santos, J.M. de, Lima, M. & Leite, A. (2020) How is the communication of bad news being performed in Neonatal Intensive Care Units and how to improve it: A scoping review, *Journal of Neonatal Nursing*, 26. Available at: https://doi.org/10.1016/j.jnn.2020.01.014.

Maciel, H. I. A., Costa, M. F., Costa, A. C. L., Marcatto, J. O., Manzo, B. F., & Bueno, M. (2019). Pharmacological and nonpharmacological measures of pain management and treatment among neonates. Medidas farmacológicas e não farmacológicas de controle e tratamento da dor em recém-nascidos. Revista Brasileira de terapia intensiva, 31(1), pp. 21–26. Available at: https://doi.org/10.5935/0103-507X.20190007.

Maher, C., Hadfield, M., Hutchings, M. & de Eyto, A. (2018). Ensuring rigor in qualitative data analysis: A Design research Approach to Coding combining NVivo with traditional material methods. *International Journal of Qualitative Methods,* 17(1-13), p. 3. Available at: https://doi.org/10.1016/j.jnn.2020.01.014.

Man, J. P., Weinkauf, J. G., Tsang, M. & Sin, D. D. (2004). Why do some countries publish more than others? An international comparison of research funding, English proficiency and publication output in highly ranked medical journals. *European Journal of Epidemiology,* 19(8), pp.811-817. Available at: https://doi.org/10.1023/b:ejep.0000036571.00320.b8.

Maree, C., Lubbe, W., Barlow, H., Davidge, R., Prullage, G.S., Scheepers, M. & van Heerden, C. (2021) South African neonatal nurse specialization – is professional licensing justifiable?, *Journal of Neonatal Nursing*, 27(2), pp. 69-76. Available at: https://doi.org/10.1016/j.jnn.2020.08.004.

Maree, C., Scheepers, M. & Janse Van Rensburg, E. (2020). Competencies for structured professional development of neonatal nurses in South Africa. *African Journal of Health Professions Education,* 12(3), p. 154. Available at: http://dx.doi.org/10.7196/ajhpe.2020.v12i3.1364.

Mariano, K., Silang, J.P.B., Ramos, R., Galang-Gatbonton, G., Ridulme, Q., Gatbonton, R.R. & Peralta, A. (2021) Maternal stress and perceived nurse support among mothers of premature infants in the neonatal intensive care unit of a tertiary hospital in Qatar, *Journal of Neonatal Nursing*, p.28. Available at: https://doi.org/10.1016/j.jnn.2021.08.002.

Martin, R. J., & Harijith, A. K. (2021). The twofold NICU challenge: avoiding hypoxia and hyperoxia. *Pediatric Research*, 90(1), 4–5. Available at: https://doi.org/10.1038/s41390-021-01518-2.

Masaba, B. B. & Mmusi-Phetoe, R. M. (2020). Neonatal survival in Sub-Sahara: a review of Kenya and South Africa. *Journal of Multidisciplinary Healthcare,* Volume 13, p. 714. Available at: https://doi.org/10.2147/JMDH.S260058.

McGowan, J., Sampson, M., Salzwedel, D., & Cormack, J. (2021). Developing effective learning resources for evidence-based practice in nursing. *Nurse Education Today*, 98, p 104674. Available at: https://doi.org/10.1016/j.nedt.2022.105295.

McKim, M. (2020) Swaddle bathing in the NICU, *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 49(6), S78. Available at: https://doi.org/10.1016/j.jogn.2020.09.123.

McLaughlin, J. (2024). *Readings in Western Philosophy for Louisiana Learners*. LOUIS: The Louisiana Library Network. Creative Commons Attribution 4.0 International License.

McNair, C., Chinian, N., Shah, V., McAllister, M., Franck, L. S., Stevens, B., Burry, L., & Taddio, A. (2020). Metasynthesis of Factors That Influence Parents' Participation in Pain Management for Their Infants in the NICU. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN*, 49(3), pp. 263–271. Available at: https://doi.org/10.1016/j.jogn.2020.02.007.

Melancon, J., Aita, M., Belzile, S. & Lavallee, A. (2021). Clinical intervention involving parents in their preterm infant's care to promote parental sensitivity: A case study. *Journal of Neonatal Nursing,* 27(1), pp. 58-62. Available at: https://doi.org/10.1016/j.jnn.2020.05.003.

Melariri, H., Osoba, T. A., Williams, M. M., & Melariri, P. (2022). An assessment of nurses' participation in Health Promotion: a knowledge, perception, and practice perspective. *Journal of Preventive Medicine and Hygiene*, 63(1), pp. E27–E34. Available at: https://doi.org/10.15167/2421-4248/jpmh2022.63.1.2209.

Mirlashari, J., Qommi, R., Nariman, S., Bahrani, N., Begjani, J. (2016). Clinical competence and its related factors of nurses in neonatal intensive care units. *Journal of Caring Sciences,* 5(4), p. 317-324. Available at: https://doi.org/10.15171/jcs.2016.033.

Mlambo, M., Silén, C. & McGrath, C. (2021). Lifelong learning and nurses' continuing professional development, a metasynthesis of the literature. *BMC Nursing,* 30(62), p. 2. Available at: https://doi.org/10.1186/s12912-021-00579-2.

Mohammadi, F., Bijani, M., Cheraghi, F. & Kyle, H. (2020). Dignity. *The Journal of Perinatal & Neonatal Nursing,* 34(4), pp. E44-E50. Available at: https://doi.org/10.1186/s12912-021-00579-2.

Montes, M. T., Herranz-Rubia, N., & NeNe Nursing Group (2020). Neonatal nursing in the COVID-19 pandemic: can we improve the future? *Journal of Neonatal Nursing*: JNN, 26(5), pp. 247–251. Available at: https://doi.org/10.1016/j.jnn.2020.07.005.

Morton, S. U., & Brodsky, D. (2016). Fetal Physiology and the Transition to Extrauterine Life. *Clinics in Perinatology*, 43(3), pp. 395–407. Available at: https://doi.org/10.1016/j.clp.2016.04.00.

Moundzika-Kibamba, J.C. & Nakwa, F.L. (2018) Neonatal mortality at Leratong Hospital, *South African Journal of Child Health*, 12(1), pp. 24-28. Available at: https://dx.doi.org/10.7196/sajch.2018.v12i1.1436.

Mrayyan, M. T., Abunab, H. Y., Abu Khait, A., Rababa, M. J., Al-Rawashdeh, S., Algunmeeyn, A., & Abu Saraya, A. (2023). Competency in nursing practice: a concept analysis. *BMJ open*, 13(6), p. e067352. Available at: https://doi.org/10.1136/bmjopen-2022-067352.

Murphy, M.C., Dunne, E., McCarthy, R., O'Hagan, L., Batson, H. & Curley, A. (2021) PRIME (preterm infants need milk early) - success of a multidisciplinary quality

improvement project in a tertiary neonatal unit, *Journal of Neonatal Nursing*, 27(2), pp. 88-93. Available at: https://doi.org/10.1016/j.jnn.2020.08.006.

Nada, A. (2015). ADDIE Model. American International Journal of Contemporary Research, 5(6), p. 68.

Namnabati, M., Farzi, S. & Ajoodaniyan, N. (2016). Care challenges of the neonatal intensive care unit. *Iranian Journal of Nursing Research,* 11(4), p. 2. Available at: http://ijnr.ir/article-1-1806-en.html.

Namulondo, S., Rasweswe, M. M. & Mooa, R. S. (2023). Blended learning during and beyond the Covid-19 pandemic: attitudes of nurse educators in Gauteng. *Health SA Gesondheid,* 28(0), pp. 1-8. Available at: https://doi.org/10.4102/hsag.v28i0.2194.

Nasa, P., Jain, R. & Juneja, D. (2021). Delphi methodology in healthcare research: how to decide its appropriateness. *World Journal of Methodology,* 11(4), pp. 116-129. Available at: https://doi.org/10.5662/wjm.v11.i4.116.

Nation, H., Sanlorenzo, L., Lebar, K. & Brandon, D. (2021). A quality improvement project to increase frequency of skin-to-skin contact for extreme low-birth-weight infants in the neonatal intensive care unit. *The Journal of Perinatal & Neonatal Nursing,* 35(3), pp. 247- 257.

Nebiyu, S., Berhanu, M. & Liyew, B., 2021. Magnitude and factors - associated with neonatal hypothermia among neonates admitted in neonatal intensive care units: multicenter cross- sectional study. *Journal of Neonatal Nursing,* 27, pp. 111-117.Available at: https://doi.org/10.1097/JPN.0000000000000556.

Nieves, H., Clements-Hickman & Davies, C. C. (2021). Effect of a parent empowerment program on parental stress, satisfaction, and length of stay in the neonatal intensive care unit. *The Journal of Perinatal & Neonatal Nursing,* 35(1), pp. 92-99. Available at: https://doi.org/10.1097/JPN.0000000000000540.

Nist, M. D., Pickler, R. H. & Harrison, T. M. (2022). Gloving and touch practices of neonatal nurses. *The Journal of Perinatal & Neonatal Nursing,* 36(1), pp. 86-92. Available at: https://doi.org/10.1097/JPN.0000000000000626.

Novak, J. L. & Vittner, D. (2021). Parent engagement in the NICU. *Journal of Neonatal Nursing,* 27(4), pp. 257-262. Available at: https://doi.org/10.3390/ijerph20116050.

Oddi, M & Moyer, S. (2021). Implementation of a detection tool to aid early identification of necrotizing enterocolitis, *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 50(5), p. S43. Available at: https://doi.org/10.1016/j.jogn.2021.08.083.

Ong, A.-J., Kinshella, M.-L.W., Salimu, S., Vidler, M., Elango, R., Banda, M., Dube, Q., Goldfarb, D., Kawaza, K. and Nyondo-Mipando, A.L. (2022) Perceptions of expressed breast milk for preterm infants in Malawian hospitals: A qualitative study, *Journal of Neonatal Nursing*, 28(2), pp. 113-117. Available at: https://doi.org/10.1016/j.jnn.2021.08.006.

Orsi, K. C. S. C., Kita, V. Y., de Souza, A. H. P., Tsunemi, M. H., & Avelar, A. F. M. (2021). Neonatal Transfusion Practice: Hemolysis Markers After In Vitro Infusion of Packed Red Blood Cells by the Gravitational Method or Syringe Pump in a Peripheral Catheter. *The Journal of perinatal & neonatal nursing*, *35*(4), pp. E40–E49. Available at: https://doi.org/10.1097/JPN.0000000000000571.

Palmar-Santos, A. M., Oter-Quintana, C., Olmos, R., Pedraz-Marcos, A., & Robledo-Martin, J. (2023). A mixed methods study using case studies prepared by nursing students as a clinical practice evaluation tool. *Nursing Open, 10*, pp. 6592–6601. Available at: https://doi.org/10.1002/nop2.1919.

Pallant, J. (2020) SPSS Survival Manual: A step-by-step guide to data analysis using IBM SPSS. 7th edn. London: Routledge.

Pathirana, J., Munoz, F. M., Abbing-Karahagopian, V., Bhat, N., Harris, T., Kapoor, A., Keene, D. L., Mangili, A., Padula, M. A., Pande, S. L., Vitali, P., Pourmalek, F., Varricchio, F., Kochhar, S. (2016). Neonatal death: Case definition & guidelines for data collection, analysis, and presentation of immunization safety data. *Elsevier,* 34, p. 6027. Available at: https://doi.org/10.1016/j.vaccine.2016.03.040.

Paor, C. (2021). Credit allocation and programme design: Insights from metaphor. *Journal of Further and Higher Education*, 45(6), pp. 836–844. Available at: https://doi.org/10.1080/0309877X.2020.1826033.

Peterson, C. (2003). Mixed methods in nursing research: an overview and practical examples. *Journal of Educational Multimedia and Hypermedia,* 12(3), p. 227. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC4287271/.

Pineda, R., Muñoz, R., Chrzastowski, H., Dunsirn-Baillie, S., Wallendorf, M., & Smith, J. (2020). Maternal Milk and Relationships to Early Neurobehavioral Outcome in Preterm Infants. The Journal of perinatal & neonatal nursing, 34(1), pp. 72–79. Available at: https://doi.org/10.1097/JPN.0000000000000460.

Platonova, R.I., Orekhovskaya, N.A., Dautova, S.B., Martynenko, E.V., Kryukova, N.I. and Demir, S. (2022) 'Blended learning in higher education: Diversifying models and practical recommendations for researchers', Frontiers in Education, 7. Available at: https://www.frontiersin.org/journals/education/articles/10.3389/feduc.2022.957199.

Polgar, S. and Thomas, S. (2020) Introduction to research in health sciences. 7th edn. Edinburgh: Elsevier.

Popowicz, H., Mędrzycka-Dąbrowska, W., Kwiecień-Jaguś, K., & Kamedulska, A. (2021). Knowledge and Practices in Neonatal Pain Management of Nurses Employed in Hospitals with Different Levels of Referral-Multicenter Study. Healthcare (Basel, Switzerland), 9(1), p. 48. Available at: https://doi.org/10.3390/healthcare9010048.

Prokop, N., Meedya, S. & Sim, J. (2021). Integrative review of the experiences of registered nurses who support breastfeeding women. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 50(3), pp. 266-274. Available at: https://doi.org/10.1016/j.jogn.2021.02.003.

Quinn, J. A., Munoz, F. M., Gonik, B., Frau, L., Cutland, C., Mallet-Moore, T., Kissou, A., Wittke, F., Das, M., Nunes, T., Pye, S., Watson, W., Ramos, A., Cordero, J. F., Huang, W-T., Kochhar, S., Buttery, J. (2016). Preterm birth: case definition & guidelines for data collection, analysis, and presentation of immunisation safety data. *Elsevier,* 34, p. 6047. Available at: https://doi.org/10.1016/j.vaccine.2016.03.045.

Rahman, A. & Muktadir, G. (2021). SPSS: An imperative quantitative data analysis tool for social science research. *International Journal of Research and Innovation in*

Social Science, V(X), p. 300. Available at: https://doi.org/10.47772/IJRISS.2021.51012.

