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Acceptability and Determinants of Integrated Management of Childhood Illness Strategy among Nurses in Botswana, 2019

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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 Epidemiology in the field of Implementation Science

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09 OCTOBER 2020

DECLARATION

I, **Jane Scotch,** declare that this research report is my own work. It is being submitted in partial fulfilment of the requirements for the degree of Master of Science Epidemiology in the field of Implementation Science at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.



_____

Signature

Date: 09 OCTOBER 2020

DEDICATION

This research report is dedicated to my daughter, Thando Naima Keisha Scotch, for understanding the reasons I had to be away during the most important part of her growth and development stage; that is her first year of starting her primary level of education and even during her second year of schooling**.** I also dedicate it to my mother, Gochiwe Majolo Dube, as well as my siblings, and I am proud to say, “nothing is impossible with GOD; He lift us high when we least expect”.

ABSTRACT

Background – Children continue to be at high risk of dying before reaching their 5th birthday due to preventable and treatable conditions. A well-coordinated implementation of the IMCI strategy has been proven effective against these conditions. However, limited use of and poor adherence to IMCI guidelines has been consistently reported among healthcare workers, even with IMCI training. This study assessed acceptability and determinants of acceptability of the IMCI strategy, among primary healthcare nurses in Botswana.

Method – A cross-sectional survey was conducted in the clinics, and health posts within four purposively selected health districts: Francistown, North-East, Tutume and Bobirwa in Botswana. The sample size was proportionally allocated by the type of health facility (clinic or health post) in each health district. Participants were randomly selected based on the type of health facility in each health district. Data were collected from 238 nurses using adapted psychometric tools to measure four indicators of acceptability and determinants (organisational support, and social relations) on a five-point Likert scale. Acceptability was presented as a composite score of affective attitude, self-efficacy, perceived effectiveness and experienced burden subscales. A cut-off point score for acceptability was determined using the 25th percentile. Data were summarised using median, interquartile ranges (IQR) for continuous variables, and frequencies and proportions for categorical variable. Binomial logistic regression models were fitted to identify determinants of acceptability. $P<0.05$ was considered significant.

Results – Participants were mostly female nurses (62%), 81.9% diploma holders, 64.2% were IMCI trained, and 72% were working in rural-based facilities. The median scores and IQR for the determinants were 3.80 (IQR: 3.20, 4.20) for the social relations and support, and 3.00 (IQR: 2.55, 3.45) for organisational support. The median scores and IQR for the indicators of acceptability were 3.77 (IQR: 3.46, 4.15) for affective attitude; 4.00 (IQR: 3.80, 4.30) for experienced burden; 4.00 (IQR: 3.75, 4.25) for self-efficacy; and 4.00 (IQR: 3.72, 4.38) for perceived effectiveness. The median, IQR for acceptability was 3.97 (IQR: 3.75, 4.14). The strategy was acceptable to 74.7% of the participants. Identified determinants of acceptability were working in rural-based facilities [adjusted odds ratio (AOR): 0.25 (95% CI:0.08 – 0.80)], organisational support score [AOR: 2.89 (95% CI:1.34 – 6.25)], and social relations and support score, [AOR: 3.21 (95% CI:1.67 – 6.16)].

Conclusion- Acceptability of the IMCI strategy was high. Organisational support and social relations and support enhance the acceptability of the strategy. Further research is needed to explain the risk of low acceptability associated with working at a rural-based facility.

ACKNOWLEDGEMENTS

First and foremost, praises and thanks to God Almighty for the strength and courage to persevere, good health and all countless blessings throughout my MSc period of study, including my research work.

I would also like to express my sincere gratitude to my research supervisors, Dr Ntombizodwa Ndlovu, Dr Ejemai Eboreime and Dr Robert Gross for their continuous support, patience, motivation, imparting their knowledge and expertise in this research project.

My sincere thanks go to my hardworking, committed field research assistants; Oaitse Wawa Nteba, Abigail Malema, Karabo Makgosa, Thato Kebonang, and Michael Lebalang for making data collection possible, as well as all the participants for their time, honest views contributed towards the success of this research project.

I would like to acknowledge the University of Witwatersrand financial aid office for the Postgraduate Merit Award that provided necessary financial support for my research module tuition fees. Also, I acknowledge Dr Robert Gross for funding this research project through the D43 Botswana-UPenn Partnership Training Grant. Thank you Sarah Blessed-Sayah and Alfred Kwesi Manyeh for editing my report.

I would like to thank Mr Nelson Baane and Abigail Piniel for getting my treatment refills on my behalf throughout my study period and ensuring that I receive them well in time all the way from Francistown Botswana to Johannesburg, South Africa. My thanks and appreciation also goes to my aunt Ookeditse Sebedi for keeping an eye on my family while away studying, my young sister Bokani Moyo for ensuring that my daughter is well fed, groomed and ready for school on a daily basis throughout my studies, Ellis Batambuze who provided emotional support every time I was about to lose it, and brother Phillimon Jena for the spiritual support and ensuring that my family do not miss church.

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DEFINITION OF TERMS

Acceptability is the health provider's perception that the IMCI strategy is relevant, appropriate, useful and effective for managing childhood illnesses.

Affective attitude refers to how a health worker felt about the IMCI strategy and its implementation.

Implementation effectiveness refers to the consistency and quality of use of a specific intervention"

Experienced burden refers to healthcare workers' perceived amount of effort devoted to implementation of the IMCI strategy in daily practice given other duties.

IMCI-trained refers to any health worker who have undergone IMCI case management training as per IMCI guidelines or locally adapted training standards and successfully completed.

Implementation is a "*specified set of activities designed to put into practice an activity or program of known dimension"*

Implementation fidelity is the extent to which a health worker implements the IMCI strategy or guidelines (i.e., implements as prescribed in the original protocol or as intended by the program developers). also refers as adherence

Implementation outcomes these *are "the effects of deliberate and purposive actions to implement new treatments, practices and services".*

Nurses refers to professional health workers with diploma and degree qualification in nursing and have been given the responsible to provide child health services in primary healthcare settings.

Quality implementation means *"putting an intervention into practice in such a way that it meets the necessary standards to achieve the intervention's desired outcomes*"

Perceived effectiveness refers to the benefits associated with implementation of that given intervention. Regarding IMCI implementation, it refers to benefits associated with implementation of the strategy, and these benefits include improved health worker skills, quality care, improved child nutritional and health status, reduced child morbidity and mortality associated with preventable and treatable conditions

Self-efficacy refers to healthcare worker's confidence in their abilities to manage sick children according to the IMCI guidelines

Social relations and support refer to those interpersonal processes that can cause healthcare workers to change their thoughts, feelings, or behaviours about implementation of a given intervention.

LIST OF ABBREVIATIONS

AOR	Adjusted odds ratio
ARR	Annual rate of reduction
CFIR	Consolidated Framework for Implementation Research
DIBQ	Determinants of Implementation Behaviour Questionnaire
EBPAS	Evidence-based provider attitude scale
HW(s)	Health worker(s)
HIV/AIDS	Human Immuno-deficiency Virus/ Acquired immunodeficiency syndrome
IMCI	Integrated Management of Childhood Illness
IMR	Illness Management Recovery
IQR	Interquartile range
KMO	Kaiser-Meyer-Olkin
LMICs	Low and Middle Income Countries
PHC	Primary Healthcare
PCTB	Professional Care Team Burden
PICS	Perceived Intervention Characteristics Scale
REDCap	Research Electronic Data Capture
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
TFA	Theoretical Framework of Acceptability
TDF	Theoretical Domains Framework
UNICEF	United Nation's Children Fund
UOR	Unadjusted odds ratio
U-5	Children under five years of age
U5MR	Under-five mortality rate
WHO	World Health Organization

CHAPTER ONE: INTRODUCTION

1. Chapter introduction

This chapter gives an overview of mortality among children under five years of age (U-5), and the role of the Integrated Management of Childhood Illness (IMCI) strategy in reducing child mortality and morbidity among this population. Also highlighted in this chapter is the implementation of the IMCI strategy in Botswana, components of successful implementation, and the role of acceptability in successful implementation of health interventions. This chapter concludes with the problem statement, justification, research questions to answer, and objectives of the study.

1.1 Background

Even with the existing extensive body of knowledge and a wide range of technologies for life-saving interventions, mortality and morbidity among children under five years (U-5) remain a public health concern. Globally, approximately 6.3 million children died in 2017, and 85% of these deaths occurred in children U-5 (1). Half of the deaths (50%) occurred in Sub-Saharan Africa (SSA), while 30% of the deaths occurred in Southern Asia (1). In SSA, pneumonia accounted for 16.2%, diarrhoea (9.0%) and malaria (9.3%) of these deaths (2). These conditions can be effectively prevented and treated with available cost-effective treatments that can be delivered at both health facility and community level (3) such as the Integrated Management of Childhood Illness (IMCI) strategy (4).

1.1.1 Integrated Management of Childhood Illness strategy

The IMCI strategy was developed by the World Health Organization (WHO) and the United Nations Children Fund (UNICEF) in the early 1990s to reduce mortality in children U-5 as well as to lessen the occurrence, severity of illness and disability (5,6). The IMCI strategy is mainly used in primary healthcare (PHC) settings for early detection and prompt treatment of childhood conditions (4). Initially, the strategy targeted conditions such as diarrhoea, measles, malaria, acute respiratory infections (ARI), and malnutrition (5,6). However, revised versions have included tuberculosis, Human Immuno-deficiency Virus/ Acquired Immuno-Deficiency Syndrome (HIV/AIDS) as well as the assessment of early child growth and development (7). The strategy focuses on three components which are: improving health worker skills in IMCI case management; strengthening healthcare systems; and improving family as well as community practices (4–6).

1.1.2 Components of the IMCI strategy

Improving health worker skills

One component of the IMCI strategy is improving skills for frontline health workers (HWs) who offer child health services in PHC settings, through training based on IMCI guidelines (4–6). IMCI guidelines consist of step by step algorithms (case management process) that assist HWs on how to interview children's caretakers, accurately recognize signs and symptoms, identify appropriate treatment and provide counselling to caretakers as illustrated in Figure 1.1. The World Health Organization (WHO) recommends an 11-day in-service training standard course (4,8); however, over time in some countries, the training has been shortened to 5 – 8 days due to cost constraints with regular training (9–11). WHO also recommends provision of locally adapted guidelines for reference during practice (4), as well as follow-up supportive supervisory visits that include an observation of a trained HW consulting sick children visit (8–10). The initial visit is within 4 – 6 weeks training, and subsequent visits are every six months coupled (8–10).

