

**VALIDATION OF THE SIMPLIFIED
THERAPEUTIC INTERVENTION SCORING SYSTEM IN THE
INTENSIVE CARE UNITS OF A PUBLIC SECTOR HOSPITAL IN
JOHANNESBURG**

Leah Chepkoech Kisorio

A research report submitted to the
Faculty of Health Sciences, University of the Witwatersrand, Johannesburg
in partial fulfilment of the requirements for the degree
of
Master of Science in Nursing

Johannesburg, 2009

DECLARATION

I, Kisorio Leah Chepkoech, declare that this research report is my own work. It is being submitted for the degree of Master of Science (in Nursing) in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

Signature

.....day of 2009

Protocol Number **M080211**

DEDICATION

Special dedication to my family the Kisorios' and the Misois' for their inspiration, love and support throughout my studies at the University of the Witwatersrand, Johannesburg.

Much thanks to my sweetheart, Daniel, for his sacrifice, patience, love and encouragement throughout this academic journey.

ACKNOWLEDGEMENTS

I thank God for provision and protection throughout my study; I owe completely nothing to myself.

My gratitude goes to the following people and institution:

To my family for their tireless support throughout my study.

To my supervisor Ms Shelley Schmollgruber for her guidance, total support and motivation. Sincerely you were not only a supervisor to me but also a mentor. A big thank you to you.

To all the ICU nurse experts for their input into the validation of the instrument used in the study.

To the institution where the research was carried out and the relevant personnel of this institution.

To the ICU patients who participated in this study and their families, thank you for making this study possible.

To Professor Pieter Becker (MRC Statistician) for his valuable input into the statistical analysis and interpretation of the data.

ABSTRACT

Purpose: To introduce the simplified therapeutic intervention scoring system (TISS-28), the original therapeutic intervention scoring system (TISS-76) and simplified acute physiological score (SAPS) version II in critically ill adult patients, in order to describe the validity and reliability of TISS-28 as a suitable measure of quantifying nursing workload in the adult intensive care units (ICU) of a public sector hospital in Johannesburg.

Objectives: To describe the profile of patient admissions to the intensive care units, to investigate the impact of the patients' profile on the requirements for nursing workload and to validate the use of TISS-28 as a measure of quantifying nursing workload in this setting.

Design: A non-experimental, comparative descriptive, correlational and prospective two-staged design was utilized to meet the study objectives. Stage I involved face and content validation of TISS-28 by a panel of ICU nurse experts (n=6). Stage II involved assessment of concurrent and construct validity as well as inter-rater reliability of TISS-28 using participants (n=105) drawn from trauma, cardiothoracic and multidisciplinary ICUs. Data necessary for the calculation of TISS-28, TISS-76 and SAPS II were recorded for each patient in the ICU at 24 and 48 hours after admission and in the wards after discharge within 24-48 hours. Descriptive and inferential statistics were used to analyze data.

Results: Content Validity Index (CVI) of 0.93 was found for TISS-28. A significant positive correlation was found between TISS-28 and TISS-76 scores ($r = 0.7857$, $p = 0.0001$) as well as TISS-28 and SAPS II scores ($r = 0.2098$, $p = 0.0317$). A significant difference was found between TISS-28 scores among patients in the ICU and patients in the ward ($t = 25.59$, $p = 0.0001$; $t = 21.48$, $p = 0.0001$) respectively. A significant correlation was found between the data collected from a sample of patients by the researcher and the expert assistant researcher with an intra-class correlation coefficient of 0.99 and a p-value of 0.0001.

Conclusions: The findings support validity and reliability of TISS-28 hence its feasibility for use in South African ICUs. Recommendations for nursing education, practice, management and research are proposed.

TABLE OF CONTENTS

	Page
DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENTS	iv
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	xi
LIST OF TABLES	xii

CHAPTER 1: OVERVIEW OF THE RESEARCH STUDY		
1.0	INTRODUCTION	1
1.1	BACKGROUND TO THE STUDY	1
1.2	PROBLEM STATEMENT	5
1.3	PURPOSE OF THE STUDY	6
1.4	RESEARCH OBJECTIVES	6
1.5	IMPORTANCE OF THE STUDY	7
1.6	PARADIGMATIC PERSPECTIVE	8
1.6.1	Meta-theoretical Assumptions	8
1.6.2	Theoretical Assumptions	10
1.6.2.1	Definition of terms for the purpose of this research	11
1.6.3	Methodological Assumptions	13
1.7	OVERVIEW OF RESEARCH METHODOLOGY	13
1.8	PLAN OF RESEARCH ACTION	15
1.9	SUMMARY	15

CHAPTER 2: LITERATURE REVIEW

2.1	INTRODUCTION	16
2.2	SHORTAGES OF ICU NURSES, COST CONSTRAINTS AND SKILL-MIX	16
2.3	NURSING WORKLOAD AND STAFFING REQUIREMENTS IN THE ICU	19
2.4	DEVELOPMENT OF THERAPEUTIC INTERVENTION SCORING SYSTEMS (TISS)	20
2.4.1	Original Therapeutic Intervention Scoring System (TISS)	20
2.4.2	Therapeutic Intervention Scoring System (TISS-76)	21
2.4.3	Simplified Therapeutic Intervention Scoring System (TISS-28)	22
2.5	OTHER SCORING SYSTEMS	23
2.5.1	Intensive Care Nursing Scoring System (ICNSS)	24
2.5.2	Nine Equivalents of nursing Manpower use Score (NEMS)	24
2.5.3	Oulu Patient Classification (OPC)	25
2.5.4	The Comprehensive Nursing Intervention Score (CNIS)	25
2.5.5	Project Research on Nursing (PRN)	25
2.5.6	Nursing Activities Score (NAS)	26
2.6	CENSUS BASED METHOD	27
2.7	PATIENT DEPENDENCY CLASSIFICATION	29
2.8	SEVERITY OF PATIENTS' ILLNESS	31
2.9	SUMMARY	32