Razeq, N. M., Alduraidi, H., Halasa, S., & Cuttini, M. (2020). Clinicians' Self-Reported Practices Related to End-of-Life Care for Infants in NICUs in Jordan. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*: JOGNN, 49(1), pp. 78–90.. Available at: https://doi.org/10.1016/j.jogn.2019.11.005.

Reid, S., Bredemeyer, S. & Chiarella, M. (2021). The evolution of neonatal family centred care. *Journal of Neonatal Nursing,* 27(5), pp. 327-333. Available at: https://doi.org/10.1016/j.jnn.2021.03.002.

Rheeder, A., Lubbe, W., van der Walt, C. S. & Pretorius, R. (2021). Compliance with best practice guidelines for neurodevelopmental supportive care in South Africa. *The Journal of Perinatal & Neonatal Nursing,* 35(4), pp. E83-E96. Available at: https://doi.org/10.1097/JPN.0000000000000275.

Rhoda, N., Velaphi, S., Gebhardt, G., Kauchali, S., & Barron, P. (2018). Reducing neonatal deaths in South Africa: Progress and challenges. *South African Medical Journal*, 108, p.9. Available at: https://doi.org/10.7196/SAMJ.2017.v108i3b.12804.

Richardson, B., Falconer, A., Shrestha, J., Cassidy, C., Campbell-Yeo, M., & Curran, J. A. (2020). Parent-Targeted Education Regarding Infant Pain Management Delivered During the Perinatal Period: A Scoping Review. *The Journal of Perinatal & Neonatal Nursing*, 34(1), pp. 56–65. Available at: https://doi.org/10.1097/JPN.0000000000000439.

Rocha, G., Soares, P., Gonçalves, A., Silva, A. I., Almeida, D., Figueiredo, S., Pissarra, S., Costa, S., Soares, H., Flôr-de-Lima, F., & Guimarães, H. (2018). Respiratory Care for the Ventilated Neonate. *Canadian Respiratory Journal*, 2018, p.7472964. Available at: https://doi.org/10.1155/2018/7472964.

Rozensztrauch, A., Smigiel, R. & Uchmanowicz, I. (2021). MISSED CARE phenomenon on neonatal intensive CARE unit (NICU). *Journal of Neonatal Nursing,* 27(5), pp. 341-346. Available at: https://doi.org/10.1016/j.jnn.2021.02.001.

Ryan, G. S. (2019). Postpositivist critical realism: philosophy, methodology and method for nursing research. *Nurse Researcher,* 27(3), pp. 20-26. Available at: https://doi.org/10.7748/nr.2019.e1598.

Ryan, M. A., Mathieson, S., Dempsey, E. & Boylan, G. (2021). An Introduction to Neonatal EEG. *The Journal of Perinatal & Neonatal Nursing,* 35(4), pp. 369-376. Available at: https://doi.org/10.1097/JPN.0000000000000599.

Sadeghi, M., Nematollahi, M., Farokhzadian, J., Khoshnood, Z., & Eghbalian, M. (2023). The effect of scenario-based training on the Core competencies of nursing students: a semi-experimental study. *BMC Nursing*, *22*(1), p. 475. https://doi.org/10.1186/s12912-023-01442-2.

Saiz-Manzanares, M. C., Escolar-Llamazares, M.C. & Gonzalez, A. A. (2020). Effectiveness of blended learning in nursing education. *International Journal of Environmental Research and Public Health,* 17(1589), p. 5. Available at: https://doi.org/10.3390/ijerph17051589.

Salameh, T. N., & Polivka, B. (2020). Knowledge of and Perceived Competence in Trauma-Informed Care and Attitudes of NICU Nurses Toward Mothers of Newborns With Neonatal Abstinence Syndrome. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN*, 49(4), pp. 373–387. Available at: https://doi.org/10.1016/j.jogn.2020.05.003.

Santini, A. (2018). Spotlight series: The importance of referencing. *The Journal of Critical Care Medicine*, 4, pp. 3–4. Available at: https://doi.org/10.1515/jccm-2018-0002.

Saptioti, A. G., Kazanidis, I. & Pange, J. (2022). A Comparative Study of the ADDIE instructional design model in distance education. *Information,* 13(9), p. 402. Available at: https://doi.org/10.3390/info13090402.

Sarici, S. U., Ozcan, M., Akpinar, M., Altun, D., Yasartekin, Y., Koklu, E., Serdar, M. A., & Sarici, D. (2021). Transcutaneous Bilirubin Levels and Risk of Significant Hyperbilirubinemia in Early-Term and Term Newborns. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN*, 50(3), pp. 307–315. Available at: https://doi.org/10.1016/j.jogn.2021.01.007.

Shahirose, P., Kaye, S. & Kenner, C. (2013). Call for neonatal nursing specialization in developing countries. *The American Journal of Maternal Child Nursing,* 38, p. 1. Available at: https://doi.org/10.1097/NMC.0b013e31829f2c94.

Sharma, M., Sarin, A., Gupta, P., Sachdeva, S., & Desai, A. V. (2014). Journal impact factor: its use, significance and limitations. *World journal of Nuclear Medicine*, 13(2), p. 146. Available at: https://doi.org/10.4103/1450-1147.139151.

Shenton, A. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information,* 22(75), p. 63. Available at: https://doi.org/10.3233/EFI-2004-22201.

Silva, M., Alves, D., Oliveira, R., Elias, N., Kohn, A., & Melo, E. (2021). Perinatal morbidities, congenital malformations and breastfeeding outcomes. *Journal of Neonatal Nursing*, 27, p. 1. Available at: https://doi.org/10.1016/j.jnn.2021.05.003.

Smith, J., Alcock, G. & Rhondda, J. (2020). Concordance of infrared non-contact thermometer aimed at the forehead versus digital thermometer vis axilla method in the preterm infant on admission to the Townsville Neonatal Unit. *Journal of Neonatal Nursing,* 28, pp. 103- 106. Available at: https://doi.org/10.1016/j.jnn.2021.08.004.

Sola, A., Golombek, S. G., Montes Bueno, M. T., Lemus-Varela, L., Zuluaga, C., Domínguez, F., Baquero, H., Young Sarmiento, A. E., Natta, D., Rodriguez Perez, J. M., Deulofeut, R., Quiroga, A., Flores, G. L., Morgues, M., Pérez, A. G., Van Overmeire, B., & van Bel, F. (2014). Safe oxygen saturation targeting and monitoring in preterm infants: can we avoid hypoxia and hyperoxia? *Acta Paediatrica (Oslo, Norway: 1992)*, 103(10), pp. 1009–1018. Available at: https://doi.org/10.1111/apa.12692.

Soni, M., Joshi, P. K., Patel, S. C., Shreya, D., Zamora, D. I., Patel, G. S., Grossmann, I., Rodriguez, K., & Sange, I. (2021). Persistent Pulmonary Hypertension: A Look Into the Future Therapy. *Cureus*, *13*(12), p. e20377. Available at: https://doi.org/10.7759/cureus.20377.

Sokou, R., Parastatidou, S., Ioakeimidis, G., Tavoulari, E. F., Makrogianni, A., Isaakidou, E., Iacovidou, N., & Konstantinidi, A. (2022). Breastfeeding in Neonates Admitted to an NICU: 18-Month Follow-Up. *Nutrients*, *14*(18), 3841. Available at: https://doi.org/10.3390/nu14183841.

South African Nursing Council. (2021). The continuous professional development framework for nurses and midwives in South Africa. Available at: https://www.sanc.co.za.

South African Nursing Council. (2014). *Generic competency framework for advanced nurse practitioners*. South African Nursing Council. Available at: https://www.sanc.co.za

South African Nursing Council. (1985). *Regulations relating to the approval of and the minimum requirements for the education and training of a nurse (general, psychiatric, and community) and midwife leading to registration* (Government Notice No. R. 425, 22 February 1985). Government Gazette.

Stanzo, K., Desai, S., & Chiruvolu, A. (2020). Effects of Dextrose Gel in Newborns at Risk for Neonatal Hypoglycemia in a Baby-Friendly Hospital. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN, 49*(1), pp. 55–64. Available at: https://doi.org/10.1016/j.jogn.2019.11.006.

Stanzo, K., Kumar, V., Chiruvolu, A., & Cipher, D. J. (2022). How Much Glucose Is in the Gel Used to Treat Neonatal Hypoglycemia? *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN, 51*(2), 218–224. Available at: https://doi.org/10.1016/j.jogn.2021.11.001.

Stelwagen, M. A., van Kempen, A. A. M. W., Westmaas, A., Blees, Y. J., & Scheele, F. (2020). Integration of Maternity and Neonatal Care to Empower Parents. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN, 49*(1), pp. 65–77. Available at: https://doi.org/10.1016/j.jogn.2019.11.003.

Stratakis, C. A., & Rivkees, S. A. (2020). Preventing disease in the twenty-first century: "Life is short, the Art long, opportunity fleeting…". *Pediatric Research*, 87(2), pp. 181–182. Available at: https://doi.org/10.1038/s41390-019-0655-6.

Struzik, S. & Dow, A. (2020). A narrative review of thermoregulation techniques used by paediatric theatre staff during intra hospital transfer from paediatric theatres to the neonatal intensive care unit (NICU). *Journal of Neonatal Nursing,* 26, pp. 25-29. Available at: https://doi.org/10.1016/j.jnn.2019.08.002.

Sujata, S., Das, K., Mukhopadhyay, K., Kaur, S., & Rohilla, M. (2022). Effect of antenatal and postnatal individualized counseling of mothers on exclusive human milk feeding in preterm infants during hospital stay and at discharge: A randomized

controlled trial. *Journal of Neonatal Nursing*, 28(1), pp. 31-36. Available at: https://doi.org/10.1016/j.jnn.2021.03.003.

Taghinejad, F., Nikfarid, L., Nikravan Monfared, M., Hoseini, N., & Habibi, S. (2021). Nursing diagnoses of preterm infants in the neonatal intensive care unit: A cross-sectional study. *Journal of Neonatal Nursing, 27*(6), pp. 451-458. Available at: https://doi.org/10.1016/j.jnn.2021.06.007.

Taherdoost, H. (2021). Data collection methods and tools for research; a step-by- step guide to choose data collection technique for academic and business research projects. *International Journal of Academic Research in Management,* 10(1), pp. 10-38. Available at: https://ssrn.com/abstract=4178676.

Talisman, S., Guedalia, J., Farkash, R., Avitan, T., Srebnik, N., Kasirer, Y., Schimmel, M. S., Ghanem, D., Unger, R., & Grisaru Granovsky, S. (2022). NICU Admission for Term Neonates in a Large Single-Center Population: A Comprehensive Assessment of Risk Factors Using a Tandem Analysis Approach. *Journal of Clinical Medicine, 11*(15), p. 4258. Available at: https://doi.org/10.3390/jcm11154258.

Tambunan, E. S., Pratomo, H., Hadi, E. N. & Rustina, Y. (2020). Knowledge of low-birth-weight care as a source of coping strategies for mothers: cross sectional study in perinatology WARD'S. *Journal of Neonatal Nursing,* 26(5), pp. 268-272. Available at: https://doi.org/10.1016/j.jnn.2020.01.003.

Taylor, R., & Taylor, S. (2014). Data extraction tool. Unpublished manuscript.

Tetorou, K., Sisa, C., Iqbal, A., Dhillon, K., & Hristova, M. (2021). Current Therapies for Neonatal Hypoxic-Ischaemic and Infection-Sensitised Hypoxic-Ischaemic Brain Damage. *Frontiers in Synaptic Neuroscience*, 13, pp.1-10. Available at: https://doi.org/10.3389/fnsyn.2021.709301.

The Colleges of Medicine of South Africa, 2024. *The Colleges of Medicine of South Africa.* [Online] Available at: https://www.cmsa.co.za [Accessed 13 February 2024].

The Learning Accelerator. (n.d.). The ADDIE model for instructional design. Retrieved September 9, 2021. Available at: https://practices.learningaccelerator.org/artifacts/the-addie-model-for-instructional-design.

Thomas, T., Goodman, R., Jacob, A. & Grabher, D. (2021). Implementation of cue-based feeding to improve preterm infant feeding outcomes and promote parents' involvement. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 50(3), pp. 328-339. Available at: https://doi.org/10.1016/j.jogn.2021.02.002.

Thukral, A., Sasi, A., Chawla, D., Datta, P., Wahid, S., Suman, R., Kannan, V., Veeragandam, A., Murki, S., Deorari, A. K. (2012). Online neonatal training and orientation programme in India (ONTOP-IN) - the way forward for distance education in developing countries. *Journal of Tropical Pediatrics,* 58(6), p. 48. Available at: https://doi.org/10.1093/tropej/fms029.

Tsao P. C. (2023). Pathogenesis and Prevention of Intraventricular Hemorrhage in Preterm Infants. *Journal of Korean Neurosurgical Society*, 66(3), pp. 228–238. Available at: https://doi.org/10.3340/jkns.2022.0288.

Ullah, S., Rahman, K. & Hedayati, M. (2016). Hyperbilirubinemia in neonates: types, causes, clinical examinations, preventative measures and treatments: a narrative review article. *Iran J Public Health,* 45(5), p. 558. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC4935699/.

United Nations Children's Fund, 2020. UNICEF. [Online] Available at: https://www.unicef.org [Accessed 20 January 2023].

Utomo, M. T., Sampurna, M. T. A., Widyatama, R. A., Visuddho, V., Angelo Albright, I., Etika, R., Angelika, D., Handayani, K. D., & Irzaldy, A. (2023). Neonatal resuscitation: A cross-sectional study measuring the readiness of healthcare personnel. *F1000Research*, 11, p. 520. Available at: https://doi.org/10.12688/f1000research.109110.2.

van Heerden, C., Maree, C., Yazbek, M., Janse van Rensburg, E. S., Leech, R. (2019). One-day workshops, a platform for continuous professional development of nursing staff in a neonatal intensive care unit. *SAGE Journals,* 25(2), p. 253. Available at: https://doi.org/10.1177/1477971419861775.

van Wyk, S. N. & Naicker, V. (2023). A review of the effect of nurse shortages on existing nurse workforces in South Africa and Ukraine. *Economics of enterprises: Economics and Management of Enterprise,* 4(10), p. 28. Available at: https://doi.org/10.15587/2706-5448.2023.286628.