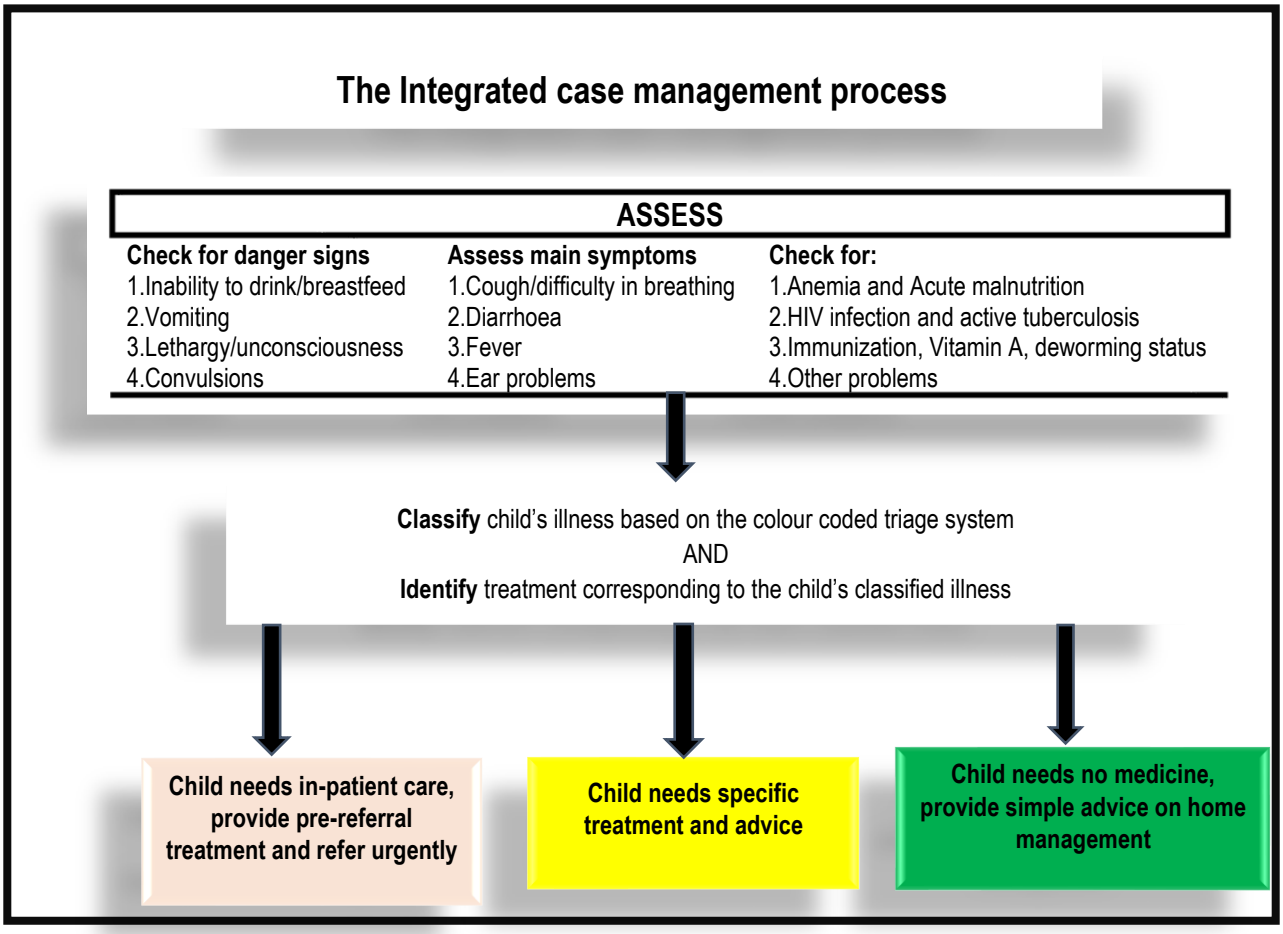


Figure 1. 1 IMCI case management process. Adapted from the WHO IMCI Handbook (12).

Strengthening of healthcare systems

Strengthening of the healthcare delivery systems, as another component, includes adequate skilled HWs to offer IMCI services, availability of drugs, equipment, supplies, and other materials across PHC settings to support full implementation of the IMCI strategy (8,13). Implementation is the use of specified facilitation strategies to put health interventions or programs into practice (14,15). The healthcare systems should be strengthened to provide adequate supervision and support to HWs and health facilities through onsite mentorships, follow-up visits, continual IMCI training, monitoring, and evaluation of IMCI implementation (5,6,9,16). Moreover, at least 60% of the HWs offering child health services must have been trained on IMCI case management in any health setting (17,18).

Improving family and community practices

The achievement of this component is based on empowering families and communities on proper childcare at home. Hence, community health workers are trained to deliver IMCI health services at the community level through home visits and mobilizing the community (19). Health services provided are mainly promotive and preventative. These include health talks that promote effective healthcare-seeking behaviours, proper child growth and development; as well as follow-up visits to families with sick children to ensure proper childcare and administration of treatment at home. Also, preventative therapies such as oral rehydration therapy, vitamin A supplements, and zinc sulphate are distributed to communities and families with children U-5 (6,20).

1.1.3 IMCI implementation in PHC settings in Botswana

The health system in Botswana consists of five levels of healthcare provision ranging from the lowest to highest, being, mobile stops clinics, health posts, clinics, primary hospitals, district hospitals and referral hospitals (21,22). The lower levels of healthcare e.g., mobile stops, health posts and clinics were designed to offer preventative and promotive health services at community, family and individual level (21,22). Thus, they serve as first points of entry for people seeking medical attention in Botswana, thereafter, critically ill patients are transferred to higher level health care facilities, which are the primary/district or referral hospitals, for further management (21,22).

Focusing on mobile stops, healthcare services are offered in a form of outreaches conducted by registered nurses (RNs) with a diploma or bachelor's degree in nursing (i.e., basic qualification leading to registration as a registered nurse) and a family welfare educator (FWE) working in a health post or clinic. Health posts are located in low population density areas (i.e., the population exceeds 500 but not above 5,000 inhabitants) and are usually staffed with at least two RNs and FWE (21,22). Clinics are located in mid-high-density population (5,000 – 10,000 inhabitants), and the staffing is usually more than two nurses plus

pharmacy technicians, FWEs and social workers, based on the size of the clinic and total population of people it is serving (21,22). The roles and functions of the lower levels of healthcare facilities (clinics and health posts) align well with the mandate of the IMCI strategy, hence, the implementation of the strategy is mainly enforced at the health posts and clinics (17,18).

The government of Botswana adopted the IMCI strategy in 1997 to improve child survival rates (23). The strategy was pilot-tested in four selected health districts before national scaling up to inform the adaptation of the guidelines to the local context (18,23). By 2004, IMCI implementation was part of the national health delivery system (17,18,23) and subsequently rolled out to other health districts. By 2012, all health districts were implementing the strategy (17,18) as illustrated in Figure 1.2 (which was extracted from Ababio et al. (24), and the shaded areas do not suggest anything related to IMCI implementation).

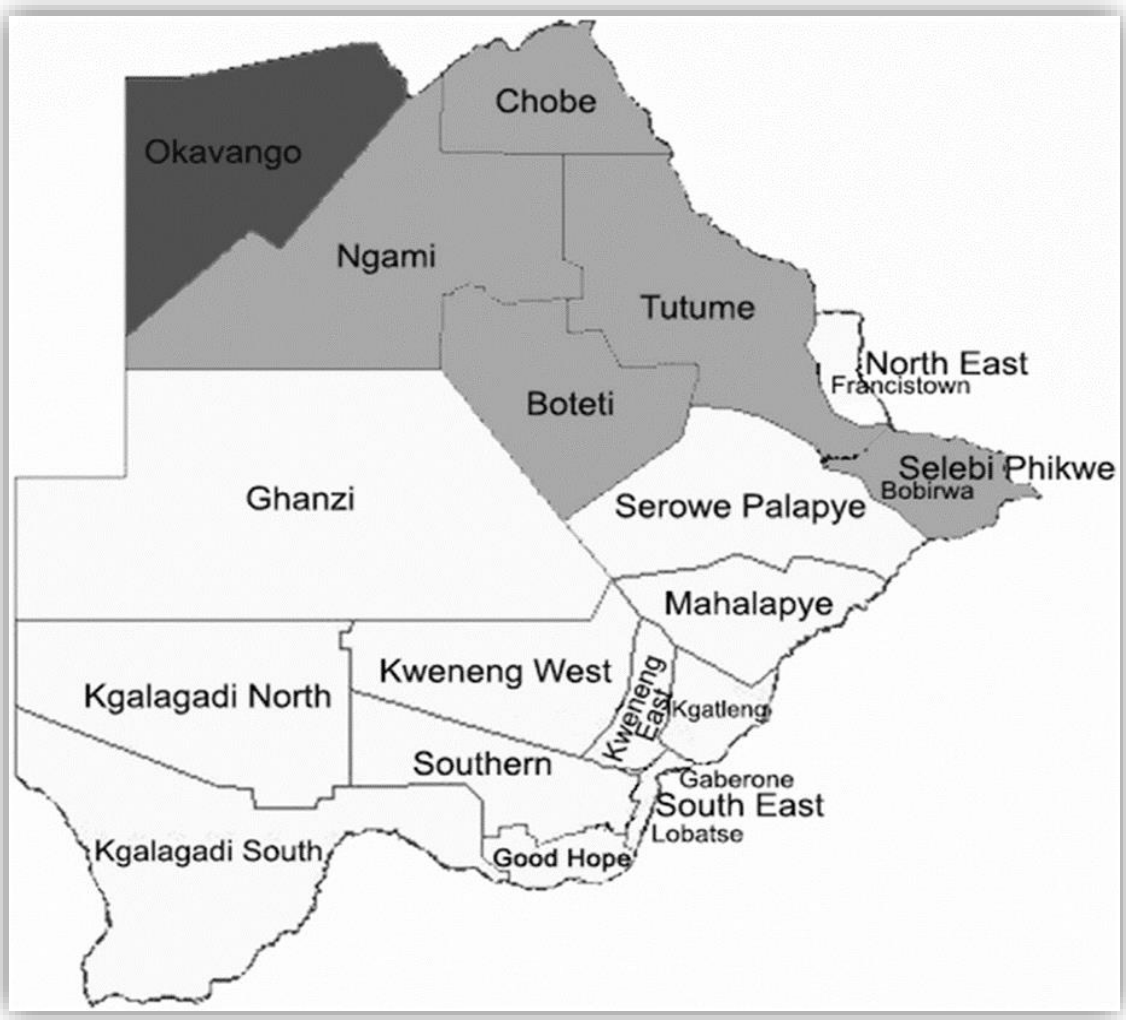


Figure 1. 2 Map of Health Districts in Botswana. Source: Ababio et al. Infection, Genetics and Evolution (2018) 63: 73 -78

Since adoption of the strategy, the IMCI strategy remains the 'gold standard' approach for standardized diagnosis, management, and prevention of childhood illnesses in lower-level healthcare facilities in Botswana (17,25). The IMCI case management training have been conducted annually for HWs such as the nurses, doctors and pharmacists (17,18,23). Moreover, IMCI pre-service training was introduced in 2010 for completing general nursing students across the Institute of Health Science (IHS) campuses as a way of increasing IMCI-trained HWs in the health system (17,18).