CHAPTER 3: RESEARCH DESIGN AND RESEARCH METHODS

3.1	INTRODUCTION	35
3.2	PURPOSE AND OBJECTIVES	35
3.3	RESEARCH DESIGN	36
3.4	RESEARCH METHOD	37
3.4.1	Research setting	38
3.4.2	Target population	38
3.4.2.1	Stage I: (face and content validation of TISS-28)	38
3.4.2.2	Stage II: (testing concurrent and construct validity and inter-rater reliability of the TISS-28)	39
3.4.3	Sample and sampling method	40
3.4.3.1	Stage I	40
3.4.3.2	Stage II	41
3.4.4	Data collection	42
3.4.4.1	Procedure Stage I	42
3.4.4.2	Procedure Stage II	43
3.4.5	Instruments	45
3.4.6	Data Analysis	46
3.4.6.1	Stage I	46
3.4.6.2	Stage II	47
3.4.7	Pilot study	47
3.5	VALIDITY AND RELIABILITY OF THE INSTRUMENTS	48
3.6	RELIABILITY AND VALIDITY OF THE DATA COLLECTION PROCESS	48
3.7	ETHICAL CONSIDERATIONS	49

3.8	SUMMARY	50
-----	---------	----

CHAPTER 4: DATA ANALYSIS AND RESULTS

4.1	INTRODUCTION	51
4.2	APPROACH TO DATA ANALYSIS	52
4.2.1	Stage I	54
4.2.2	Stage II	54
4.3	RESULTS AND ANALYSIS OF STAGE I	55
4.3.1	Demographic data of the participants	55
4.3.2	TISS-28 item content validity	57
4.3.3	Instruments' (TISS-28) content validity	58
4.4	RESULTS AND ANALYSIS OF STAGE II	58
4.4.1	Demographic data of the participants	59
4.4.2	TISS-28 scores by reason for ICU admission	60
4.4.3	Description of SAPS II, TISS-28 and TISS-76 scores	61
4.4.4	Description of TISS-28 scores	62
4.4.5	Concurrent validity of TISS-28	65
4.4.6	Construct validity of TISS-28	67
4.4.7	Inter-rater reliability of TISS-28	67
4.5	SUMMARY	68

CHAPTER 5: SUMMARY, DISCUSSION OF RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

5.1	INTRODUCTION	69
5.2	SUMMARY OF THE STUDY	69

5.3	MAIN FINDINGS AND DISCUSSION	70
5.4	CONCLUSION	77
5.5	LIMITATIONS OF THE STUDY	77
5.6	RECOMMENDATIONS OF THE STUDY	78
5.6.1	Recommendations for clinical nursing practice	79
5.6.2	Recommendations for nursing management	79
5.6.3	Recommendations for nursing education	80
5.6.4	Recommendations for further research	80

LIST OF REFERENCES	82
---------------------------	-----------

APPENDICES		
APPENDIX A	Panel of experts information letter	88
APPENDIX B	Panel of experts consent form	89
APPENDIX C	Panel of experts checklist	90
APPENDIX D	Patients' family member information letter	93
APPENDIX E	Family member / relative consent form	94
APPENDIX F	Patients' information letter	95
APPENDIX G	Retrospective patient consent form	96
APPENDIX H	Data collection instrument	97
APPENDIX I	Approval from Post Graduate Committee	102
APPENDIX J	Ethics clearance certificate	103
APPENDIX K	Letter from the Institution Chief Executive Officer	104

LIST OF FIGURES

Figure		Page
4.1	Approach to data analysis	53
4.2	Participants' ratings for each of the TISS-28 items	57
4.3	Relationship between TISS-28 > 24hrs and SAPS II < 24hrs	65
4.4	Relationship between TISS-28 >24 hrs and TISS-76 >24 hrs	66
4.5	Relationship between TISS-28 >48 hrs and TISS-76 >48hrs	66

LIST OF TABLES

Table		Page
4.1	Demographic data for panel of ICU nurse experts (n = 6)	55
4.2	Participants' characteristics	59
4.3	TISS-28 scores obtained by reason for ICU admission	60
4.4	Summary of the scores obtained from SAPS II, TISS-28 and TISS-76 in ICU.	61
4.5	Summary of the scores obtained from TISS-28 in the ward after discharge from ICU	61
4.6	Summary of participants' TISS-28 score categories in ICU and after discharge to the ward	62
4.7	Frequency distributions of participants' TISS-28 scores for each item in ICU and after discharge to the ward	63
4.8	Description of therapeutic intervention groups of participants' TISS-28 scores in ICU and after discharge to the ward	64
4.9	Comparison of TISS-28 scores between ICU patients and Ward patients after discharge from ICU	67
4.10	Comparison of data collected by the researcher and assistant expert researcher using TISS-28 in ICU	67