Vanderlaan, J. & Woeber, K. (2022). Early perinatal workforce adaptions to COVID-19 pandemic. *The Journal of Perinatal & Neonatal Nursing,* 36(1), pp. 37-45. Available at: https://doi.org/10.1097/JPN.0000000000000617.

Vergnano, S., Butter, J., Cailes, B., Chandrasekaran, R., Chiappin, E., Clark, E., Cutland, C., Dourado de Andrade, S., Esteves-Jaramilllo, A., Ruiz Guinazu, J., Jones, C., Kampmann, B., King, J., Kochhar, S., Macdonald, N., Mangili, A., de Menezes Martins, R., Velasco Munoz, C., Padula, M., Munoz, F.M., Oleske, J., Sanicas, M., Schlaudecker, E., Spiegel, H., Subelj, M., Sukumaran, L., Tagbo, B. N., Top, K. A., Tran, D., Heath, P. T. (2016). Neonatal infections: case definition and guidelines for data collection, analysis, and presentation of immunisation safety data. *Elsevier,* 34, p. 6039. Available at: https://doi.org/10.1016/j.vaccine.2016.03.046.

Vetcho, S., Cooke, M. & Ullman, A. J. (2020). Family-centred care in dedicated neonatal units: an integrative review of international perspectives. *Journal of Neonatal Nursing,* 26(2), pp. 73-92. Available at: https://doi.org/10.1016/j.jnn.2019.09.004.

Vilanova, C. S., Hirakata, V. N., de Souza Buriol, V. C., Nunes, M., Goldani, M. Z., & da Silva, C. H. (2019). The relationship between the different low birth weight strata of newborns with infant mortality and the influence of the main health determinants in the extreme south of Brazil. *Population Health Metrics, 17*(1), p.2. Available at: https://doi.org/10.1186/s12963-019-0195-7.

Waddington, C., van Veenendaal, N. R., O'Brien, K. & Patel, N. (2021). Family integrated care: supporting parents as primary caregivers in the neonatal intensive care unit. *Pediatric Investigation,* 5(2), p. 149. Available at: https://doi.org/10.1002/ped4.12277.

Walliman, N. (2011). *Research methods: The basics* (p. 10). Routledge.

Wallace L. J. (2021). A Proactive Curriculum With Remediation Intervention Tool for Nursing Education Success. *Nursing Education Perspectives*, *42*(6), pp. E89–E90. Available at: https://doi.org/10.1097/01.NEP.0000000000000811.

Williams, K. G., Patel, K. T., Stausmire, J. M., Bridges, C., Mathis, M. W., & Barkin, J. L. (2018). The Neonatal Intensive Care Unit: Environmental Stressors and Supports. *International Journal of Environmental Research and Public Health, 15*(1),

p.60. Available at: https://doi.org/10.3390/ijerph15010060.

Wine, O., McNeil, D., Kromm, S. K., Foss, K., Caine, V., Clarke, D., Day, N., Johnson, D. W., Rittenbach, K., Wood, S., & Hicks, M. (2023). The Alberta Neonatal Abstinence Syndrome Mother-Baby Care ImprovEmeNT (NASCENT) program: protocol for a stepped wedge cluster randomized trial of a hospital-level Neonatal Abstinence Syndrome rooming-in intervention. *BMC Health Services Research, 23(*1), p. 448. Available at: https://doi.org/10.1186/s12913-023-09440-5.

Withell, C., Johnson, M., & McLellan, J. (2021). Guidelines for neonatal care: Importance of current evidence in practice. Journal of Neonatal Nursing, 27(4), pp. 188-196.

World Health Organization. (2020). Newborns: Improving survival and well-being. https://www.who.int/news-room/fact-sheets/detail/newborns-reducing-mortality [Accessed 15/10/2021 June 2020].

Wreesmann, W. W., Lorié, E. S., van Veenendaal, N. R., van Kempen, A. A. M. W., Ket, J. C. F., & Labrie, N. H. M. (2021). The functions of adequate communication in the neonatal care unit: A systematic review and meta-synthesis of qualitative research. *Patient Education and Counseling, 104*(7), pp. 1505–1517. Available at: https://doi.org/10.1016/j.pec.2020.11.029.

Wu, W., He, J. & Shao, X. (2020). Incidence and Mortality trend of congenital heart disease at the global, regional, and national level, 1990-2017. *Medicine,* 99(23), p. 1. Available at: https://doi.org/10.1097/MD.0000000000020593.

Yamada, N. K., Yaeger, K. A. & Halamek, L. P. (2015). Analysis and classification of errors made by teams during neonatal resuscitation. *Resuscitation,* 96, p. 109. Available at: https://doi.org/10.1016/j.resuscitation.2015.07.048.

Yiend, J., Tracy, D. K., Sreenan, B., Cardi, V., Foulkes, T., Koutsantoni, K., Kravariti, E., Tchanturia, K., Willmott, L., Shergill, S., & Reedy, G. (2016). Postgraduate clinical placements: Evaluating benefits and challenges with a mixed methods cross-sectional design. *BMC Medical Education, 16*(64). Available at: https://doi.org/10.1186/s12909-016-0575-7.

Yilak, G., Getie, A., Fitwi, A., Wondmieneh, A., & Gebremeskel, T. (2022). Implementation of Nursing Process and Its Associated Factor Among Nurses at

Woldia Comprehensive Specialized Hospital, Northern Ethiopia: An Institution-Based Cross-Sectional Study. *Nursing: Research and Reviews*, *12*, 111–119. Available at: https://doi.org/10.2147/NRR.S368097.

Youseff, M. & Kleytman, I. (2020). Post-discharge telephone-based program for NICU parents. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 49(6), p. S77. Available at: https://doi.org/10.1016/j.jogn.2020.09.134.

Youseff, M. & Kleytman, I. (2021). Decreasing the number of NICU admissions related to hypoglycaemia. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 50(5), p. S42. Available at: https://doi.org/10.1016/j.jogn.2021.08.080.

Zahouani, T., & Mendez, M. D. (2023). Omphalocele. In StatPearls [Internet]. Treasure Island, FL: StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov/books/NBK519010/.

Zauche, L. H., Zauche, M. S. & Wiliams, B. L. (2021). Influence of quiet time on the auditory environment of infants in the NICU. *Journal of Obstetric, Gynecologic & Neonatal Nursing,* 50(1), pp. 68-77. Available at: https://doi.org/10.1016/j.jogn.2020.09.159.

Zhang, X., Kurtz, M., Lee, S.-Y. & Liu, H. (2021). Early intervention for preterm infants and their mothers. *The Journal of Perinatal & Neonatal Nursing,* 35(4), pp. E69-E82. Available at: https://doi.org/10.1097/JPN.0000000000000065.

Zolkefli, Y. (2021). The challenges in reporting incompetent practices in nursing. *International Journal of Care Scholars,* 4(2), p. 95. Available at: https://doi.org/10.31436/ijcs.v4i2.197.

Zwimpfer, L., Wiltshire, E. & Elder, D. (2021). Nurse to infant vocalisation during nursing care: does it vary between painful and non-painful procedures? *Journal of Neonatal Nursing,* 27(6), pp. 459-462. Available at: https://doi.org/10.1016/j.jnn.2021.06.006.

APPENDICES

APPENDIX A DATA EXTRACTION TOOL DEVISED BY TAYLOR & TAYLOR (2014)

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of Neonatal Nursing Science Total published January 2020-March 2022: **N=151** Total articles included: **N=53**	Reviews (N=12)	Literature reviews (N=5)	1.Qualitative & Quantitative Analysis	• Workplace-based education strategies for the 21st century neonatal nurse • Best practices for neonatal nurses through workplace-based learning
			2.Covidence systematic review software, Rodgers' evolutionary & concept analysis	• Promotion of Family-centred care in the Neonatal Intensive Care Unit • Role of the neonatal nurse in FCC
			3. Thematic Analysis	• Family-centred care • Models of neonatal Family-centred care • Individualised neonatal FCC • Neonatal developmental care • Neuroprotective developmental supportive care of the neonatal • Role of the Neonatal nurse in FCC
			4.Thematic Analysis	• Neonatal Assessment of Infant Mental Health • Early detection and intervention of infant mental health disorders
			5. Aveyard (2014) systematic approach to data analysis & Critiquing tool by Holland and Rees (2010)	• Nasal Skin Breakdown • Use of protective barriers to prevent impaired skin integrity for neonates on supplemental oxygen • Skin Assessments

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of Neonatal Nursing Science Total published January 2020-March 2022: **N=151** Total articles included: **N=53**	Reviews cont. (N=12)	Systematic Reviews (N=1)	1.Narrative Analysis	• Neonatal Hypothermia • Management of hypothermia • Awareness of hyperthermia due to warming medical devices
		Rapid Review (N=1)	1.Descriptive Summary	• Best practices for educating NICU nurses about palliative care
		Integrative Reviews (N=3)	1.Narative Analysis	• Promotion of FCC in neonatal units
			2.Thematic Analysis	• Role of neonatal nurses in transition from NICU to discharge • Discharge preparation and readiness
			3. Arksey and O'Malley's (2005) 5 step framework & Levac et al.'s. (2010) method of synthesising health evidence	• Implications of COVID 19 for neonatal nursing • Midwifery practice relating to the babies and families in our care
		Scoping Review (N=1)	4. Thematic analysis	• Care of the dying neonate • Effective communication to parents of the dying neonate
		Narrative Review (N=1)	5.Thematic analysis	• Prevention of neonatal hypothermia during transfer of neonate from theatre to NICU's • Providing effective warmth & thermoregulation
	Discussion Paper (N=6)	1.N/A	1.N/A	• Defining the role of the Neonatal Nurse Practitioner(NNP) • Strengths and limitations of NNP role • The evolution of the neonatal nurse practitioner role
		2.N/A	2.N/A	• Neonatal nursing specialization • Advanced resuscitation • Care of the sick neonate • Medical & Surgical interventions
		3.N/A	3.N/A	• Need for Neonatal Nurses engagement of parents during a pandemic

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of Neonatal Nursing Science Total published January 2020-March 2022: **N=151** Total articles included: **N=53**	Discussion Paper cont. (N=6)	4.N/A	4.N/A	• Infant Mental Health • Parent-infant bonding Neonatal Neuroprotective care • Family-centred care • Parental psychological health Developmental care Neurodevelopmental outcomes • Pain & Stress of the neonate
		5.N/A	5.N/A	• Interaction of regulation relationships and reflection in applying Infant Mental Health (IMH) to neonatal intensive care
		6.N/A	6.N/A	• Adaption of Neonatal Nurses roles to COVID-19
	Mixed Methods (N=3)	1.-Pre & Post knowledge test -Focus Groups -Survey	1.T-test and correlation analysis & Flicks six steps of Thematic Analysis	• Improving the quality of neonatal care through the education of maternity health workers • Need for on-going training of Neonatal Nurses
		2. -Close-ended questionaries -Focus Group Discussions	2.Statistical analysis using excel & Thematic analysis	• Role of the Neonatal Nurse in Neonatal family integrated care • Communication between the Nurse and parent
		3..-Literature Review-Survey	3.Statistical & thematic analysis	• Avoidance of neonatal medical adhesive-related skin injuries
	Quantitative (N=25)	1.Cross Sectional Study	1. Statistical Package for Social Sciences (SPSS) software-24, Descriptive & Analytical statistics	• Nursing diagnoses of preterm infants in the neonatal intensive care unit • Recognizing the signs and symptoms associated with nursing diagnoses
		2. Case Study	2.Analytical statistics	• Neonatal Nurses role in parental involvement of their neonates during clinical interventions
		3.Cross Sectional Study	3.SPSS version 20, Kolmogorov–Smirnov test & Multiple linear regression analysis	• Support of mother in a Neonatal Intensive Care Unit

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of Neonatal Nursing Science Total published January 2020-March 2022: **N=151** Total articles included: **N=53**	Quantitative cont. (N=25)	4.Cross Sectional Study	4.IBM SPSS version 25 & Analysis of Variance (ANOVA)	• Parent engagement in the NICU • Barriers and challenges to parent engagement • Individualized plan of care
		5.Cross Sectional Study	5.ANOVA, Kruskal Wallis test, post-hoc analysis with Fisher's LSD test, Dunn's test, Shapiro-Wilk test & R program version 3.5.2.	• Neonatal Nurse Care Rationing implications • Improvement of critical thinking of neonatal nurses
		6. Pretest–posttest experimental randomized controlled design	6. SPSS Graduate Pack 21.0 Independent t-tests	• Acute stress disorder among mother after NICU admission • Emotional support training program • Assessing early signs of acute distress disorder in mothers • Best practices of supporting mothers in NICU's
		7.randomized clinical trial	7.Analysis of covariance (ANCOVA) & paired t-test	• Gastrointestinal anomalies • Supportive program on maternal self-confidence • Routine care for mothers of infants with an anomaly in neonatal intensive care units
		8.Quasi-experimental study	8.SPSS software version 21	• The effect of telenursing on the rate of newborn readmission
		9.Retrospective chart review data	9.LR chi-squared test, negative binomial model, Variance Inflation factor (VIF) & Collin procedure in STATA software	• Diaper Dermatitis • Skin Integrity Assessment of the neonate • Preventative measures to avoid impaired skin integrity of the neonate
		10.Cross Sectional Study	10.SPSS version 22	• Neonatal Hypothermia • Preventions of neonatal hypothermia • Consequences of Neonatal Hypothermia
		11. Pre & Post test intervention	11.z-test	• Neonatal emergent tracheostomy care