1.1.4 Assessment of successful Implementation of the IMCI strategy

Successful implementation of an evidence-based intervention in real-world settings is defined by both the intervention and implementation effectiveness (14,26–28). Intervention effectiveness describes the benefits associated with the consistency and quality of use of the evidence-based intervention (15,27) and can be measured using service and client outcomes like efficiency, safety, client-centeredness, timeliness, optimal health, satisfaction (26,27). Implementation effectiveness refers to the consistency and quality of use or practice of the intervention in an organisation (14,15,27,28). It can be measured using implementation outcomes such as acceptability, adoption, fidelity to describe how well the implementation process actually works and why outcomes are achieved (26,27).

A systematic review conducted in 2016 demonstrated that a well-coordinated implementation of the strategy has the potential to significantly reduce U5MR in low and income countries (LIMCs) (29). Assessment of successful implementation of the strategy is mainly guided by the conceptual IMCI impact model proposed by Bryce and colleagues (16) (see Appendix C, Figure 1C). However, the conceptual model does not capture the domains of implementation effectiveness; it only reflects the domains of intervention effectiveness, that is service and client outcomes related to IMCI implementation. The service outcomes include the three components of the strategy mentioned earlier and their impact on the quality of care rendered to children U-5 and level of compliance to treatment at family and community level. The client outcomes include improved child's nutritional, health status and reduced U5MR. On the other hand, it is widely documented that the implementation of the IMCI strategy among HWs is suboptimal (30–38). Considering the level of IMCI implementation among HWs, it is critical to understand how well the IMCI implementation processes actually work and why outcomes are achieved at that level. Proctor et al. (26) suggest assessment of the acceptability of interventions from the HWs' perspective in addition to service and client outcomes to guide implementation processes.

1.1.5 Acceptability of health interventions

Acceptability is a "multi-faceted construct that reflects the extent to which people delivering or receiving a healthcare intervention consider it to be appropriate based on expected or experienced cognitive and emotional responses to the intervention" (39). The degree of acceptability of a health intervention to a HW is likely to affect the extent to which that intervention will be implemented or provided to patients (26,39–41). Evidence suggests that poor adherence to and reduced uptake of health interventions may be associated with low acceptability (42,43). Moreover, health interventions that initially had low acceptability may have high anticipated acceptability based on HW's experience with the intervention and how the intervention will be adapted to fit with individual preferences and values (39). Considering that acceptability is not static, lack of information on the acceptability of a given health intervention is a threat to successful implementation (26,39). Acceptability may be assessed during development, piloting, and implementation phases of the health intervention (26,27). This helps intervention developers, program managers and policymakers to understand the contextual factors associated with acceptability and to make informed decisions about the format, content and delivery mode of the health intervention (39).

Pertaining to IMCI implementation, poor acceptability of the strategy by HWs may act as a barrier towards reducing U5MR, and identifying contextual factors that enhance acceptability may promote adoption of the strategy, adherence to IMCI guidelines leading to quality of care rendered to children U-5 and reduced U5MR.

1.2 Problem statement

Botswana has been implementing the IMCI strategy over two decades and has trained 60.4% health workers to deliver services (17) competently. However, U5MR in Botswana remains significant, with 38 deaths/1000 live births reported in 2017 (2). Botswana's current annual rate of reduction (ARR) in the U5MR is approximately 2.3% (1). However, to attain the Sustainable Development Goal (SDG)-3 target of 25 deaths per 1000 live births by 2030, Botswana needs to achieve and maintain ARR of 3.6% (Figure 1.3) (44). Pneumonia, neonatal sepsis, and HIV/AIDS remain among the leading causes of deaths in children U-5, accounting for 9.1%, 9.2%, and 7.7% respectively in Botswana (2). But these conditions can be effectively prevented and managed through good implementation of the IMCI strategy (4–6).

Studies conducted in Botswana indicate limited use of IMCI guidelines among HWs in PHC settings (18,23,33,45), even among IMCI-trained HWs and with provision of IMCI case management guidelines for reference during practice (17,18,33). Limited use of the guidelines often contributes to incorrect classification of child's illness, unbeneficial treatments and suboptimal health outcomes (17,18,23,33). A recent survey conducted in Botswana indicated that 47.3% of sick children were not checked for cough, diarrhoea, and fever; and 50% had their illness classified incorrectly despite having 81% of sick children

in the survey attended to by IMCI-trained HWs (17). These findings indicate poor adherence to IMCI guidelines by HWs contributing to the omission of quality care, preventable harm and beneficial treatment to sick children U-5 (18,23,33,45). Moreover, these findings suggest lack of acceptability of the strategy among HWs, since acceptability is considered a critical determinant of adherence and successful implementation of a specific health intervention (46–48).

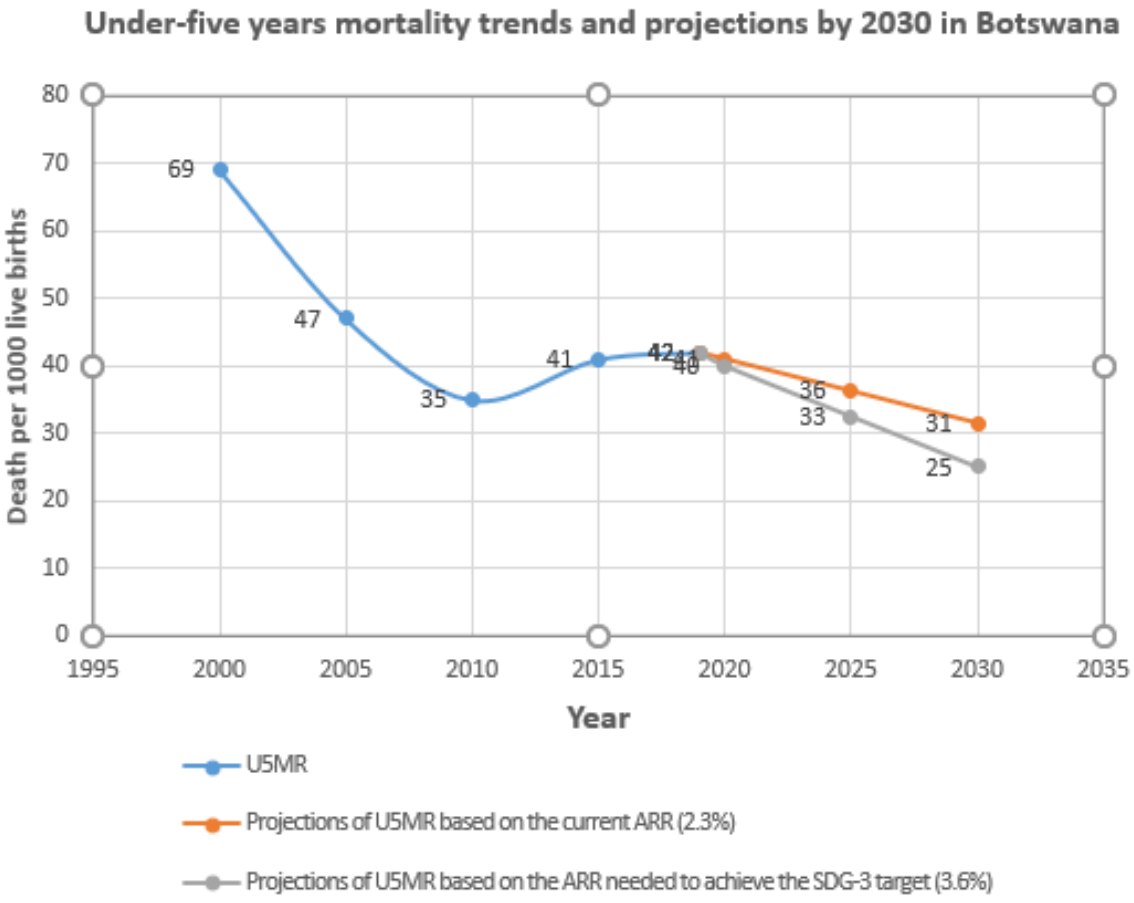


Figure 1. 3 Mortality trends and projected mortality rates of children U-5 by 2030 in Botswana. Source: http://data.unicef.org: Child Mortality Estimates (2020)

1.3 Justification of the study

Lack of acceptability is a risk factor for poor quality of implementation (26,27,40,46). However, strategies to promote acceptability may result in significant uptake and implementation fidelity of the specific health intervention (49–53). The ultimate result would be improved quality of care and better health outcomes (26,39). Additionally, assessing acceptability can guide the modification of the given health intervention and identification of strategies to ensure a better fit in the respective contexts (40). Thus, assessing the level of acceptability of the IMCI strategy and its determinants in PHC settings in Botswana will aid the

identification of implementation constraints and process gaps needed to be addressed in order to optimize implementation fidelity of the IMCI strategy.