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of Neonatal Nursing Science Total published January 2020-March 2022: **N=151** Total articles included: **N=53**	Quantitative cont. (N=25)	12.Audit of practice	12.Microsoft Excel	• Neonatal Hypoxia • Oxygen saturation alarm compliance • Role of neonatal nurse in oxygen saturation targeting •
		13.Observational Study	13.SPSS 20 software, Kolmogorov–Smirnov test& Turkey's Post Hoc tests	• Correct positioning of a neonate with respiratory distress syndrome
		14. Descriptive correlation study	14. SPSS software (version 13.0) & KS test	• Promotion of exclusive breastfeeding for Low Birth Weight infants • Breastfeeding self-efficacy • Support of mothers breastfeeding low birth weight infants
		15.Randomized Controlled Trial	15.Software SPSS 20, t-test, Mann-Whitney U test, Pearson's Chi-square test, Fisher's exact test & Wilcoxon signed rank test	• Exclusive breastfeeding in NICU • Benefits of exclusive breastmilk for neonates in NICU • Expression of milk
		16.Cross sectional study	16.R Foundation for Statistical Computing version 3.5.2	• Benefits of breastmilk on Low Birth Weight (LBW)Infants with congenital abnormalities • Support for breastmilk feeding for LBW infants with congenital abnormalities
		17.Cross sectional study	17.Statistical Analysis	• PRIME (preterm infants need milk early) • NICU bedside expression of milk • Promotion of breastmilk feeds
		18.Survey	18.Statistical Analysis	• Neonatal nurse's knowledge of neonatal nutrition • Donor human milk
		19.Survey	19.SPSS for Windows Version 25 statistical package	• Pain management practices during newborn blood sampling • Procedural Pain

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of Neonatal Nursing Science Total published January 2020-March 2022: **N=151** Total articles included: **N=53**	Quantitative cont. (N=25)	20.Observational Study	20.Mann-Whitney test & Chi-square tests	• Effects of Nurse to infant vocalisation during nursing care • Vocal soothing • Companionship • Infant mental health •
		21.Randomized Control Study	21.NCSS (Number Cruncher Statistical System) 2007 program, ANOVA, Kruskal–Wallis test, Bonferroni-corrected Mann-Whitney, U tests, Pearson's & Chi-square test	• Effects of heel warming prior to heel pricks on neonates • Non-pharmacological pain management • Use of automatic heel lancet for heel pricks on neonates
		22.Cross Sectional Study	22.SPSS software version 19	• Family-centred care in NICU • Open visiting
		23.Comparitive design	23.Bland and Altman analyses	• Accurate measurement of neonatal temperature • Infrared non-contact Thermometer aimed at the forehead versus digital thermometer via axilla method
		24. Retrospective chart review	24.Statistical Analysis	• Correct timing of anti-biotic administration in NICU • Late onset sepsis
		25. Descriptive correlational study	25.SPSS version 23, t-test & ANOVA	• Family-Centred Care • Nurse support among mothers of premature infants in the neonatal intensive care unit
	Qualitative (N=7)	1.In-depth Interviews	1.Thematic Analysis using a framework approach	• Neonatal nursing staff perceptions of their role • Diverse workload • Neonatal Nursing skills and competencies • Mechanical Ventilation • Intravenous blood cannulation • Managing clinical risks

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of Neonatal Nursing Science Total published January 2020-March 2022: **N=151** Total articles included: **N=53**	Qualitative cont. (N=7)	2.In-depth Interviews	2.Open Code 3.6 software, Thematic analysis	• Preparing parents for discharge from NICU
		3.In-depth Interviews	3.Roper and Shapira's (2000) framework	• Pain of the neonate • Mother's role in painful procedures on a neonate • Nurse's role in painful procedures on neonates •
		4.In-depth Interviews	4.Constant comparative method	• Neonatal intensive care nurses' perceptions of implementing parent discharge preparation tools
		5. In-depth Interviews	5.Deductive & Inductive content analysis	• Support for milk expression • Support for the transition to direct breastfeeding
		6.In-depth Interviews	6.NVivo 12 software	• Supporting mothers practice of expressed breastmilk
		7.In-depth Interviews	7.Qualitative content analysis	• Neonatal nursing, involving close collaboration with families in distress
Journal of obstetric, gynaecological & neonatal nursing Total published January 2020-March 2022: **N=124** Total articles included: **N=29**	Quantitative (N=16)	1.Single-group, crossover experimental study	1.SPSS version 21.0 software Student's t test	• Correct Positioning of neonates during the feeding of preterm neonates
		2.Cross-sectional, descriptive comparison design	2.SPSS Version 24, Descriptive statistics, a missing data analysis, t-test, Wilcoxon signed rank test	• Creation of a neuroprotective environment through implementation of quiet time • Quiet time protocols in NICU • Reduction of noise in the NICU
		3.Prospective interventional, baseline response–paired pilot study.	3.Software package SAS (Version 9.4)	• Skin-to-skin care as a nurse led practice in NICU • Benefits of skin to skin care on the infant and mother

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of obstetric, gynaecological & neonatal nursing Total published January 2020-March 2022: **N=124** Total articles included: **N=29**	Quantitative cont. (N=16)	4.Cross-sectional survey	4.Descriptive statistics, Pearson chi-square analyses, binary logistic regression analysis	• End-of-Life Care for Infants in NICUs • Nurses' roles in clinical decision-making processes regarding end of life care in NICU • Involvement of infants' families in decision-making processes regarding end-of-life care in NICUs
		5.Retrospective chart review data	5.Statistical Analysis	• Prevention of hypoglycemia in the newborn
		6.Observational cohort study	6.Descriptive statistics, regression analysis & Stata (Version 15.1 SE)	• Fathers' Presence and Involvement in the NICU • NICU nurses pivotal role in helping fathers become more involved in the care of their newborns
		7.Quasi-experimental, pre- and postintervention	7.Two-tailed Student t tests, Pearson chi-square tests, Fisher exact p value & SPSS (Version 25)	• Effects of Dextrose Gel in Newborns at Risk for Neonatal Hypoglycemia • Prevention of Hypoglycaemia
		8.A randomized controlled clinical trial	8.SPSS (Version 20) Chi-square tests Student t tests ANCOVA Mann–Whitney U tests	• Hyperbilirubinemia in Newborns • Use of massage for newborns who are treated with phototherapy
		9.Cross-sectional, descriptive, correlational study	9.SPSS, version 26, linear regression analysis, univariate and bivariate tests Kolmogorov–Smirnov test, nonparametric tests	• NICU Nurses role in support of families during discharge of a neonate • Prevention of health deterioration of neonate post discharge
		10.A quantitative laboratory study	10.Microsoft Excel	• Prevention of Hypoglycaemia in neonates • Management of Hypoglycaemia in neonates with the use of dextrose gel • Correct administration of dextrose gel to neonates

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of obstetric, gynaecological & neonatal nursing Total published January 2020-March 2022: **N=124** Total articles included: **N=29**	Quantitative cont. (N=16)	11.A quality improvement project with a pre–post evidence-based practice implementation design	11.descriptive statistics,	• Feeding preterm infants in response to developmental cues • Nursing staff's empowerment to take the lead as patient advocates in infant feeding practices
		12.A cross-sectional survey study	12.IBM SPSS Statistics for Windows, Version 22.0 descriptive statistics one-way analysis of variance and t tests Pearson's correlation coefficients Content analysis	• Management of Neonatal Abstinence Syndrome(NAS) • Trauma-info NICU nurses' judgmental attitudes toward mothers of newborns with NAS • Trauma-informed care
		13.A prospective controlled cohort analysis	13.independent-sample t and chi-square tests post hoc multiple comparison test was performed by using Bonferroni correction	• Management of neonatal hyperbilirubinemia • Risks of jaundice associated with early-term newborns
		14.Pre & Post-intervention survey	14.Statistical Analysis	• Swaddle Bathing in the NICU • Observing signs of stress in a neonate
		15.pre- and postsimulation survey of confidence	15.Statistical Analysis	• Nurses' Neonatal Resuscitation Confidence • Rapid Cycle Deliberate Practice
		16.Chart Review & Survey	16.Statistical Analysis	• Preparing the family of the neonate for transitioning home after NICU discharge

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of obstetric, gynaecological & neonatal nursing Total published January 2020-March 2022: **N=124** Total articles included: **N=29**	Reviews (N=3)	1.Systematic Review	1.Narrative Analysis	• Involving parents in pain-reducing measures during painful interventions for their preterm infants • Kangaroo/skin-to-skin care • Breastfeeding • Facilitated tucking
		2.Integrative Review	2.Braun and Clarke's (2006) framework for thematic analysis	• Registered Nurses support of breastfeeding Women • Breastfeeding education
		3.Literature Review	3.Thematic synthesis technique & Nvivo (Version 12; QSR International, 2019)	• Pain Management of neonates in NICU • NICU role in encouraging parent participation in the pain management of their neonates
	Qualitative (N=6)	1.In-Depth Interviews	1.Interpretive description constant comparative analyses	• Role of the NICU Nurse in family-centred care • Maintenance of safety of neonates during family integrated care
		2.In-Depth Interviews	2.Thematic analysis with an inductive and deductive coding approach	• Neonatal Care to empower parents • Family integrated care • Family-centred care
		3.Focus group discussions and semi structured interviews	3.Inductive and deductive coding approach	• Family nursing in NICU • Empowerment of parents of newborns in maternity and neonatal care
		4.Focus Group Discussions	4.Thematic Analysis	• Baby-Friendly Hospital Initiative (BFHI) • Barriers to achieving Baby-Friendly designation
		5.Secondary qualitative analysis	5.Krippendorff's content analysis	l Injury in Obstetric and Neonatal Nurses • Scope of practice

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
Journal of obstetric, gynaecological & neonatal nursing Total published January 2020-March 2022: **N=124** Total articles included: **N=29**	Qualitative cont. (N=6)	6.Focus Group Discussions	6.Thematic analysis	• Tool to Enhance Relationships Between Staff and Parents in the Neonatal Unit • Empowerment of parents of premature infants in the neonatal period and support of neonatal nurses in their unique and powerful attacher role
	Poster Presentation (N=4)	1.Not mentioned	1.Not mentioned	• Achieving Normothermia in Low-Birth-Weight Neonates
		2.Not mentioned	2.Not mentioned	• Detection tool to aid early detection of Necrotising Enterocolitis (NEC) • Nurse Management of NEC
		3.Not mentioned	3.Not mentioned	• Optimising Outcomes in Extremely-Low-Birth-Weight Infants in NICU • Obstetric and neonatal collaborative care •
		4.Not mentioned	4.Not mentioned	• Improving discharge outcomes for neonates after admission into NICU
The Journal of Perinatal & Neonatal Nursing Total published January 2020-March 2022: **N=85** Total articles included: **N=27**	Quantitative (N=15)	1.Chart reviews & Pre & Post Surveys	1.Independent-samples t-test Fisher's exact test REDCap electronic data capture tools IBM SPSS version 26	• Benefits of skin-to-skin contact (SSC) in NICU • Increasing the utilisation of SSC in NICU • Family-centred care (FCC)
		2.Quasi-experimental trial	2.IBM SPSS Statistics 20.0 Pearson's $\chi 2$ test Student's t test Mann-Whitney tests ANOVA	• Implementing a care bundle for preventing periintraventricular hemorrhage (PIVH) in preterm newborns • Patient safety for the maintenance of children's health •
		3.Retrospective cross-sectional design using hospital data	3.SAS 9.4 software	• Nurse staffing and nosocomial infections in very low-birth-weight (VLBW) infants in NICU • Reduction of nosocomial infections

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
The Journal of Perinatal & Neonatal Nursing Total published January 2020-March 2022: **N=85** Total articles included: **N=27**	Quantitative cont. (N=15)	4.A Randomized Controlled Trial	4.Research Electronic Data Capture [REDCap]) $\chi 2$ test Fisher's exact test ANOVA Kruskal-Wallis test t test Wilcoxon-Mann-Whitney test Spearman's rank correlation coefficient	• Pain management neonates • Use of non-pharmacological pain management techniques • Breastfeeding • Oral sucrose • Non-nutritive sucking • Skin-to-skin contact
		5.Exploratory Survey	5.SPSS version 25 $\chi 2$ analysis	• Peri-natal workers adaptions to COVID-19 pandemic • Preparation for the next pandemic
		6.Quasi-experimental approach	6.SPSS version 21.0 $\chi 2$ test t test ANOVA	• Family support and empowerment programs at the bedside • Creating Opportunities for Parent Empowerment (COPE)
		7.Non-equivalent group design	7.Social Sciences (SPSS) version 24 ANCOVA	• Helping Babies Breathe (HBB) training program • Improving neonatal health outcomes with correct resuscitation methods
		8.Quasi-experimental study	8.SPSS statistical software, version 22.0 t test chi-square test Kolmogorov-Smirnov goodness-of-fit test Mann-Whitney U test Wilcoxon signed rank tests	• e-Learning Breastfeeding Program for Postpartum Mothers of Moderately High-Risk New-born Infants Admitted to the Special Care Nursery

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
The Journal of Perinatal & Neonatal Nursing Total published January 2020-March 2022: **N=85** Total articles included: **N=27**	Quantitative cont. (N=15)	9.Cross-sectional, anonymous survey	9.χ2 Mann-Whitney U test KruskalWallis test Dunn's test with Bonferroni correction STATA (version 14)	• Gloving and Touch Practices of Neonatal Nurses • Infection prevention vs infant's need for human skin-to-skin contact
		10.Retrospective medical record review	10.t tests χ2	• Treatment of Hyperbilirubinemia in late preterm infants • Use of phototherapy • Prevention of Kernicterus • Care surrounding bilirubin management.
		11.Cohort study	11.Statistical Product and Service Solutions version 24.0, χ2 analyses, logistic regression models	• Maternal Milk and Relationships to Early Neurobehavioral Outcome in Preterm Infants • Importance of maternal milk feedings in the NICU
		12.Longitudinal and prospective study	12.Pearson's χ2 test Welch's t test varimax rotation with Kaiser normalization The KMO (KaiserMeyer-Olkin) measure Bartlett's test of sphericity SPSS Statistics 24/25	• Mothers' Adaptation to a Late Preterm Infant When Breastfeeding • Good support for breastfeeding • Breastmilk benefits on a low birth weigh infant • Prevention of Necrotising Enterocolitis & Sepsis in neonates • Delayed breastfeeding initiation
		13.Experimental study	13.Microsoft Excel version 2010 R Core Team program, version 3.6.1 Shapiro-Wilk test Levene's test Student's t test Kruskal-Wallis test Wilcoxon signed ranked test Mann-Whitney test	• Neonatal Transfusion Practice • Quality standards for blood transfusion proposed by blood banks • Benefits of using a Syringe infusion pump for blood transfusions