1.4 Research question

What are the determinants of acceptability of the IMCI strategy among PHC nurses in Botswana in 2019?

1.5 Aim

To assess acceptability of the IMCI strategy and its determinants among primary healthcare nurses in Botswana in 2019.

1.6 Objectives

1. To measure acceptability of the IMCI strategy among PHC nurses in Botswana.
2. To examine the relationship between acceptability of the IMCI strategy and its determinants among PHC nurses in Botswana.

CHAPTER TWO: LITERATURE REVIEW

2. Chapter introduction

In this chapter, the literature review first highlights the measures of acceptability, followed by a discussion on the determinants of acceptability across health interventions and determinants of IMCI implementation. Based on the review of extant literature, this chapter concludes with the conceptual framework used in this study.

2.1. Measures of acceptability

There are no universal or standardized measures of acceptability across the literature (39,54,55). Extant studies used observed behaviour measures; proportion of those who intend to use the intervention agreed or are willing to participate in the study and participant drop-out/retention rates as proxy indicators for acceptability (48,54,56,57). While other studies used self-report measures; individual perceptions of, and experience with the intervention, attitudinal measures, satisfaction measures (40,43,54,58–60). None of these studies specified the threshold criterion or cut-off point in terms of a specific score or percentage of participants to consider intervention as having low or high acceptability.

In a systematic review, studies with more than 67% participants willing to use an intervention implied high acceptability, while (66–34%) and less than 33% indicated moderate and low acceptability respectively (57). However, the authors did not stipulate what informed the categorization of acceptability into three categories. In another study, the range of acceptability scores was 2.28 – 3.82 on a five-point scale, an intervention with a rating score of 2.28 and 3.82 was considered "*mild unacceptability*", and "*mild acceptability*" respectively (43). In studies that utilized the Evidence-Based Practice Attitude Scale (EBPAS) to measure HWs attitude, a proxy for acceptability, high EBPAS scores on a five-point scale indicated positive attitude towards health interventions by HWs (59,61–65). However, in both situations, it was not clearly stated what score was needed to consider intervention as acceptable or not acceptable; or HW's attitude as negative or positive. In such situations, Barua et al (66) suggest the use of the 25th percentile as the minimum cut-off point for dichotomising scores obtained through ratings.

2.2. Determinants of Acceptability

Determinants are defined as factors believed or shown to influence implementation effectiveness, and ultimately successful implementation (67). Two recent systematic reviews identified organisational culture and climate, organisational support, organizational leadership, social relations and support and organizational structures, patients, HW, policies, regulations, guidelines, legislation, political stability, resources, teamwork, collaboration, monitoring and feedback, funding, communication as common

determinants of successful implementation (67,68). These determinants have been taken into consideration in the ecological framework for understanding effective implementation developed by Durlak and DuPre (69); the consolidated framework for implementation research (CFIR) by Damschroder et al (70), and conceptual framework for predicting implementation outcome by Chaudoir et al (71). Conceptual framework by Chaudoir et al (71) was developed based on the CFIR and ecological framework domains taking into consideration the patient domain, which was not captured by the CFIR and ecological framework. Chaudoir et al (71) proposed that determinants can be grouped into structural, organizational, Health worker, patient and health intervention-related factors.

2.2.1. Structural level factors

These include constructs that represent the outer setting or external structure (70) or broader community (69) in which an organisation is nested (71). These factors include socio-political climate, funding, policies, and infrastructures (69–71). Adequate funding is needed for training HWs, incentives and rewards, and procuring necessary resources to facilitate effective implementation of health interventions. Palinkas et al (41) reported costs for implementing new health interventions as the most cited constraining feature in mental health clinics. In a recent systematic review, Li et al (68) reported that securing adequate funding for training and educating staff; procuring and allocating resources; providing monitoring and feedback; and ensuring efficient implementation was vital to enhance implementation effectiveness. HWs who believe they are politically pressured to implement an intervention is less likely to implement that intervention as intended (69).

2.2.2. Organizational level factors

The organisational level factors include constructs that represent aspects of the related to the inner setting and implementation processes (70) or prevention delivery systems organisational capacity and prevention support system (69) of the organisation in which a health intervention is being implemented (71). These include organisational culture and climate, organisational support, organisational leadership engagement, social relations and support, and organisational structure (64,67,68,71).

Organisational climate and culture

Organisational climate refers to employees' perceptions about their work environment and how it affects their well-being and overall functioning of an organisation (62,72). While organisational culture refers to norms and expectations by the organizations on how employees should behave and how things are done (62,64). Organisational culture and climate have a significant influence on HWs' attitude, in terms of how HWs will perceive and implement health interventions (62,64,73). HWs working in organisations that are open to adoption of new interventions; support and encourage continual learning; have clear values,

beliefs and norms; have engaging and less stressful climates are more likely to adopt, use and implement interventions as expected compared to those who worked in stressful and emotionally exhausting facilities (62,64,68,72,73).

Organisational support

Organisational support, as perceived by HWs, is related work outcomes, higher job satisfaction and improved performance (61,74,75). Organisational support includes strategies to improve HW skills and enhance a sense of self-efficacy (e.g., training and re-training in certain skills, deployment to relevant units), availability of human and material resources; staff workload; monitoring and feedback giving; providing information and decision-support systems; emotional support and mechanisms to promote local problem-solving efforts (67–71). Huijg et al (53) highlighted that the degree of organisational support could motivate or hinder the development of relevant skills and abilities necessary for implementation, sense of independence and social competence by the HW. The measurement of organisational support can be facilitated through Determinants of Implementation Behaviour Questionnaire (DIBQ) (53) that was developed based on the Theoretical Domain Framework (TDF) (76).

Organisational leadership

Organisational leadership play a critical role in creating a conducive organisational climate and culture to facilitate the effective and successful implementation of health interventions (67–70,77–81). Acceptability of health interventions by HWs was associated with perceived positive leadership support (63,79,82,83). Studies on "illness management and recovery" (IMR) program indicated that HWs who reported implementation and willingness to continue implementing the program also reported high leadership engagement, dedication, commitment and support to the entire implementation process (79,83).

Social relations and support

The social relations and support component are concerned about opinions, ideas, events, activities, communications and certain behaviours that support positive HWs' attitude, beliefs and behaviours relevant to the health intervention being implemented (53,67). Studies indicate that teamwork, collaborative relationships, the establishment of systems and processes to effectively manage information and communication facilitated HW positive attitude and good work relations leading to a successful implementation of health interventions (53,67,68,71,73,84). A systematic review conducted by Craig and colleagues (84) found that a lack of social support from other workers and managers was associated with low acceptability and implementation of the triage, treatment, and transfer clinical intervention for management of acute stroke. However, sharing of experiences among colleagues, and getting advice from seniors or leaders, were identified as enablers of successful implementation (84).

Organisational structure

The organisational structures that can influence implementation of health interventions include size, degree of specialization, complexity, functional differentiation, decentralisation or centralisation (67,69,70,73). The likelihood of adopting an intervention may increase with organizational size because larger organisations are more likely to have more resources and diverse expertise (specialisations) to facilitate adoption and use of new interventions (73). Also, the implementation of new interventions is likely to be easier in centralized organisations compared to less centralised and dispersed organisations (70). While availability of formalised policies supporting the use of evidence-based practices as part of the organisation's core values and mission can lead to better adoption and implementation of health interventions (59,73).

2.2.3 Health intervention level factors

These encompass a number of constructs that represent aspects of the health intervention to be or being implemented (69–71). These aspects include perceived effectiveness (potential or actual benefits), efforts needed to implement (burden) and contextual appropriateness (69–71,73,85,86).

Perceived effectiveness refers to the extent to which the intervention being implemented is perceived as likely to achieve its purpose (39). Several studies indicate that health interventions that are considered not beneficial or producing insignificant patient outcomes are less likely to be acceptable to HWs (40,70,83,84,86,87). Cognitive processing therapy in mental health practice was more acceptable to HWs compared to prolonged exposure therapy based on the perception of benefit to patients (40). The authors measured the perceived effectiveness of the two mental health interventions through the development of a Perceived Characteristic of Intervention Scale (PCIS) (40) based on the theory of diffusion by Rogers (85).

Interventions that require too much time or cognitive effort indicate that the burden is too great (39). Interventions considered too demanding and time-consuming were reported to be less acceptable to HWs (40,41,79,83,84,86,87). A qualitative study on an illness management and recovery (IMR) program found that the IMR program was given a lower priority as HWs reported that they had to give up their own time, and dedicate their own efforts to sustain the program (83). The measurement of subjectively perceived burden in practice has been facilitated through development of a Professional Care Team Burden (PCTB) scale (88). On the other hand, Other studies indicate that health interventions that can be easily adapted or modified to fit provider preferences, organization's needs, patient's needs, values are likely to be acceptable (15,40,58,60,69,70,73).

2.2.4 Health worker-related factors

Health worker-related factors include a number of constructs that represent the aspect of the individual HW who is implementing health intervention with the patient (69–71,73). These aspects include HW's demographic factors such as level of education, training, age, primary discipline, years of professional experience and ethnicity; personal values and goals, attitude towards intervention (62,63,69–71,73). Level of education or qualification, professional experience, primary discipline and ethnicity were associated with openness towards the adoption of health interventions (58,62–64). Health worker's attitude is associated with the adoption and use of interventions (61–64,73). The attitudes of HWs towards the use of health interventions can be measured using the EBPAS developed by Aarons (59).

Health workers who feel confident in their abilities to implement the intervention as intended (self-efficacy); have relevant skills are more likely to highly accept, adopt and implement health interventions (47,53,58,69,70,73). The measurement of self-efficacy has been facilitated through self-efficacy subscale from the DIBQ (53). Research utilizing the TDF has reported a lack of self-efficacy as a barrier to the use and implementation of health intervention (60,84,87).

2.2.5 Patient-level factors

These factors include patient characteristics that can influence the implementation of health interventions by HWs (71). These may include patient's personality, motivation, attitude towards the intervention (71). Patient's attitude and motivation can influence the extent and consistency to which the HW would implement the intervention as intended. Health interventions that patients are less likely to use or adhere to are prone to low acceptability by HWs (39,87).