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
The Journal of Perinatal & Neonatal Nursing Total published January 2020-March 2022: **N=85** Total articles included: **N=27**	Quantitative cont. (N=15)	14.Randomized controlled trial	14.IBM SPSS Statistics 22 Shapiro-Wilk test Student t test ANOVA Tukey HSD (honestly significant difference) post hoc test Kruskal-Wallis test Mann-Whitney U test Friedman test Wilcoxon signed rank test $\chi 2$ test	• Positioning of a neonate to reduce pain during a heelprick
		15.Surveys	15.IBM SPSS for Windows Version 25 $\chi 2$ statistical test descriptive statistics	• Pain management strategies for neonates • BSweet2Babies • Using social media to disseminate evidence on pediatric pain management
	Qualitative (N=4)	1.Semi structured individual and group interviews	1.Categorical Analysis fishbone diagram Thematical Analysis	• Transition to home from an NICU • Barriers for the transition to home • NICU nurse role in the discharge process
		2.Individual semi structured interviews	2.Colaizzi method	• Promotion of family-centred care • Preserving the dignity of parents of infants hospitalized in the NICU
		3.Semi-structured interviews	3.NVivo 12 software Conventional content analysis	• Neonatal Palliative Treatment • Nurse important role in supporting the shared decision-making process for palliative care
		4.In-depth interviews	4.MAXQDA qualitative data analysis software Colaizzi's 7-step method for data analysis	• Neonatal Intensive Care Nurses Experiences in COVID-19 Pandemic • Neonatal care adaptions due to COVID-19 • Improvement of neonatal nurses working conditions

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
The Journal of Perinatal & Neonatal Nursing Total published January 2020-March 2022: **N=85** Total articles included: **N=27**	Mixed Methods (N=3)	1.Situational analysis through observation & focus group discussion	1.Descriptive statistics 8 steps according to Tesch's approach	• Neurodevelopmental supportive care in neonates • Best practice guidelines when initiating neurodevelopmental supportive care
		2.Focus Group Discussions, observation & photographic data	2.Qualitative data analysis not mentioned Quantitative: SPSS version 22.0 Shapiro-Wilk test Chi-square test, Mann-Whitney U test and independent-samples t tests	• Hospital-Acquired Neonatal Skin Injury • Medical device–associated injuries • Neonatal Skin Risk Assessment Scale • Braden Q Scale
		3.Retrospective medical record review & Qualitative interviews	3.Descriptive statistics Bivariate analyses Thematic Analysis	• Infant-Family Mental Health in the NICU • Infant Neurodevelopmental care
	Reviews (N=4)	1.Systematic Review	1.Newcastle-Ottawa Scale to assess for the risk of bias among included studies Type of data analysis not mentioned	• Understanding determinants of the VLBW infant's intestinal microbiome • Neonatal risk to developing Necrotising Enterocolitis • Antibiotic stewardship • Support of human milk feeding & Hygienic care practices
		2.Systematic review	2.PEDro scale to evaluate internal and external validity of the study	• Increasing maternal competence during and after the infant's hospitalization period
		3.Scoping Review	3.Thematic Analysis	• Management of infant pain • Nurses to engage and educate parents on parent-led pain interventions

Name of Journal	Study design	Data collection method	Method of analysis	Topics covered
The Journal of Perinatal & Neonatal Nursing Total published January 2020-March 2022: **N=85** Total articles included: **N=27**	Reviews cont. (N=4)	4.Systematic Review	4.Descriptive statistics	• Mechanical ventilation of neonates • Weaning to Reduce the Duration of Invasive Mechanical Weaning in Neonates
	Discussion Paper (N=1)	N/A	N/A	• Neurocritical care in the intensive care unit • continuous cot-side Monitoring of brain function • Neuromonitoring techniques in neonatal intensive care • Diagnosing and managing seizures • Application of eeg methods • Preventing peri intraventricular haemorrhage (PIVH) in preterm newborns

APPENDIX B SURVEY FOR PROFESSIONAL NURSES WORKING IN NICUS

Good day participants, thank you for taking the time to complete this survey, your contribution in this survey will assist the researcher in the development of a short course for singly qualified registered nurses working in neonatal intensive care units in South Africa

The survey will be split into two sections

Section 1: You will be asked to rate each provided Neonatal Competency in order of importance, on a scale from 0-3

3- Very Important

2- Important

1- Slightly Important

0- Not Important

Section 2: You will be asked to select the neonatal competencies you rated 3 & 2 and provide a reason as to why you deem these competencies as important from the following choices. You may select more than one reason.

A. Need to use it frequently

B. Lack confidence relating to this competency

C. My colleagues have limited knowledge of the competency

D. It will make a positive impact towards the care of a neonate in ICU

Part 1: Management & Prevention of common Neonatal Conditions

COMPETENCY	SECTION 1	SECTION 2 *Only answer once section 1 is complete- provide reasons for all competencies rated 2 & 3*
The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the management of the following conditions:	Scale of importance 3-Very important 2-Important 1-Slightly Important 0-Not Important	Reason A. Need to use it frequently B. Lack of confidence relating to this competency C. My colleagues have limited knowledge of the competency D. It will make a positive impact towards the care of the neonate
Neonatal Abstinence Syndrome		
Hyperbilirubinemia		
Respiratory Distress Syndrome		
Persistent Pulmonary Hypertension		
Necrotising Enterocolitis		
Gastroschisis		
Omphalocele		
Congenital heart defects		
Intraventricular Haemorrhage		
Hypothermia		
Hypoxia		
Infection		
Hypoglycaemia		

COMPETENCY	**SECTION 1**	**SECTION 2** ***Only answer once section 1 is complete- provide reasons for all competencies rated 2 & 3***
The nurse should demonstrate competency in the ability to implement a range of advanced procedures, treatments, and interventions in accordance with the developed care plan for the management of the following conditions:	Scale of importance 3-Very important 2-Important 1-Slightly Important 0-Not Important	Reason A. Need to use it frequently B. Lack of confidence relating to this competency C. My colleagues have limited knowledge of the competency D. It will make a positive impact towards the care of the neonate
Intraventricular Haemorrhage		
Hypothermia		
Hypoxia		
Infection		
Hypoglycaemia		

Part 2: Best practices in Neonatal Care

COMPETENCY	SECTION 1	SECTION 2 *Only answer once section 1 is complete- provide reasons for all competencies rated 2 & 3*
Nurse uses appropriate assessment to identify actual and potential risks to safety and security, takes appropriate action to ensure:	Scale of importance 3-Very important 2-Important 1-Slightly Important 0-Not Important	Reason A. Need to use it frequently B. Lack of confidence relating to this competency C. My colleagues have limited knowledge of the competency D. It will make a positive impact towards the care of the neonate
Maintenance of skin integrity		
Early initiation of breastmilk		
Safe and correct administration of medication		
Promotion of a neuroprotective environment by the implementation of quiet time		
Effective initiation of neonatal resuscitation		
Execution of safe administration of a blood transfusion		
Correct management of a neonate on phototherapy		
Promotion of skin to skin contact with primary care giver		
Correct management of a neonate on supplemental oxygen		
Effective non-pharmacological pain management		

Part 3: Promotion of family-centred care

COMPETENCY	SECTION 1	SECTION 2 ***Only answer once section 1 is complete- provide reasons for all competencies rated 2 & 3***
Nurse Initiates, develops, and continues therapeutic relationships using a range of advanced communication and interpersonal skills with families of neonates to ensure	Scale of importance 3-Very important 2-Important 1-Slightly Important 0-Not Important	Reason A. Need to use it frequently B. Lack of confidence relating to this competency C. My colleagues have limited knowledge of the competency D. It will make a positive impact towards the care of the neonate
Effective communication with families of neonates		
Involvement of families in the care of the neonate		
Support of families of the neonate		
Effective management of challenges or barriers to Family-Centred Care due to COVID-19		
Creation of a therapeutic environment for the family of the dying neonate		

APPENDIX C INFORMATION LETTER FOR THE EXPERTS

Good day participants, in order for me fulfil the requirements of this degree I am expected to undertake a research project under supervision. Research is a step by step guided and controlled process that is used in order to answer a research question, which for this study is: How can singly qualified nurses working in neonatal ICU's best be supported to gain additional knowledge required to care for compromised neonates?

The purpose of this research aims to develop a short course on neonatal intensive care nursing that will serve as a contributor to continuous professional development for nurses working in neonatal ICUs, but who lack specialist training in the field.

I am inviting you to take part in this research study.

What is involved in the study: The study will be conducted in three phases, the first phase is divided into 3 parts, phases 2 and 3 will follow. **Your involvement will be needed for phase** 1.2 and phase 3 of the study.

Phase 1.1 The researcher will conduct a mapping review. Literature will be sourced and synthesized to identify neonatal competencies required of nurses working in Neonatal Intensive Care Units.

Phase 1.2 An expert group will be invited to participate in a ranking exercise followed by a Focus Group Discussion. Neonatal competencies will be identified by the researcher with the help of a mapping review, these competencies will be handed to each participant on cardboard flashcards. Participants will then be asked to place them in a ranking order from most to least important, the researcher will then observe each set carefully and take down information with the help of a designated scriber. The ranking exercise will take 30 minutes.

A Focus Group Discussion will follow, and the following question will be posed: What factors should be considered in developing and offering this on-line/blended learning course?

The focus groups will consist of 14 experts in a group, every participant's view will be considered very important, and will not be used against the participant. It is estimated that the focus group will take 60 minutes and will be digitally recorded with your consent, there will be a co-facilitator who will assist with note taking.

Members of the focus group will be asked to discuss aspects that should be included when designing a neonatal intensive care on-line/blended learning course, followed by prompting questions from the researcher.

Phase 1.3 Registered Nurses working in identified Neonatal Intensive Care Units will be invited to participate in a survey, where neonatal competencies derived from phase 1.1 will be the focus. Participants in this phase will be asked to rank the competencies from important to least important on a scaling system, thereafter state reasons why competencies were deemed important or not will be explored. The researcher will physically distribute surveys in the relative units and will be available to clarify any queries or concerns. A box will be left in each selected unit for completed surveys.

Phase 2 The researcher will develop a short course on neonatal intensive care nursing for singly qualified registered nurses working in NICUs.

Phase 3 The expert group from phase 1.2 will be invited back to complete a Delphi questionnaire with the purpose of evaluating the course. An electronic link to access the developed program will be distributed to the expert group along with the Delphi Questionnaire.

Risks involved in the study: choice of participation in this study is voluntary, and no risks will be attached to participation or not.

Benefits of being in the study: there will be no financial benefits if choosing to participate in this study, however, participants will have access to findings of the study upon completion.

Participation is voluntary: Participation in this study will be entirely voluntary, and withdrawal from the study can be done at any time if the participant wishes to do so, without the participant being charged or penalised.

Confidentiality and Anonymity: Researcher will encourage confidentiality within and out of the focus groups by making participants aware that discussions in the

focus group should not be discussed outside the group, however absolute confidentiality cannot be guaranteed. If a direct quote is made of anything a participant says in the report, this will be done so anonymously, whereby there will be no mention of names.

Participants completing the survey will be granted total confidentiality and anonymity as their names will not be required when filling out the survey.

Approval and permission to do the study will be obtained from Human Research Ethics Committee, and from the Post graduate Research committee of the University of the Witwatersrand.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretary are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Name and contact numbers of researcher and supervisors:

Researcher: Kerry-Ann Singaram (0837425483)

Supervisors: Dr Susan Jennifer Armstrong (0823720557) and Dr Meghan Botes(0729976409)

APPENDIX D CONSENT FORM FOR PHASES 1.2 AND 1.3

"DEVELOPMENT OF A NEONATAL INTENSIVE CARE SHORT COURSE FOR SINGLY QUALIFIED NURSES PRACTISING IN JOHANNESBURG."

I have been given a Participant Information Sheet which explains the nature and processes involved in this study, which is attached hereto.

1. I was given time to read it, or had it read to me, in the language I best understand.
2. I was given time to ask any questions I wanted to and found any answers given to me to be reasonable and satisfactory.
3. I believe I fully understand why the study is being conducted and what the intended outcomes will be.
4. I understand that there will be no immediate benefit to me, should I agree to participate, nor will I receive any payment; conversely, participation will not cost me anything but my time.
5. I understand that, even if I initially consent to take part in the study, I may subsequently withdraw at any time and would not be required to give any reasons; if that happened, any data collected about me for the purposes of the study would immediately be destroyed, unless I give consent for it to be retained.
6. I have been given a range of contact details, listed below. If I require further information or become concerned about any aspect of this study I am free to speak to any of these contacts.

Name and contact numbers of researcher and supervisors:
Researcher: Kerry-Ann Singaram (0837425483)
Supervisors: Dr Susan Jennifer Armstrong (0823720557) and Dr Meghan Botes(0729976409)

Name of participant……

Date……..

Place……

Signature……

Witness……..….

Date…….……

Place……

APPENDIX E INFORMATION LETTER FOR REGISTERED NURSES WORKING IN IDENTIFIED NICUS

INFORMATION LETTER FOR REGISTERED NURSES WORKING IN IDENTIFIED NICUs

Good Day participants, in order for me fulfil the requirements of this degree I am expected to undertake a research project under supervision. Research is a step by step guided and controlled process that is used in order to answer a research question, which for this study is: How can singly qualified nurses working in neonatal ICU's best be supported to gain additional knowledge required to care for compromised neonates?

The purpose of this research aims to develop a short course on neonatal intensive care nursing that will serve as a contributor to continuous professional development for nurses working in neonatal ICUs, but who lack specialist training in the field.

I am inviting you to take part in this research study.

What is involved in the study: The study will be conducted in three phases, the first phase is divided into 3 parts, phases 2 and 3 will follow. **Your involvement will be needed for phase** 1.3 of the study.

Phase 1.1 The researcher will conduct a mapping review. Literature will be sourced and synthesized to identify neonatal competencies required of nurses working in Neonatal Intensive Care Units.

Phase 1.2 An expert group will be invited to participate in a ranking exercise followed by a Focus Group Discussion. Neonatal competencies will be identified by the researcher with the help of a mapping review, these competencies will be handed to each participant on cardboard flashcards. Participants will then be asked to place them in a ranking order from most to least important, the researcher will then observe each set carefully and take down information with the help of a designated scriber. The ranking exercise will take 30 minutes.

A Focus Group Discussion will follow, and the following question will be posed: What factors should be considered in developing and offering this on-line/blended learning course?