2.3 Determinants of IMCI implementation

Extensive literature indicated that IMCI implementation is largely influenced by factors related to the healthcare system and HW (3,16,91–96,30,31,34,37,45,55,89,90).

2.3.1 Healthcare system-related factors

The healthcare system-related factors include leadership and governance; availability of resources (e.g., skilled HWs, drugs, equipment and other supplies); training and re-training of HWs; adequate supervisory support with frequent onsite mentorship; monitoring and evaluation as well as performance feedback (8,9,16,20). In settings where a strengthened healthcare system was reported, studies also reported consistent use of IMCI guidelines and improved quality of care rendered to children U-5 (55,95,97,98). On the other hand, suboptimal implementation of the strategy has been reported in settings where healthcare systems were perceived weak (17,18,45,89,90,92,99–102).

2.3.2 Health worker-related factors

The degree of IMCI implementation has been shown to be associated with HWs' attitude, IMCI training status, level of qualification, years of experience and age. In a study conducted in Benin (3) older HWs were found to be the worst IMCI implementers and less likely to manage sick children using IMCI guidelines. A study conducted in Tanzania reported consistent use of IMCI guidelines among HWs with more than three years of experience compared to those with less than three years of experience (103). Research also indicates that IMCI-trained HWs consistently managed sick children as per IMCI guidelines compared to those without IMCI training (17,30,35,37,91,104). Studies conducted in Bangladesh, Tanzania and Morocco found that lower-level cadres (e.g., nurses) adhered to IMCI guidelines more compared to medical officers and physicians (35,95,103). While in other settings, higher-level cadres (e.g., physicians, medical officers) were more likely to adhere to IMCI guidelines compared to lower-level cadres (36,91).

Health worker attitude towards the IMCI strategy and guidelines is reported as one of the factors affecting IMCI implementation (30,31,90,93,105–107). Several studies reported a negative attitude towards the strategy by HWs (30,31,90,93,106,107) mostly observed among those with a higher level of qualification compared to those of lower level of qualification (35,93,106,107). Health workers perceived the use of IMCI guidelines as a tedious and time-consuming process resulting in long waiting hours for patients, queues and working hours; increased workload and burnout (30,31,37,45,90,107). While in other studies, HWs were of the opinion that IMCI guidelines are boring, demotivating, too basic and simple for their level of qualification and clinical experience (35,93,105–107). Some studies showed a lack of support amongst HWs themselves with sick children being left for IMCI-trained HWs to deal with (30,93). A recent qualitative study conducted in South Africa reported a lack of confidence among HWs to use the IMCI guidelines (30).

2.4 Theoretical Framework of Acceptability

In a recent review of several studies across health interventions conducted by Sekhon, Cartwright and Francis (39), no explicit theory for acceptability was found. Based on the review, the authors developed a theoretical framework of acceptability (TFA) (39) summarised in Figure 2.1. The TFA proposes that acceptability is a multi-faceted construct represented by seven constructs: affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs, and self-efficacy (39). The TFA helps in assessing acceptability at various stages of the health intervention: development, piloting and implementation phases taking into consideration the purpose of assessment at a given point in time. During or after implementation phases, the TFA can be applied to assess for retrospective or concurrent

acceptability to explain the observed level of implementation and to predict the intentions of continuing with the intervention as part of routine based on HWs' experience with the intervention.

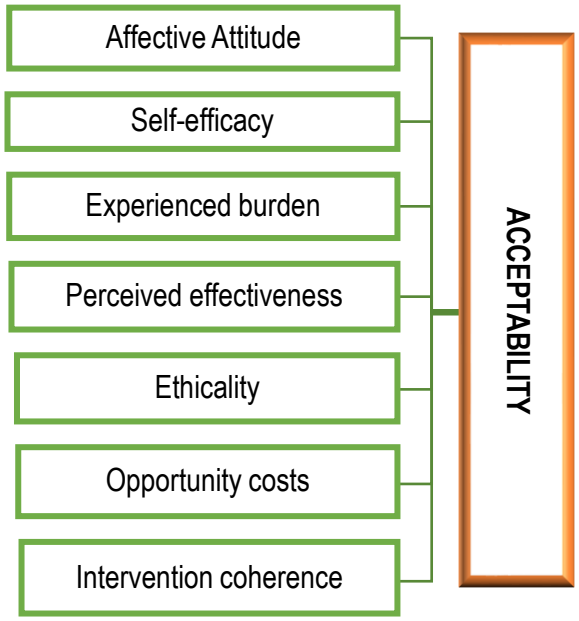


Figure 2. 1 Theoretical Framework of Acceptability developed by Sekhon et al.,2017.

2.5 Conceptual framework for this study

The conceptual framework for this study is shown in Figure 2.2. Acceptability construct was adapted from the TFA, and the determinants were mainly informed by the ecological framework (69); CFIR (70), and conceptual framework (71) and findings from the recent scoping review on determinant frameworks by Nilsen and Bernhardsson (67). Some of the constructs for acceptability and determinants identified in the literature were excluded in this study mainly because of time and funding constraints. A reasonable time was needed to complete the proposed study, and to assist the participants with completion of the questionnaire without overwhelming or interrupting with their work.The proposed relationship between acceptability and adherence was informed by various studies (26,39–41). While the components influenced by adherence were adapted from the IMCI conceptual model developed by Bryce et al (16).

The framework is divided into two sections. The first section is the main focus of this study, represented by solid arrow lines. This section illustrates the influence of the organisational and health worker-related factors on the acceptability of the IMCI strategy, which is defined by affective attitude, self-efficacy, perceived effectiveness and experienced burden. The second part of the framework is depicted by dotted arrow lines and was not the main focus of this study. This section illustrates how the acceptability of the strategy among HWs can further influence implementation fidelity (adherence) to IMCI guidelines which plays a critical role in the quality of care rendered to children U-5 at the facility level, treatment compliance at family level and subsequently, overall child health outcomes.

The adapted indicators of acceptability include affective attitude, self-efficacy, experienced burden, and perceived effectiveness. The inclusion of the above mentioned indicators was in line with the findings of the literature reviewed in which HWs' attitude, perceptions of the IMCI strategy and guidelines in terms of the efforts needed to implement the strategy (burden) and potential benefit (effectiveness) (30,31,90,93,105–107), and self-efficacy (30) were shown to influence the use of the guidelines in PHC settings (30). There is little information on the other indicators of acceptability: ethicality, intervention coherence; hence they were excluded. Affective attitude assessed how participants felt about the IMCI strategy and the use of guidelines to manage sick children in their settings. Self-efficacy depicted participant's perceived level of confidence in the ability to manage sick children as per IMCI guidelines. Perceived effectiveness assessed the extent to which participants perceived the IMCI strategy to have achieved or be achieving its purpose. Experienced burden examined the amount of effort required to implement the strategy and manage sick children using the IMCI guidelines as perceived by the participant.

The determinants of acceptability included aspects related to organisational (e.g., organisational support, organisational structure, social relations and support) and HW level (e.g., level of qualification, IMCI training status, age, years of experience offering child health services). The structural level constructs were not included in the framework because their measurements pose unique methodological challenges, also large samples are required to achieve adequate statistical power to detect the effects of structural level constructs on implementation outcomes (71). The patient-level constructs were also not included, given that there are relatively few measures to assess these constructs (71).

The organisational support construct encompasses the participant's perceptions of the availability of resources (both skilled HWs and material), IMCI training coverage, monitoring and giving of feedback practices, provision of information and decision-support systems, and leadership support and mechanisms to promote local problem-solving efforts. The inclusion of the organisational support construct was in line with the findings of the literature review in which organisational support is nested within the health system component of the IMCI strategy (17,20,95,108,109) and has been largely reported to be associated with suboptimal IMCI implementation (17,31–34).

Social relations and support construct reflected participant's perceptions of other workers, quality of relationships, degree of teamwork and collaboration with other co-workers with regard to IMCI implementation. This construct was included because extant literature indicated that it plays a critical role in implementation effectiveness (67,84,110), but it has not been clearly explored in IMCI implementation. Organisational culture and climate were not included in this study because observed social relations and support within an organisation are a reflection of the culture and climate prevailing in that organisation

(110). Therefore, given the time constraints for data collection, social relations and support component may give findings close to culture and climate.

Organisational structure is this study is represented by type (clinics, health posts) and location (rural, urban) of health facilities which reflects the physical environment and size of health facilities. HWs' demographics, such as age and gender, were included to address the issues of confounding (62). HWs' work-related characteristics such years of experience offering child health services, IMCI training status and nursing specialisation were in line with findings of the literature reviewed where these variables were found to be associated with the use and uptake of health interventions (35,36,59,62–64,73,91).

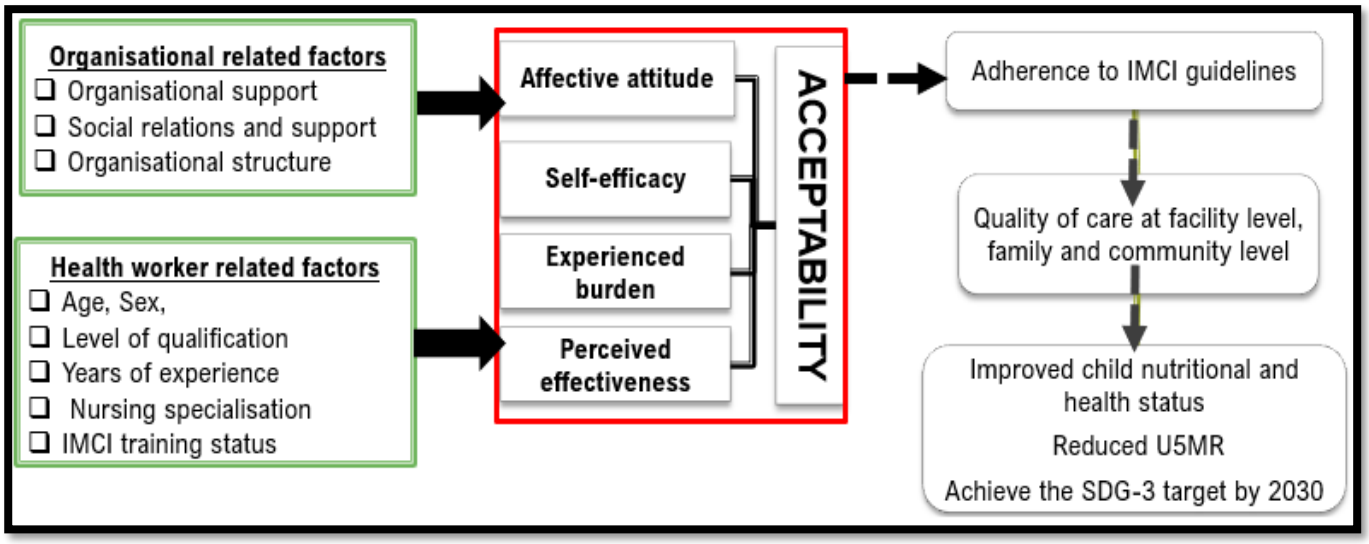


Figure 2. 2 Conceptual framework of determinants of acceptability of the IMCI strategy among primary health care nurses in Botswana. Adapted from Sekhon et al., (2017), Chaudoir et al., (2013), Damschroder et al.,(2009), Durlak & DuPre (2008), Nilsen & Bernhardsson (2019) and Bryce et al., (2004)

CHAPTER THREE: METHODOLOGY

3. Chapter introduction

This chapter presents the study site and population, sample size, sampling procedures, data collection methods, and data management approaches. Also presented in this chapter are the study variables, approaches used to assess the validity and reliability of the scales used to measure the key determinant and indicators of acceptability, as well as the analysis plan. The data were analysed using STATA 15.0.

3.1 Study site

The study site included four health districts: Francistown, North-East, Tutume, and Bobirwa. The health districts were selected based on the level of IMCI implementation reported in the 2012 and 2017 IMCI health facility surveys. The level of IMCI implementation in Tutume and Bobirwa were 48% and 56.5% respectively, in 2017 (17), which was below the WHO recommended level of performance of 68% (37). Francistown and North-East level of IMCI implementation were reported to be above the WHO recommended level in the 2012 IMCI health facility survey (18). Furthermore, these districts are adjacent to each other with almost similar geographical areas, lifestyle and types of health facilities (clinics and health posts). However, Tutume, Bobirwa, and North-East are rural-based districts; whereas, the Francistown district has a mix of urban and rural health facilities set up which are based in the city of Francistown and neighbouring villages respectively.

Data provided by the respective District Health Management Teams (DHMTs) indicated a total of 108 health facilities and 548 nurses offering child health services within these districts (excluding primary/district hospitals). Francistown had a total of 33 health facilities and 265 nurses offering child health services; North-East had a total of 34 health facilities and 105 nurses; Tutume had a total of 21 health facilities and 110 nurses, and Bobirwa had a total of 20 health facilities and 68 nurses.

3.2 Study design

This study used a cross-sectional survey that provided information about the acceptability of the IMCI strategy among nurses in four health districts in Botswana.

3.3 Study population

The study population consisted of all nurses who offered child health services in lower levels of healthcare facilities, e.g., clinics and health posts. Participants were nurses who had consented to participate in the study and had at least 12 months of experience offering child healthcare services in the current facility.

3.4 Sample size

To estimate the proportion of nurses who would accept the implementation of the IMCI strategy in a single population at 95% confidence level and within 5% of the true proportion, the following formula was used to determine the sample size needed:

$$n = p\ (1-p)\left(Z_{\alpha/2}/E\right)^2$$

Where: $\boldsymbol{n}$ is sample size needed, $\boldsymbol{p}$ is the proportion of nurses accepting the IMCI strategy in the population, $\boldsymbol{Z_{\alpha/2}}$ is 1.96, the value from the standard normal distribution reflecting the 95% confidence level and $\boldsymbol{E}$ =0.05, the desired margin error for this study (111,112). The prevalence of IMCI strategy acceptability among HWs could not be found in previous studies. Thus, it was assumed that the proportion of nurses accepting the implementation of the IMCI strategy in the population is p= 0.5 (111,112). Thus, the sample size was determined to be:

$$n = 0.5\ (1-0.5)(1.96/0.05)^2 = 385$$

The total number of nurses offering child health services as provided by the DHMTs was 548. The determining sample size is more than 10% of the study population; thus, the finite correction factor was considered to adjust for the sample size (112), using the formula:

$$n = n/\left(1 + {}^{n}/_{N}\right)$$

Where $\boldsymbol{n}$ is sample size needed and $\boldsymbol{N}$ = total population of nurses offering child health services in the four health districts. Assuming a 94% response rate, sample size needed:

$$= 385/\left(1 + {}^{385}/_{548}\right) = 227 \qquad \text{and} \qquad n = 227/0.94 = 242$$

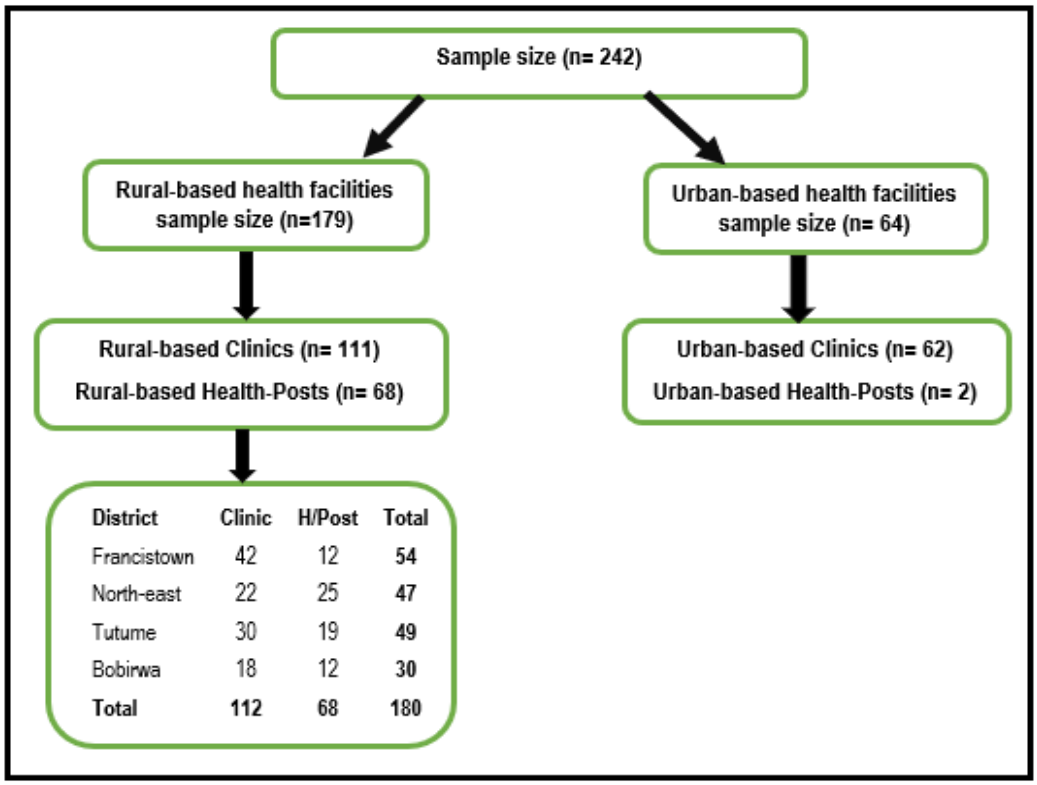
3.5 Sampling procedure

The determined sample size (N= 242) was proportionally allocated based on the type of health facility (clinic or health post) in each health district, as illustrated in Figure 3.1 using the formula:

$$n_i = (N_i/N)\ n$$

Where: n_i= sample size for i^{th} stratum (Clinic or health post) in district X, N_i = Population size of nurses offering child health services for i^{th} stratum (Clinic or health post) in district X, N = Size for the entire population of nurses offering child health services in the four health districts, n is a sample

Simple random sampling was employed for the selection of participants based on the type of health facility (clinic or health post) per each district. First, a list of nurses provided by the DHMTs was entered into Microsoft Excel 2016 by type of health facility for each health district. The nurses were assigned numbers. The Microsoft Excel random number generation function was used to select nurses per clinic according to sample size needed among nurses working in the clinics, and those in health posts per each district.



District	Clinic	H/Post	Total
Francistown	42	12	**54**
North-east	22	25	**47**
Tutume	30	19	**49**
Bobirwa	18	12	**30**
Total	**112**	**68**	**180**

Figure 3. 1 Sample size allocation across health districts by location and type of health facility

3.6 Data collection

3.6.1 Questionnaire

The researcher used an electronic version structured questionnaire developed in English and designed using an online designer tool in REDCap (Research Electronic Data Capture) to collect data. The questionnaire was in three sections (see Appendix B). The first section collected information on participant demographic and work-related characteristics. The second and the last sections collected information on the indicators and proposed key determinants of acceptability. Previous validated psychometric tools were adapted to measure the four indicators and proposed key determinants of acceptability. The 4-item self-efficacy scale, 11-item organisational support scale and 5-item social relations and support scale were adapted from the DIBQ (53). The 18-item intervention effectiveness scale, 13-item affective attitude scale and 10-item experienced burden scale was adapted from the PCIS (40), EBPAS (59) and PCTB scale

(88) respectively. Responses of all the scales were on a five-point Likert scale *(strongly disagree=1, disagree=2, neutral=3, agree=4 and strongly disagree=5).*

Data was collected using REDCap mobile App and then synchronized to the main REDCap database. Five field research assistants with a health-related background qualification were recruited and trained for data collection to ensure quality in the data collection processes. The training was conducted over three days. The training covered data collection processes, research ethics, e.g., issues of confidentiality, autonomy and informed consent, and data safety. The training also included how to use the REDCap mobile app menu to retrieve the questionnaire sections, capture data and synchronize it to the main REDCap database. The usability of the REDCap mobile app by research assistants was assessed on the last day of training.

Data was collected between May 2019 and June 2019. All the data collected was self-reported through the interviewer-administered questionnaire. All interviews were conducted in English. On average, the questionnaire was completed in 30 - 45 minutes.