The focus groups will consist of 14 experts in a group, every participant's view will be considered very important and will not be used against the participant. It is estimated that the focus group will take 60 minutes and will be digitally recorded with your consent, there will be a co-facilitator who will assist with note taking.

Members of the focus group will be asked to discuss aspects that should be included when designing a neonatal intensive care on-line/blended learning course, followed by prompting questions from the researcher.

Phase 1.3 Registered Nurses working in identified Neonatal Intensive Care Units will be invited to participate in a survey, where neonatal competencies derived from phase 1.1 will be the focus. Participants in this phase will be asked to rank the competencies from important to least important on a scaling system, thereafter state reasons why competencies were deemed important or not will be explored. The researcher will physically distribute surveys in the relative units and will be available to clarify any queries or concerns. A box will be left in each selected unit for completed surveys.

Phase 2 The researcher will develop a short course on neonatal intensive care nursing for singly qualified registered nurses working in NICUs.

Phase 3 The expert group from phase 1.2 will be invited back to complete a Delphi questionnaire with the purpose of evaluating the course. An electronic link to access the developed program will be distributed to the expert group along with the Delphi Questionnaire.

Risks involved in the study: choice of participation in this study is voluntary, and no risks will be attached to participation or not.

Benefits of being in the study: there will be no financial benefits if choosing to participate in this study, however, participants will have access to findings of the study upon completion.

Participation is voluntary: Participation in this study will be entirely voluntary, and withdrawal from the study can be done at any time if the participant wishes to do so, without the participant being charged or penalised.

Confidentiality and Anonymity: Researcher will encourage confidentiality within and out of the focus groups by making participants aware that discussions in the focus group should not be discussed outside the group, however absolute confidentiality cannot be guaranteed. If a direct quote is made of anything a participant says in the report, this will be done so anonymously, whereby there will be no mention of names. Participants completing the survey will be granted total confidentiality and anonymity as their names will not be required when filling out the survey.

Approval and permission to do the study will be obtained from Human Research Ethics Committee, and from the Post graduate Research committee of the University of the Witwatersrand.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Clement Penny, who may be contacted on telephone number 011 717 2301, or by e-mail on Clement.Penny@wits.ac.za. The telephone numbers for the Committee secretary are 011 717 2700/1234 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za and Rhulani.Mukansi@wits.ac.za

Name and contact numbers of researcher and supervisors:

Researcher: Kerry-Ann Singaram (0837425483)

Supervisors: Dr Susan Jennifer Armstrong (0823720557) and Dr Meghan Botes (0729976409)

APPENDIX F INTERVIEW TRANSCRIPTION SAMPLE

..Aligning program to legisl..

..Aligning program to legisl..

..Aligning program to le..

..Aligning program to legisl..

..Barriers to learning..

27 INTERVIEWER 4: I think for me, important factors to consider is first the program itself so in terms of legislation requirements within nursing as well as those very general nurses, their scope of practice. And that needs to align to the online program. So at my institution for example we've got an in-service certificate six-month program where these very general nurses participate on these programs but yet a challenge and a factor to consider is that they may have never had exposure in a neonatal ICU environment and with that being said, you know we have a critical shortage of specialised nurses, whether it is in any area of speciality, we have massive amounts of shortage of nurses and I think in terms of pathways, career pathways are factors that also need to be considered for our nurses of today because there are legislative requirements that prohibit some nurses to actually go onto a program that is not accredited with South African Nursing Council for example. So, if we look at South African Nursing Council, if we look at published institutions' lists that are currently on the existing database, I don't see any recognised neonatal ICU program or advanced diploma in neonatal ICU that these potential candidates can actually progress into and I think that must be considered as factors when designing this online program because it will influence who actually joins the program. Because a lot of people will say; is this program accredited? And if it is not accredited, they are not interested. So, within my environment, we get a lot of students onto the program because the program is designed around skill and making sure because the six-month program, you cannot teach people how to be all that good right, so you are teaching them basic fundamental skills to be able to work in a neonatal ICU environment and I think many, many factors that are important in the program is how you design your curriculum. And if it is going to be a blended method it needs to involve absolutely students' age, time, as well as their resources because we have seen you know they are employed, they are working, they come on the program but they are not able to actually pursue or they discontinue or they terminate, the throughputs remain low because they do not complete the program because they are having to not be able to do it whether

4/21

APPENDIX G ASSESSORS' APPROVAL

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

Private Bag 3 Wits, 2050
Fax: 027117172119
Tel: 02711 7172076

Reference: Mrs Sandra Benn
E-mail: sandra.benn@wits.ac.za

14 January 2022
Person No: 1844807
PAG

Mrs K Singaram
5 Tampa Springs
44 Seder Road
Winchester Hills
2054
South Africa

Dear Mrs Kerry-ann Singaram

Doctor of Philosophy: Approval of Title

We have pleasure in advising that your proposal entitled *Development of a neonatal intensive care short course for singly qualified registered nurses practising in Johannesburg* has been approved. Please note that any amendments to this title have to be endorsed by the Faculty's higher degrees committee and formally approved.

Yours sincerely

Mrs Sandra Benn
Faculty Registrar
Faculty of Health Sciences

APPENDIX H HOD APPROVAL TO CONDUCT THE STUDY

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

DEPARTMENT OF NURSING EDUCATION

From:
Prof TR Mavundla
Department of Nursing Education
Tel: 0114884196
Email: thandisizwe.mavundla@wits.ac.za

To:

Mrs. K Singaram
Department of Nursing Education
Tel: 0114884196

Date: 3 August 2022

Student: Mrs Kerry-Ann Singaram

Degree: DOCTOR OF SCIENCE IN NURSING

Study title: **Development of a Neonatal Intensive Care Short Course for singly qualified nurses practicing in Johannesburg**

Dear Mrs. Singaram

Permission is granted for you to conduct your study in the Department of Nursing Education.

Prof TR Mavundla
Head of Department
DEPARTMENT OF NURSING EDUCATION

Department of Nursing Education | School of Therapeutic Sciences | Faculty of Health Sciences
7 York Road, Parktown, 2193, South Africa. Tel: +27 11 488-4272 | Fax: +27 11 488-4196
www.wits.ac.za/therapeuticsciences/nursing

APPENDIX I HOSPITAL B APPROVAL TO CONDUCT THE RESEARCH



[redacted]

Dear Kerry-Ann Singaram

The [redacted] Research Cluster Committee has reviewed your request to research "DEVELOPMENT OF A NEONATAL INTENSIVE CARE SHORT COURSE FOR SINGLY QUALIFIED REGISTERED NURSES PRACTISING IN JOHANNESBURG ".

I am pleased to inform you that you have been granted to research [redacted] provided that;

1. [redacted] will not anyway incur or inherit costs as result of the said study.
2. Your study shall not disrupt services at the study sites.
3. Strict confidentiality shall be observed at all times.
4. Informed consent shall be solicited from patients participating in your study.

The data collection to be started only after obtaining the Human Research Ethics Committee (HREC) *unconditional approval*.

Kindly note that it is a requirement at [redacted] that for *unconditional approval* to be granted, all pending documents highlighted below are to be submitted as soon as they are available or within 3 months, and if not applicable, kindly elaborate. Failure to comply with the above-stated requirements may result in the withdrawal of this research's approval at [redacted].

Head(s) of Department(s) Approval Letter	Provided
Human Research Ethics Committee Approval	Provided
The National Health Research Database Registration	Provided
Data Collection Sheets	Provided
Informed Consent Documents	Provided

Kindly forward this office with the results of your study on completion of the research.

I wish you every success with your research.

Yours sincerely,

[redacted]
Chief Executive Officer

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL
UNIVERSITY OF THE WITWATERSRAND
Cluster Research Committee
7 Jubilee Rd, Parktown 2196, Johannesburg
Enquiries: Office of the CEO
Ms. T. Ndlovu; Tell: 011 488 4211 Fax 011 488 3753
Ms L. Nkosi Tel: 011 488 3500
Email: Lindiwe.Nkosi@wits.ac.za

HOSPITAL PERMISSION TO CONDUCT RESEARCH - CMJAH CLUSTER RESEARCH COMMITTEE

DATE RECEIVED: 8/10/2022 11:31:55 AM

Application letter from the researcher Y/N:

Degree Related Research Y/N: **Yes** **Which Degree**: **PhD (Nursing)**

Undergraduate or Postgraduate committee approval Y/N: Yes

Non-degree purpose research Y/N: **Specify**:

HREC Approval Y/N: **Applied for but Pending** **HREC Number**: **MED22-03-056**

NHRD Registration Y/N: Registration Accepted **NHRD Number**: -GP_202208_018

Clinical Trial: **No** **Trial Registry Number**: **N/A**

Title of Research Project: DEVELOPMENT OF A NEONATAL INTENSIVE CARE SHORT COURSE FOR SINGLY QUALIFIED REGISTERED NURSES PRACTISING IN JOHANNESBURG

Name of Principal Investigator: **Kerry-Ann Singaram**

Name of Supervisor/Co-investigator: Susan Armstrong

CHECKLIST

- Is the study methods clear, and is the rationale for the study well motivated?
- Is the research cost to the hospital reasonable and justifiable?
- Does the research need support from other staff and allied staff?
- Are the study coordinators, research and registered nurses explicitly stated?
- LETTER OF PERMISSION FROM HODS TO CONDUCT RESEARCH
- Postgrad Assessor Group Approval (if for degree purposes)
- Data collection sheet reasonable
- Consent form and information sheet satisfactory
- HARDCOPY OF PROTOCOL AND ALL RELEVANT DOCUMENTS

DECISION **Conditional Approval**

OTHER COMMENTS: Needs to submit the Unconditional HREC Certificate

NAME OF ASSESSOR: **Nqoba Tsabedze**

SIGNATURE:

DATE SIGNED OUT: **09 September 2022**

GROUP: **2 / B**

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL
UNIVERSITY OF THE WITWATERSRAND
Cluster Research Committee
7 Jubilee Rd, Parktown 2196, Johannesburg
Enquiries: Office of the CEO
Ms. T. Ndlovu; Tell: 011 488 4211 Fax 011 488 3753
Ms L. Nkosi Tel: 011 488 3500
Email: Lindiwe.Nkosi@wits.ac.za

CMJA Hospital Research Checklist

Requirement	Yes	No	N/A
HOD Approval Letter	YES		
HREC Approval	Pending		
NHRD Approval	Pending		
Postgraduate Approval	YES		
Co-investigators	YES		
Collaborators	YES		

Study team and collaborators

Organisation	Investigator	Qualifications	Contact details
Principal Investigator	Kerry-Ann Singaram	Bachelor of Nursing (University of the Witwatersrand) Post Graduate Diploma in Child Nursing Science (Chris Hani Baragwanath Nursing College) Master of Nursing Science (University of the Witwatersrand)	0837425483
Study Leads			

APPENDIX J HOSPITAL C APPROVAL TO CONDUCT THE RESEARCH



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

[redacted]

TITLE OF RESEARCH PROJECT:
"DEVELOPMENT OF A NEONATAL INTENSIVE CARE SHORT COURSE FOR SINGLY QUALIFIED NURSES PRACTISING IN JOHANNESBURG"

NAME OF SUPERVISOR:
Susan Armstrong

NAME OF RESEARCHER:
Kerry-Ann Singaram
Department of Nursing Education
University of the Witwatersrand

NHRD REF NO: GP_202208_018

Dear Mrs. Singaram,

Permission is granted for you to conduct the research as indicated in the title above.

The terms under which this permission is granted is contained in the Researcher Declaration form that you have signed. Failure to comply with these conditions will result in the withdrawal of such permission.

It is crucial for you to inform the Research Coordinator, [redacted] of the actual start and end dates of your study. This could be done by e-mail.

Should the study commence more than 12 months after receipt of this approval letter you will have to go through the process of applying again.

You are strongly advised to keep a signed copy of the declaration form to ensure that the terms of this agreement are always complied with.

Yours sincerely,

[redacted]
Senior Clinical Executive
[redacted]
2022.10.04

APPENDIX K HOSPITAL D APPROVAL TO CONDUCT THE RESEARCH

Date: 10 October 2022

Title of Research Project	: DEVELOPMENT OF A NEONATAL INTENSIVE CARE SHORT COURSE FOR SINGLY QUALIFIED REGISTERED NURSES PRACTISING IN JOHANNESBURG
Department of Programme	: Department of Neonatology
Principal Investigator	: Mrs Kerry-Ann Singaram
Supervisors	: Dr Susan Jennifer Armstrong and Dr Meghan Botes

Dear Mrs Kerry-Ann Singaram,

You have been given permission to conduct research [redacted] lease note that the following conditions should be met:

1. Ethical Approval should be sort from a Human Ethics Research Committee of any recognised institution. Once such approval is granted, it must be submitted to the Hospital Research and Ethics Committee for record-keeping.
2. There will be no cost to the hospital associated with conducting this research.
3. Once the research is completed, the Hospital will be notified, and a report of the results provided.
4. The hospital will be acknowledged in any publications and presentations that will be given in relation to this research.

Documents submitted and required:

Title of document	Required documents
Approval from Ethics Committee	
Ethics Clearance Certificate	
Research Protocol	
Report of the results	

NB: The contact people to assist you [redacted] will b[redacted] and [redacted]

All the best with your research.

APPENDIX L HOSPITAL A APPROVAL TO CONDUCT THE RESEARCH

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MEDICAL ADVISORY COMMITTEE

[redacted]

PERMISSION TO CONDUCT RESEARCH

Date: 17th November 2022

TITLE OF PROJECT:

Development of a Neonatal Intensive Care Short Course for Singly Qualified Registered Nurses Practicing in Johannesburg.

UNIVERSITY: Witwatersrand

Principal Investigator: Mrs Kerry-Ann Singaram

Department: Nursing

Supervisor : Dr S Armstrong/ Dr M Botes

Permission Head Department (where research conducted): Yes

NHRD No. GP_202208_018

The Medical Advisory Committee recommends that the said research be conducted a[redacted]he CEO / management o[redacted]s accordingly informed and the study is subject to:-

- **Permission having been granted by the Committee for Research on Human Subjects of the University of Witwatersrand.**
- The Hospital will not incur extra costs as a result of the research being conducted on its patients within the hospital
- The MAC will be informed of any serious adverse events as soon as they occur
- Permission is granted for the duration of the Ethics Committee Approval.

Recommended
(On behalf of the MAC)
Date: 17/11/2022

Approved/~~Not Approved~~
Hospital Management
Date: 18/11/202

APPENDIX M DEAN'S APPROVAL TO CONDUCT THE RESEARCH

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG | FACULTY OF HEALTH SCIENCES

5 December 2022

Mrs Kerry-Ann Singaram
Department of Nursing Education
Faculty of Health Sciences
Parktown
Johannesburg

PROTOCOL NUMBER: M220637 MED22-03-056

Dear Mrs Singaram,

Approval to conduct research at the University of the Witwatersrand Faculty of Health Sciences

I am pleased to grant approval and permission for you to collect data from the Wits Faculty of Health Sciences community for your study titled *Development of a neonatal intensive care short course for singly qualified registered nurses practicing in Johannesburg.*

Please ensure that you contact the ethics committee if there are any changes to the study to consider possible implications for ethics approval. Please quote the protocol number in any correspondence.

I would be pleased to receive a copy of the summary of your research study when completed.

Yours sincerely,

Professor Shabir A. Madhi
Dean, Faculty of Health Sciences
University of the Witwatersrand

Office of the Dean
Phillip V Tobias Health Sciences Building | 29 Princess of Wales Terrace (Cnr York Road), Parktown 2193, Johannesburg
Private Bag 3, WITS, 2050, South Africa | T +27 11 717 2718 | E antonia.appel@wits.ac.za | www.wits.ac.za
IYUNIVESITHI YASEWITWATERSRAND | YUNIVESITHI YA WITWATERSRAND

APPENDIX N ETHICS WAIVER FOR THE STUDY

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research & Innovation)

TO: Ms K-A Singaram
School: Therapeutic Sciences
Department: Nursing Education
Medical School
University

E-mail: Kerry-Ann.Singaram@wits.ac.za

CC: Supervisor: Dr S Armstrong <Sue.Armstrong@wits.ac.za>
and <HREC-Medical.ResearchOffice@wits.ac.za>

FROM: Mr Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 17/02/2022

REF: *R14/49*

PROTOCOL NO: W-CBP-220217-01 (This is your ethics application study reference number. Please quote this reference number in all correspondence relating to this study)

PROJECT TITLE: *Development of a neonatal intensive care short course for singly-qualified registered nurses practising in Johannesburg*

Please find attached the Ethics Waiver Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to the Government funding of the University.

MSWorks2000/Iain0007/ClearScanWaiver.wps

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research & Innovation)

17/02/2022

Ref: W-CBP-220217-01

TO WHOM IT MAY CONCERN

Waiver: This certifies that the following research does not require clearance from the Human Research Ethics Committee (Medical)

Investigator: Ms K-A Singaram
Student No. (if appropriate): 1844807
Staff No. (if appropriate): A0060466

Supervisor: Dr S Armstrong

School: Therapeutic Sciences
Department: Nursing Education
Medical School
University

Project title: *Development of a neonatal intensive care short course for singly-qualified registered nurses practising in Johannesburg*

Reason: Review of information in the public domain
No human participants will be involved in the study

Dr CB Penny
Chairperson: Human Research Ethics Committee (Medical)

Research Office Secretariat:
Third Floor, Phillip Tobias Building, corner of St Andrews and York Roads, Parktown, Johannesburg 2193
Postal address: Private Bag 3, Wits 2050
Tel Nos: +27 (0)11 717 1234/1252/2656/2700
Office E-mail: HREC-Medical.ResearchOffice@wits.ac.za
Website:
https://www.wits.ac.za/research/researcher-support/research-ethics/ethics-committees/

APPENDIX O PHASES 1.2 AND 1.3 ETHICS APPROVAL

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG	HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

Office of the Deputy Vice-Chancellor (Research and Innovation)

TO: Ms K-A Singaram
School of Therapeutic Sciences
Department of Nursing Education
Medical School
University

E-mail: Kerry-Ann.Singaram@wits.ac.za

CC: Supervisor: Drs S Armstrong and M Botes
<Sue.Armstrong@wits.ac.za>
and <HREC-Medical Research Office@wits.ac.za>

FROM: Mr Iain Burns
Human Research Ethics Committee (Medical)
Tel: 011 717 1252

E-mail: Iain.Burns@wits.ac.za

DATE: 2023/01/05

REF: R14/49

PROTOCOL NO: **M220637** (This is your ethics application reference number. Please quote it in all enquiries, oral or written, relating to this study.)

PROJECT TITLE: *Development of a neonatal intensive care short course for singly qualified registered nurses practising in Johannesburg*

Please find attached the Clearance Certificate for the above project. I hope it goes well and that an article in a recognized publication comes out of it. This will reflect well on your professional standing and contribute to Government funding of the University.

MSWorks2000/Iain0007/Clearscan.wps

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R49 Ms K-A Singaram

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M220637

NAME: (Principal Investigator)	Ms K-A Singaram
DEPARTMENT:	School of Therapeutic Sciences Department of Nursing Education Medical School University
PROJECT TITLE:	*Development of a neonatal intensive care short course for singly qualified registered nurses practising in Johannesburg*
DATE CONSIDERED:	2022/06/24
DECISION:	Approved unconditionally
CONDITIONS:	This clearance covers Phases 1.2 and 1.3 only; subsequent Phases are to discussed with the HREC (Med) thereafter
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR:	Drs S Armstrong and M Botes
APPROVED BY:	Dr N Naran, Co-Chairperson, HREC (Medical)
DATE OF APPROVAL:	2023/01/05

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **June** and therefore reports and re-certification will be due in the month of **June** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator _____ Date _____

APPENDIX P PHASE 2 ETHICS APPROVAL

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R49 Ms K-A Singaram

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M220637

NAME: (Principal Investigator)	Ms K-A Singaram **DEGREE:** PhD
DEPARTMENT:	School of Therapeutic Sciences Department of Nursing Education Medical School University
PROJECT TITLE:	*Development of a neonatal intensive care short course for singly qualified registered nurses practising in Johannesburg*
DATE CONSIDERED:	2022/08/24
DECISION:	Approved unconditionally
CONDITIONS:	Phase 2 approved on 2023/10/10
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR:	Drs S Armstrong and M Botes
APPROVED BY:	Professor P Ruff, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2023/01/05 **EXPIRY DATE:** 2028/01/04

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. I agree to submit a yearly progress report. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in June and therefore reports and re-certification will be due in the month of June each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator Date

APPENDIX Q PHASE 3 ETHICS APPROVAL

UNIVERSITY OF THE WITWATERSRAND JOHANNESBURG

R49 Ms K-A Singaram

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M220637

NAME: (Principal Investigator)	Ms K-A Singaram	**DEGREE:** PhD
DEPARTMENT:	School of Therapeutic Sciences Department of Nursing Education Medical School	
TITLE:	*Development of a neonatal intensive care short course for singly qualified registered nurses practising in Johannesburg*	
DATE CONSIDERED:	24 June 2022	
DECISION:	Approved unconditionally	
CONDITIONS:	Phase 2 approved on 2023/10/10 Phase 3 approved on 2024/04/14	
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office <Nicolaen.Potgieter@wits.ac.za>	
SUPERVISOR:	Drs S Armstrong and M Botes	
APPROVED BY:	Professor P Ruff, Chairperson, HREC (Medical)	

DATE OF APPROVAL: 5 January 2023 **EXPIRY DATE:** 4 January 2028

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. I agree to submit a yearly progress report in the format available at https://wits.ac.za/research/researcher-support/research-ethics/ethics-committees/. This report is due annually, for the duration of the Clearance Certificate, beginning on the first anniversary of Date of Approval above. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator Date

APPENDIX R CONSENT FORM FOR AUDIO RECORDING OF FOCUS GROUP DISCUSSION/INDIVIDUAL INTERVIEWS

CONSENT FORM FOR AUDIO RECORDING OF FOCUS GROUP DISCUSSIONS

PERMISSION TO DIGITAL RECORDING

Dear Participant

I would like to request your permission to digital recording of the focus group interview that will be conducted with you. Your real name will not be used in the interview and these records will not be given to anyone other than those involved in the study. I will destroy these records once they are no longer required to be used in the study.

Thank you

K. Singaram

PhD Student (Department of Nursing Education)

0837425483

CONSENT TO DIGITAL RECORDING

I....., consent to be interviewed and I understand that this interview will be recorded for the sake of accuracy and reliability. I understand that the consent is voluntary and that once these records are completed its use towards research, they will be destroyed.

Participant signature:.....Date:.....

APPENDIX S EVALUATION OF NEONATAL INTENSIVE CARE SHORT COURSE FORM (INITIAL QUESTIONNAIRE FOR THE DELPHI STUDY)

Confidential

Evaluation of a Neonatal Intensive Care short course

Good Day,Thank you for taking the time to evaluate the developed outline for a Neonatal Intensive Care Short Course.Your answers, comments and suggestions are needed for improvement purposes of the course outline.You will be provided with a link to the outline of the short course together with a set of questions related to the course structure and content.The questions are in the form of a Likert Scale where you will be asked to answer the question given under the following sections:- Curriculum- Module 1- Module 2- Module 3- Module 4- Clinical Component- Appropriateness of AssessmentEach question to be answered has a space for any comments you would like to make if you have answered with partially or no. At the end of the evaluation document, is a section for any additional comments you would like to make about the course outline that were not addressed in the questions.The evaluation process will be repeated after the initial evaluation, until a 90% consensus is reached.May I kindly request you complete this survey by the 3/6/2024

Please find link to access the course outline

[Attachment: "Neonatal Intensive Care Nursing program outline .pdf"]

1) Does the course outline have clear learning outcomes/competencies?
   ○ Yes ○ Partially ○ No

2) Comment if answered with partially or no: _____

3) Does the course outline allow for flexibility of learning styles?
   ○ Yes ○ Partially ○ No

4) Comment if answered with partially or no: _____

5) Does the course outline focus on application of theory?
   ○ Yes ○ Partially ○ No

6) Comment if answered with partially or no: _____

7) Does the course outline meet the criteria for a competency-based curriculum?
   ○ Yes ○ Partially ○ No

8) Comment if answered with partially or no: _____

9) Does the course outline focus on integration of knowledge, skills and attitudes?
   ○ Yes ○ Partially ○ No

10) Comment if answered with partially or no: _____

11) Are the assessment methods aligned with the desired outcomes?
   ○ Yes ○ Partially ○ No

12) Comment if answered with partially or no: _____

13) MODULE 1: INTRODUCTION TO THE NEONATE
Does this module have sufficient resources?
- ◯ Yes
- ◯ Partially
- ◯ No

14) Comment if answered with partially or no:

15) MODULE 1: INTRODUCTION TO THE NEONATE
Are the learning activities for this module sufficiently varied to maintain the student's interest?
- ◯ Yes
- ◯ Partially
- ◯ No

16) Comment if answered with partially or no:

17) MODULE 1: INTRODUCTION TO THE NEONATE
Is the content under this module related to neonatal intensive care nursing?
- ◯ Yes
- ◯ Partially
- ◯ No

18) Comment if answered with partially or no:

19) MODULE 1: INTRODUCTION TO THE NEONATE
Is the credit value appropriate for the planned learning?
- ◯ Yes
- ◯ Partially
- ◯ No

20) Comment if answered with partially or no:

21) MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Does this module have sufficient resources?
- ◯ Yes
- ◯ Partially
- ◯ No

22) Comment if answered with partially or no:

23) MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Are the learning activities sufficiently varied to maintain the student's interest?
- ◯ Yes
- ◯ Partially
- ◯ No

24) Comment if answered with partially or no:

25) MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the content under this module related to neonatal intensive care nursing?
- ◯ Yes
- ◯ Partially
- ◯ No

26) Comment if answered with partially or no:

27) MODULES 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the credit value appropriate for the planned learning?
- ◯ Yes
- ◯ Partially
- ◯ No

28) Comment if answered with partially or no:

---

29) MODULES 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Does this module have sufficient resources?
- ◯ Yes
- ◯ Partially
- ◯ No

30) Comment if answered with partially or no:

---

31) MODULES 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Are the learning activities sufficiently varied to maintain the student's interest?
- ◯ Yes
- ◯ Partially
- ◯ No

32) Comment if answered with partially or no:

---

33) MODULES 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Is the content under this module related to neonatal intensive care nursing?
- ◯ Yes
- ◯ Partially
- ◯ No

34) Comment if answered with partially or no:

---

35) MODULES 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Is the credit value appropriate for the planned learning?
- ◯ Yes
- ◯ Partially
- ◯ No

36) Comment if answered with partially or no:

---

37) MODULES 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE UNIT
Does this module have sufficient resources?
- ◯ Yes
- ◯ Partially
- ◯ No

38) Comment if answered with partially or no:

---

39) MODULES 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE UNIT
Are the learning activities sufficiently varied to maintain the student's interest?
- ◯ Yes
- ◯ Partially
- ◯ No

40) Comment if answered with partially or no:

---

41) MODULES 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE UNIT
Is the content under this module related to neonatal intensive care nursing?
- ◯ Yes
- ◯ Partially
- ◯ No

42) Comment if answered with partially or no:

---

43) MODULES 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE UNIT
Is the credit value appropriate for the planned learning?
- ◯ Yes
- ◯ Partially
- ◯ No

44) Comment if answered with partially or no:

45) CLINICAL COMPONENT
Do you agree with the structure of the three planned clinical days?
- ◯ Yes
- ◯ Partially
- ◯ No

46) Comment if answered with partially or no:

47) CLINICAL COMPONENT
Are the skills that will be demonstrated and practiced appropriate for the course?
- ◯ Yes
- ◯ Partially
- ◯ No

48) Comment if answered with partially or no:

49) APPROPRIATENESS OF ASSESSMENTS
Are the formative assessments appropriate for the modules?
- ◯ Yes
- ◯ Partially
- ◯ No

50) Comment if answered with partially or no:

51) APPROPRIATENESS OF ASSESSMENTS
Do you agree with the flexibility and pass rate for the summative theoretical exam?
- ◯ Yes
- ◯ Partially
- ◯ No

52) Comment if answered with partially or no:

53) APPROPRIATENESS OF ASSESSMENTS
Do you agree with the structure of the POE which will form part of the summative assessment?
- ◯ Yes
- ◯ Partially
- ◯ No

54) Comment if answered with partially or no:

55) Comments you would like to make about the course outline that were not addressed:

APPENDIX T: EVALUATION OF NEONATAL INTENSIVE CARE SHORT COURSE FORM (SUBSEQUENT QUESTIONNAIRE FOR THE DELPHI STUDY)

Confidential

Delphi Round 2

Please complete the survey below.