3.6.2 Questionnaire Pre-test

Prior data collection, the questionnaire was assessed for face validity (113). The questionnaire was pre-tested for feasibility, formatting, wording, appropriateness of the language among nurses at Nyangabgwe Rereferral Hospital and Jubilee Clinic in Francistown. No changes made to the questionnaire as participants indicated that the questionnaire was easy to understand, terms used were relevant, and the interview was not too long. The findings from the pilot were not included in the study.

3.7 Data management

Research assistants used the REDCap mobile app to capture responses provided by participants and synchronized data collected to the central database, which was password protected. The researcher reviewed data collected from the database daily for inconsistencies. Data collected was then exported from REDCap database to Stata 15.0 for data cleaning and analysis. Data collected was also examined for missingness using Little's MCAR statistical test (114).

3.8 Study variables

The study variables are listed in Table 3.1. The psychometric tools used to measure the four indicators of acceptability, and eventually acceptability as well as to measure organisational support, and social relations and support were first assessed for validity and reliability prior computing the scores (113,115). The internal consistency reliability (i.e., Cronbach's alpha coefficient) ≥0.70 was considered acceptable (113). Exploratory factor analysis was used to assess for construct validity and to identify items to be

retained in the scales based on Bartlett's test of sphericity ($p < 0.005$), Kaiser-Meyer-Olkin (KMO) value ≥ 0.60 and factor loading ≥ 0.30 (113,115,116).

The final scores for each scale were computed such that the original rating scale (e.g., a five-point scale) is maintained to preserve the strength of the response and facilitate meaningful interpretation (117,118). Also, this is because the use of aggregated item scale scores is more reflective of the number of items than the strength of the response (117).

Outcome variable

Acceptability is the outcome variable of this study derived from affective attitude, self-efficacy, perceived effectiveness and experienced burden subscales. The details about the measurement of acceptability are provided under section 3.9.

Explanatory variables

Organisational support score and social relations and support score were measured on a five-point scale using a 11-item organisational support scale and 5-item social relations and support scale respectively after confirming the validity and reliability of the scales. The scores were computed using the mean of the ratings of all items on each scale to maintain the original rating scale (e.g., a five-point rating scale) (117,118).

Type and location of health facilities were variables related to organisational structure. Responses “health post ’and “clinic” for the variable type of health facility implied that the participant was working in the second and third level of healthcare provision facilities, respectively. Diploma and degree level of qualification applied to RNs that have undergone general nursing training for three years at an Institute of Health sciences or at least four years at a University, respectively (21).

In terms of Nursing specialisation, “none” applied to RNs that had undergone general nursing training (either at diploma and degree level) but without any post-basic training qualification; “midwifery” applied to RNs with either degree and diploma qualification plus a post-basic training in midwifery; and “other” applied to RNs who had a post-basic nursing training other than midwifery. The RNs with general nursing training and midwives, largely provide child healthcare services, including the IMCI services. The scope of practice for RNs with general nursing focuses on the provision of general nursing care in a holistic manner across all population groups, including children. By specialisation, the scope of practice for midwives focuses mainly on child and maternal health. Similarly, other nurses with specialities other than midwifery are usually deployed to units that are relevant to their area of expertise with possible limited

provision of IMCI services. Thus, the acceptability of the IMCI strategy across these groups is likely to differ based on the scope of practice.

IMCI training status "yes" applied to participants who had been trained in IMCI case management, and "no" indicated lack of IMCI training.

Table 3. 1 List of explanatory variables, their measurement scale and values in the analysis

Variable	Measurement scale	Values
Outcome variable		
Acceptability	Categorical (binary)	Yes/No
Indicators of Acceptability		
Affective attitude	Continuous	1 - 5
Self-efficacy	Continuous	1 - 5
Perceived effectiveness	Continuous	1 - 5
Experienced burden	Continuous	1 - 5
Explanatory Variables (Determinants of Acceptability)		
Organisational support score	Continuous	1 - 5
Social relations and support score	Continuous	1 - 5
Health district	Categorical (nominal)	Francistown/Northeast/Tutume/Bobirwa
Location of health facility	Categorical (binary)	Urban/Rural
Type of health facility	Categorical (ordinal)	Health post/Clinic
Age	Continuous	24 – 60 years
Sex	Categorical (binary)	Female/Male
Level of qualification	Categorical (ordinal)	Diploma/Degree
Nursing specialization	Categorical (nominal)	None/Midwifery/Others
Years of experience offering child health services	Continuous	1 – 39 years
IMCI training status	Categorical (binary)	Yes/No

3.9 Statistical analysis

All the data were analysed in STATA 15.0. Data analysis began with survey analysis, using *"svyset"*, taking into consideration the probability of each individual nurse to be selected based on the provided population of nurses offering child health services and the sample size need for the study.

Measuring acceptability of the IMCI strategy

Acceptability was measured using four subscales: a 4-item self-efficacy scale, 10-item experienced burden scale, 18-item perceived effectiveness scale and 13-item affective attitude scale. Negatively worded items in experience burden and perceived effectiveness scale were first recoded to positive. Prior computation of the scores, the scales were assessed for validity and reliability (113,115). The mean of the ratings of all items comprising of each subscale was computed for each participant. Acceptability score was the average sum of the scores obtained from the subscales. Acceptability scores were assessed for normality distribution using graphical and statistical tests (119–122). A histogram and Shapiro Wilk statistical test indicated non-normality distribution; hence, median and interquartile range (IQR) were used to summarise acceptability score (119–122). Spearman correlation analysis was conducted with continuous variables.

The acceptability score was then categorized into a binary outcome. Currently, there is no standardised cut-off point or threshold criterion for acceptability (39). However, this study adopted Barua et al.'s, (66) suggested approach for categorizing non-normality distributed outcome. The 25^{th} percentile was used as a cut-off point (66). Scores above the 25^{th} percentile were considered acceptable. Thus, a binary outcome of "Yes/No" group was generated. "Yes" implied acceptability of the strategy while "no" meant lack of acceptability to a participant. Participant's socio-demographic and organisational variables were summarized using frequencies and percentages for categorical variables, and median and IQR for continuous variables by acceptability category.

Examining the relationship between acceptability of the IMCI strategy and its determinants

Unadjusted and adjusted odds ratios were determined for two models. Model 1, unadjusted odds ratios (UOR) with their 95% confidence interval (95%CI) were obtained by fitting a binomial logistic regression model to estimate the strength of association between acceptability as a binary outcome and each of the eleven explanatory variables in Table 3.1. For Model 2, the adjusted odds ratios (AOR) with their 95% CI were obtained by fitting a binomial logistic regression with all sets of the explanatory variables in the model. All set of the explanatory variables were included in the adjusted model for conceptual reasons. A statistical significance level $p<0.05$ was considered to identify the variables associated with acceptability.

The variables were assessed for multicollinearity. Reasonable collinearity was indicated by Variances Inflation Factor (VIF) less than 10 (123–125). The goodness-of-fit test (e.g., Hosmer–Lemeshow test), model specification test (e.g., linktest) and the receiver-operating characteristic curve (ROC curve) were used to assess for calibration, specification and predictive ability of the fitted model respectively (123,126–128). The Hosmer-Lemeshow goodness-of-fit test compares the predicted values against the actual values of the dependent variable. A p-value greater than 0.05 indicates that the model fitted the data well (127,129). The model achieving area-under the curve (AUC) value of 0.5 indicate lack of ability to discriminate, while 0.5 <AUC< 0.7 has poor to fair discriminatory ability, 0.7 <AUC< 0.8 indicates acceptable discrimination, 0.8 <AUC< 0.9 indicates excellent discrimination, and AUC greater than 0.9 is considered outstanding discrimination (127,129).

3.10 Ethical considerations

The researcher obtained the approval of the study, and ethical clearance from the Health Research Development Committee (HRDC) in Ministry of Health and Wellness of Botswana (see Appendix D). Furthermore, Ethics committees in the respective District Health Management Teams (DHMTs) approved and gave permission for conducting the study in the respective health districts (see Appendix E). Ethical clearance for this study was also obtained from the Medical Human Research Ethics Committee (HREC) of the University of Witwatersrand in Johannesburg, South Africa, with clearance certificate number M190111 (see Appendix F).

Trained research assistants shared the study information sheet with the eligible participants. Highlighted in the information sheet were the details about the study, objectives, and how it was planned to be conducted. Also outlined in the study information sheet was the participant's right to choose to participate or withdraw from the study without fear of prejudice or any kind of punishment at any point during the data collection process. Participants willing to participate in the study were requested to sign an informed consent form (see Appendix G). Signed consent forms and smartphones with REDCap mobile data were kept in a locked cabinet. The data collected was stored in the Wits REDCap database, which is password protected; only the researcher and supervisors have access to the data. Confidentiality was also ensured by not including their names, social security numbers or the name of health facilities participants worked at in the questionnaire, and the research assistants were requested to sign a confidentiality agreement contract (see Appendix H) prior data collection. This was meant to safeguard the information collected from and shared by participants or any information concerning this study.

CHAPTER FOUR: RESULTS

4. Chapter introduction

This chapter presents the findings of the study. The first section presents the descriptive statistics for participants' demographics and work-related variables. Also included in this section is the summary for data missingness. This is followed by summary statistics for the key determinants of acceptability. The third section presents the results for the validity and reliability of the instruments used to measure acceptability and percentage distribution of participants by acceptability category. The last section presents the results obtained by fitting logistic regression to identified determinants of acceptability of the IMCI strategy.

4.1 Sociodemographic characteristics of participants

Data were collected from 238 participants who consented to participate in the study. Findings indicated 17 (7.1%) missing data points for items of the indicators and proposed key determinants of acceptability. Little's MCAR statistical test (114) yielded insignificant results; X^2 (933.63), p value= 0.7601 indicating missingness of data completely at random (MCAR) (114,130,131). Thus, 17 participants with missing data points were excluded from the study, and only 221 were used in subsequent analysis.

Table 4.1 shows the descriptive statistics of the study sample by demographic and work-related variables. A higher percentage of participants was 30 years and below. There were more nurses who were female, IMCI trained and had a diploma nursing qualification, than those without nursing specialization as well as with ten or less number of years' experience.

4.2 Key determinants of acceptability

The organisational support scale, as well as social relations and support scale, were found valid and reliable to measure the respective constructs following adaptation. The Cronbach's alpha coefficients 0.85 and 0.90, while Bartlett's test of sphericity was significant ($p<0.001$) and KMO values were 0.8708 and 0.8604 respectively.