Thank you!

Good day experts. Thank you for participating in round one of the Delphi for my study, there was an 85% consensus for the first round of the Delphi.

In this round of the Delphi, I will address those questions that did not obtain a 90% consensus and ask that you consider your response in relation to the comment made by those participants who raised concerns and my explanation/response to the concern.

Thank you for taking the time to complete this questionnaire

---

1) Question:
Does the course outline focus on integration of knowledge, skills and attitudes?
Comment:
"It is difficult to see how the integration is done"
Explanation:
A three-day skills face-to-face workshop will form part of the neonatal intensive care short course, focused on specific skills needed when working in a NICU. During this workshop students will be enabled to integrate the knowledge, skills and attitudes taught during the course. In addition, much of the theoretical modules contain case studies and problem-solving exercises which will aid in the consolidation of skills taught.

In view of the explanation:
Does the course outline focus on integration of knowledge, skills and attitudes?

◯ Yes
◯ No

---

2) Question:
MODULE 1: INTRODUCTION TO THE NEONATE
Does this module have sufficient resources?
Comment: "Some of the journals are not open access and therefore not accessible, and important resources such as WHO documents are not included"
Explanation: In the business consultation with the University access to the library as part of student registration fees will be discussed. Additional resources which were not on the original course outline from The World Health Organisation's guidelines for essential newborn care have been added to the course.

In view of the explanation:
MODULE 1: INTRODUCTION TO THE NEONATE
Does this module have sufficient resources?

◯ Yes
◯ No

---

3) Question: MODULE 1: INTRODUCTION TO THE NEONATE
Are the learning activities for this module sufficiently varied to maintain the student's interest?
Comment:
I do not see how the students will receive feedback of the activities done
Explanation:
All student activities across module 1-4 will be monitored by the facilitator and comments will be made online per upload made. There will be monthly facilitator check-ins and facilitator contact details will be made available for students to contact the facilitator should any queries come up

In view of the explanation:
MODULE 1: INTRODUCTION TO THE NEONATE
Are the learning activities for this module sufficiently varied to maintain the student's interest?

◯ Yes
◯ No

4) Question:
MODULE 1: INTRODUCTION TO THE NEONATE
Is the content under this module related to neonatal intensive care nursing?
Comment:
"Some aspects are addressed, but concepts of developmental care and kangaroo care are not addressed as dedicated approaches to care, including in the NICU. There is also no attention to feeding, fluids or electrolytes.
Explanation:
All clinical skills highlighted above will be addressed during the 3 day clinical skills workshop and integrated into the theoretical teachings

In view of the explanation:
MODULE 1: INTRODUCTION TO THE NEONATE
Is the content under this module related to neonatal intensive care nursing?

◯ Yes
◯ No

5) Question:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Does this module have sufficient resources?
Comment:
" Some of the journals prescribed are not open access, which implies that those who are not registered users will not have access to it. I also think it is important to add the WHO resources
Explanation:
In the business consultation with the University access to the library as part of student registration fees will be discussed. There will be an addition of resources which was not on the course outline previously from The World Health
Organisation's guidelines for essential newborn care. In order for the student to enter into the short course they have to be registered with the affiliated university

In view of the explanation:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Does this module have sufficient resources?

◯ Yes
◯ No

6) Question:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the content under this module related to neonatal intensive care nursing?
Comment:
"Those listed are relevant, but asphyxia and acidosis are missing, which are some of the most common conditions"
Explanation:
The conditions of asphyxia and both respiratory and metabolic acidosis will be covered under the topic: Prevention and management of hypoxia in neonates

In view of the explanation:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the content under this module related to neonatal intensive care nursing?

◯ Yes
◯ No

7) Question:
MODULE 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Does this module have sufficient resources?
Comment:
"Same comment as previous two modules"
Explanation:
In the business consultation with the University access to the library as part of student registration fees will be discussed. There will be an addition of resources which was not on the course outline previously from The World Health Organisation's guidelines for essential newborn care. In order for the student to enter into the short course they have to be registered with the affiliated university

In view of the explanation:
MODULE 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Does this module have sufficient resources?

◯ Yes
◯ No

8) Question:
MODULE 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Is the content under this module related to neonatal intensive care nursing?
Comment:
"Involving the family in developmental care and kangaroo care should be high priorities, but are not addressed"
Explanation:
Involving the family in developmental care and kangaroo care will be covered during the facilitator presentation under the topic "Involvement and support of families in the care of the neonate"

In view of the explanation:
MODULE 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Is the content under this module related to neonatal intensive care nursing?

◯ Yes
◯ No

9) Question:
MODULE 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE
Does this module have sufficient resources?
Comment: " Same comment as other modules"
Explanation:
In the business consultation with the University access to the library as part of student registration fees will be discussed. There will be an addition of resources which was not on the course outline previously from The World Health Organisation's guidelines for essential newborn care. In order for the student to enter into the short course they have to be registered with the affiliated university

In view of the explanation:
MODULE 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE
Does this module have sufficient resources?

◯ Yes
◯ No

10) Question:
CLINICAL COMPONENT
Do you agree with the structure of the three planned clinical days?
Comment:
"Neuroprotective promotion is much more than handling techniques and cannot be taught in 30 minutes. An hour for mechanical ventilation is very little, and there is no attention paid to CPAP?"
Explanation:
The registered students will have a Portfolio of Evidence (POE) that will supplement the 3 clinical teaching days. Theoretical teaching of handling techniques will be covered under the topic "Prevention and Management of Intraventricular Hemorrhage and theoretical teaching of CPAP will be covered under management of respiratory distress syndrome. Nursing of a neonate on a CPAP will be added to the POE, there is an activity in Module 1 where students must record themselves setting up for an admission into NICU, this video will be critiqued by the facilitator.

In view of the explanation:
CLINICAL COMPONENT
Do you agree with the structure of the three planned clinical days?

◯ Yes
◯ No

11) Question:
CLINICAL COMPONENT
Are the skills that will be demonstrated and practiced appropriate for the course?
Comment:
"It is not very clear why mechanical ventilation is included which is an advanced skill, but more commonly used skills such as CPAP and intravenous access are not included. Keep in mind that students tend to get confused if they are taught HBB and neonatal resuscitation according to the resus algorithm-rather decide which one is most appropriate and focus on that one."
Explanation:
Private and Public NICU's differ in that public NICU's have a majority of mechanically ventilated neonates in their units therefore to accommodate both private and public nurses mechanical ventilation will be a priority skill. Management of a neonate on a CPAP will be added to the POE and will be covered theoretically under the topic "Management of respiratory distress syndrome"
I agree with your comment on HBB and neonatal resus, to avoid confusion neonatal resuscitation will be given priority

In view of the explanation:
Question:
CLINICAL COMPONENT
Are the skills that will be demonstrated and practiced appropriate for the course?

◯ Yes
◯ No

Question:
Comments you would like to make about the course outline that were not addressed
Comment:
It is important to also address the basic or essential care of neonates and the application thereof in the NICU and not only selected advanced care, e.g. developmental care, kangaroo care, breastfeeding, bonding, etc.
Explanation:
Agreed. The above-mentioned aspects will be covered under the topic "Involvement and support of families in the care of the neonate" and emphasised on day 2 of the skills workshop under "Early Initiation of breastmilk"

12) Question:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the content under this module related to neonatal intensive care nursing?
Comment:
"e.g. On the cardiac system it will be advisable to classify the defects as acyanotic v/s cyanotic so that the learner will understand the effect of the shunting and how it leads to either of the classification. Thus the learner will easily state the condition that falls to a particular type of defect group"
Explanation:
This content will form part of the facilitator presentations under the topic "Congenital Cardiac Conditions"
The table (Annexure C) in the course outline will have an additional column labelled acyanotic and cyanotic, students will have to classify the cardiac defect either acyanotic or cyanotic and stipulate the reason why.

In view of the explanation:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the content under this module related to neonatal intensive care nursing

◯ Yes
◯ No

Question:
Comments you would like to make about the course outline that were not addressed:
Comment:
"Genetics should be incorporated as some of the conditions that need palliative care are chromosomal"
Explanation:
Agreed. Clinical examples of neonatal chromosomal conditions and contributing factors to chromosomal conditions will be discussed during facilitator presentation under the topic "Creation of a therapeutic environment for the family of the dying neonate"

13) Question:
Does the course outline have clear learning outcomes/competencies?
Comment:
"Is it the Dissemination of National integrated neonatal care guidelines 2023 chapters, or National integrated guidelines for Neonatal care in South Africa 2024? I found this difficult to find. I found your reference at the end."
Explanation:
It is the Integrated Neonatal Care Guidelines 2023 Chapters; this will be corrected on the outline.

In view of the explanation:
Does the course outline have clear learning outcomes/competencies?

◯ Yes
◯ No

14) Question:
Does the course outline allow for flexibility of learning styles?
Comment:
"I think some candidates will need more time for skills to help them understand the theory"
Explanation:
There will remediation offered by the facilitator for those students who need additional support

In view of the explanation:
Does the course outline allow for flexibility of learning styles?

◯ Yes
◯ No

15) Question:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the credit value appropriate for the planned learning?
Comment:
"I would rather give 4 credits to module 2 and 3 to module 3"
Explanation:
Module credit changed according to above comment/suggestion

In view of the explanation:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the credit value appropriate for the planned learning?

◯ Yes
◯ No

16) Question:
CLINICAL COMPONENT
Do you agree with the structure of the three planned clinical days?
Comment:
"I would spend less time on adhesives and more time on assessment. I would also spend less time on suctioning and include an understanding of the ventilator settings as I find most RN's copy and paste the vent obs, having no understanding of what they mean and how they can affect the baby"
Explanation:
This will be addressed during the three clinical day workshop and also incorporated under theoretical teaching for Module 2

In view of the explanation:
CLINICAL COMPONENT
Do you agree with the structure of the three planned clinical days?

◯ Yes
◯ No

17) Question:
APPROPRIATENESS OF ASSESSMENTS
Do you agree with the flexibility and pass rate for the summative theoretical exam?
Comment:
"I am concerned that they may get their friends to help or do it for them"
Explanation:
This is a perennial problem in nursing education, it is not possible to address this in the course however the facilitator will try to prevent this from happening by asking the Unit Manager to identify staff members who are qualified and clinically competent to sign off skills in the POE in the units the students are employed in.

In view of the explanation:
APPROPRIATENESS OF ASSESSMENTS
Do you agree with the flexibility and pass rate for the summative theoretical exam?

◯ Yes
◯ No

18) Question:
APPROPRIATENESS OF ASSESSMENTS
Do you agree with the structure of the POE which will form part of the summative assessment?
Comment:
"Will the unit manager help decide which shift leaders are competent, not all are"
Explanation:
The unit managers will be asked to identify staff members who are qualified and clinically competent to sign off skills in the POE in the units the students are employed in.

In view of the explanation:
APPROPRIATENESS OF ASSESSMENTS
Do you agree with the structure of the POE which will form part of the summative assessment?

◯ Yes
◯ No

19) Question:
CLINICAL COMPONENT
Do you agree with the structure of the three planned clinical days?
Comment:
"I would include early initiation of breastmilk on day 1 schedule. You may want to move one component e.g. the blood transfusion to day 2 to try and make day 1 shorter or equalize the hours between day 1 and 2"
Explanation:
Adjustment made on the three-day skills workshop as per comment/suggestion above

In view of the comment:
CLINICAL COMPONENT
Do you agree with the structure of the three planned clinical days?

◯ Yes
◯ No

Question:
Comments you would like to make about the course outline that were not addressed:
Comment:
"You can add the latest ILCOR guidelines as part- of resources for the Adaption of the neonate to extra-uterine life"
Explanation:
Agreed and important evidenced based resource which will be added to the resources for this course

---

20) Question:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON CONDITIONS
Is the credit value appropriate for the planned learning?
Comment:
"The same activities have been included for each topic"
Explanation:
A consistent format is used for each condition to ensure consistency of teaching and learning, however some conditions will be presented by students to provide variety and there will be integration of case studies for the students to work on.

In view of the explanation:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON CONDITIONS
Is the credit value appropriate for the planned learning?

◯ Yes
◯ No

---

21) Question:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the credit value appropriate for the planned learning?
Comment:
"Consider adding something other than populating a summary to generate interest e.g. case study or scenario"
Explanation:
Case studies will be incorporated at the end of facilitator presentations of neonatal conditions for students to discuss in order to assist with integration of the theory taught

In view of the explanation:
MODULE 2: MANAGEMENT AND PREVENTION OF COMMON NEONATAL CONDITIONS
Is the credit value appropriate for the planned learning?

◯ Yes
◯ No

22) Question:
MODULE 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Does the module have sufficient resources?
Comment:
"Just a thought to add an interview/video or case study of the moms/families lived experience and journey of having a neonate in an NICU"
Explanation:
This will be added as an activity under module 3 under the topic "Involvement of families in the care of the neonate", where students can interview either moms or their families on their experiences and journey of having a neonate in an NICU

In view of the explanation:
MODULE 3: FAMILY CENTRED CARE IN THE NEONATAL INTENSIVE CARE UNIT
Does the module have sufficient resources?

◯ Yes
◯ No

23) Question:
MODULE 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE UNIT
Does this module have enough resources?
Comment:
"Consider specific equipment manuals and reference. Also depending on the context, the involvement of a clinical engineer?"
Explanation:
The facilitator will organise a presentation by a clinical engineer centering on the variation of equipment makes used in NICU and emphasis will be put on the importance of being aware that all equipment used must be guided by the specific manual instructions. Students are to reference their specific equipment manuals depending on the make of equipment they will be setting up as part of the activities under the topic: "Use of technology in the NICU"

In view of the explanation:
MODULE 4: UNIQUE ENVIRONMENT OF THE NEONATAL INTENSIVE CARE UNIT
Does this module have enough resources?

◯ Yes
◯ No