The median score for organisational support was 3.00 (IQR: 2.55, 3.45). From the organisational support scale, 150 (68.9%) participants indicated lack of feedback giving; 115 (52%) indicated the lack of mechanisms in place for recognition of HWs; 149 (67.4%) pointed out the lack of supervisory supports visits; only 67 (30.3%) indicated availability of adequate equipment and supplies to support IMCI implementation; and 92 (41.6%) indicated that most of the HWs in their health facilities were trained on IMCI case management.

Table 4. 1 Descriptive statistics of selected demographic variables for the participants (N= 221)

Demographic variables	Frequency	Percentage (%)
Health districts		
Francistown	109	49.3
North-East	45	20.4
Tutume	42	19.0
Bobirwa	25	11.3
Age groups		
30yrs and below	88	39.8
31 – 40 years	62	28.1
Above 40 years	71	32.1
Sex		
Female	137	62.0
Male	84	38.0
Type of health facility		
Health post	60	27.2
Clinic	161	72.8
Health facility location		
Urban	61	27.6
Rural	160	72.4
Level of qualification		
Diploma	181	81.9
Degree	40	18.1
Nursing specialization		
None	145	65.6
Midwifery	60	27.2
Other	16	7.2
Years of experience		
10 years and below	148	67.0
11 – 20 years	46	20.8
Above 20 years	27	12.2
IMCI training status		
No	79	35.8
Yes	142	64.2

The median score for social relations and support was 3.80 (IQR: 3.20, 4.20). Results showed that 168 (76%) participants could always count on their colleagues when faced with challenges related to use of IMCI guidelines; 154 (69.7%) indicated that they are consistently encouraged by colleagues to use the guidelines; 121 (64.8%) indicated that other colleagues constantly used IMCI guidelines; and 143 (64.7%) indicated that colleagues respect their views related to IMCI implementation.

4.3 Measuring the level of acceptability of the IMCI strategy amongst nurses

Validity and reliability of the scales used to measure the indicators of acceptability

The adapted scales for the indicators of acceptability were valid and reliable; even with adaptation. They measured what they were intended to measure within the four health districts in Botswana. Table 4.2 shows the Cronbach's alpha coefficients of the scales which were greater than 0.70, Bartlett's test of sphericity was significant ($p<0.001$) for all the scales and KMO values were greater than 0.60. The results

also show that the median score for affective attitude was 3.77 (IQR: 3.46, 4.15), for experienced burden was 4.00 (IQR: 3.80, 4.30), for self-efficacy was 4.00 (IQR: 3.75, 4.25) and for perceived effectiveness was 4.00 (IQR: 3.72, 4.38).

Table 4. 2 Reliability and validity test results for the indicators of acceptability

Constructs	No of Items	Cronbach's alpha		Bartlett's Test		KMO
		Item range	overall	X^2	P values	
Affective attitude	13	0.70 – 0.74	0.73	947.23	<0.001	0.6970
Experienced burden	10	0.74 – 0.77	0.78	513.38	<0.001	0.8187
Perceived effectiveness	18	0.92 – 0.93	0.93	2556.65	<0.001	0.9174
Self-efficacy	4	0.76 – 0.81	0.83	337.63	<0.001	0.7797
Acceptability	4	0.71 – 0.84	0.83	375.47	<0.001	0.7222

Note: KMO: Kaiser-Meyer-Olkin; X^2: Chi-square

The distribution of the composite acceptability score derived from the above-mentioned indicators of acceptability is illustrated in Figure 4.1. The Shapiro-Wilk test for normality was significant (p <0.001). The scores were negatively skewed with a median of 3.97 (IQR: 3.75, 4.14), mean and standard deviation of 3.92 ± 0.46, skewness -1.191 and kurtosis 7.617. Spearman's correlations analysis indicated positive correlations between acceptability score and self-efficacy, experienced burden, affective attitude, and perceived effectiveness scores (Table C2, Appendix C).

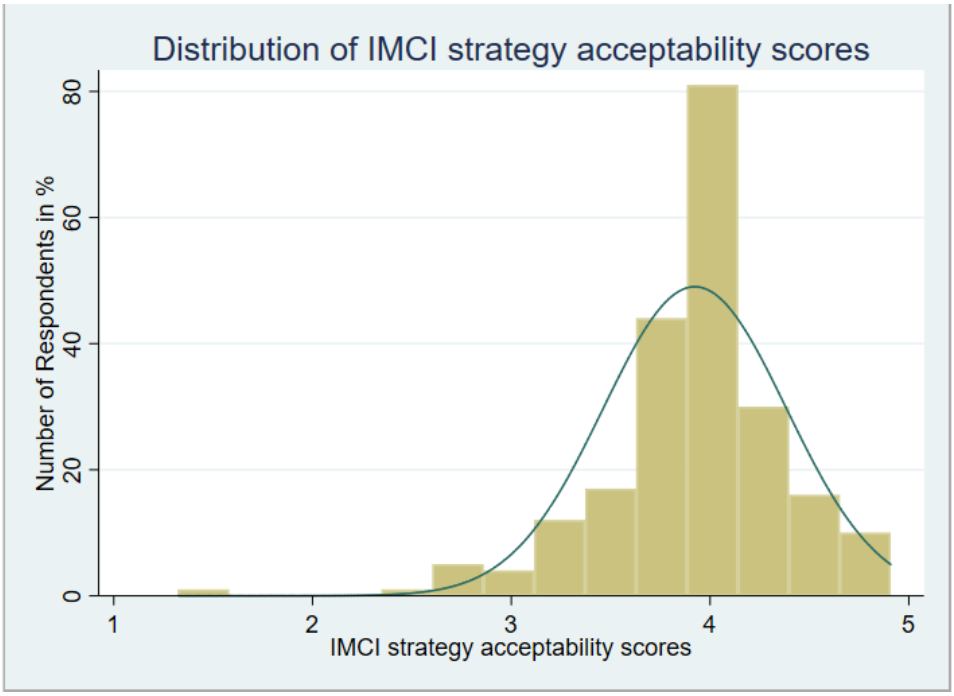


Figure 4. 1 Histogram of distribution of IMCI strategy acceptability scores on a five-point rating scale (1 – 5) among study participant

Level of acceptability of the IMCI strategy

The IMCI strategy was acceptable to 165 (74.7%) of the participants when using the score corresponding to the 25th percentile as a cut-off point for acceptability. Table 4.3 shows that the Francistown district, the clinics, urban-based health facilities, degree qualification holders, IMCI trained nurses, those without nursing specialization, and males had the highest level of acceptability compared to the respective counterparts. The strategy was also acceptable to participants with higher organisational support scores, and social relations and support scores.

Table 4. 3 Descriptive statistics for participants' socio-demographic and organisational variables by acceptability category (N=221)

Socio-demographics	Acceptability	
	No n (%)	Yes n (%)
Health District		
Francistown	25(22.9)	84(77.1)
North-East	12(26.7)	33(73.3)
Tutume	13(30.9)	29(69.1)
Bobirwa	6(24.0)	19(76.0)
Type of Health facility		
Health Post	17(28.3)	43(71.7)
Clinic	39(24.2)	122(75.8)
Location of Health facility		
Urban	8(13.1)	53(86.9)
Rural	48(30.0)	112(70.0)
Median Age in years*	35.5 (29.0, 43.0)	34.0(28.0 - 44.0)
Sex		
Female	38(27.7)	99(72.3)
Male	18(21.4)	66(78.6)
Level of Qualification		
Diploma	47(26.0)	134(74.0)
Degree	9(22.5)	31(77.5)
Nursing specialization		
None	29(20.0)	116(80.0)
Midwifery	20(33.3)	40(66.7)
Other	7(43.8)	9(56.2)
Median Years of Experience*	7.0(5.0, 14.0)	6.0(3.0, 14.0)
IMCI training		
No	21(26.6)	58(73.4)
Yes	35(24.6)	107(75.4)
Key determinants		
Median Organisational support score*	2.5 (1.9, 3.0)	3.2(2.7, 3.5)
Median Social relations and support score*	3.0 (2.5, 3.6)	4.0(3.6, 4.2)

Note: *presented as median and interquartile range (IQR)

4.4 Determinants of IMCI acceptability

Table 4.4 shows the results for both bivariate (unadjusted) and multivariable (adjusted) binomial logistic analysis. The adjusted model indicated good model specification, goodness-of-fit, less collinearity and model accuracy with insignificant linktest (p= 0.426), Hosmer-Lemeshow goodness-of-fit test (p= 0.3344), mean VIF= 1.62 and area under the ROC curve of 0.85 (95% CI 0.78 – 0.91).

Table 4. 4 Unadjusted and adjusted odds ratios for acceptability of the IMCI strategy among HWs (N=221)

Acceptability of the IMCI strategy	N (221)	UOR (95% CI)	P values	AOR (95% CI)	P values
Health District					
Francistown	109	Reference		Reference	
North-East	45	0.82 [0.37 - 1.82]	0.622	0.97 [0.36 - 2.58]	0.951
Tutume	42	0.66 [0.30 - 1.47]	0.310	0.65 [0.20 - 2.12]	0.471
Bobirwa	25	0.94 [0.34 - 2.63]	0.909	2.59 [0.65 - 10.29]	0.175
Type of Health facility					
Health Post	60	Reference		Reference	
Clinic	160	1.24 [0.63 - 2.42]	0.533	1.30 [0.54 - 3.14]	0.552
Location of Health facility					
Urban	61	Reference		Reference	
Rural	160	0.35 [0.15 - 0.81]	0.014**	0.25 [0.08 - 0.80]	0.020**
Age	221	0.99 [0.97 - 1.03]	0.946	0.99 [0.93 - 1.06]	0.822
Sex					
Female	137	Reference		Reference	
Male	84	1.41 [0.74 - 2.69]	0.299	1.34 [0.61 - 2.96]	0.464
Level of Qualification					
Diploma	181	Reference		Reference	
Degree	40	1.21 [0.53 - 2.74]	0.650	1.42 [0.48 - 4.22]	0.527
Nursing specialization					
None	145	Reference		Reference	
Midwifery	60	0.50 [0.25 - 0.99]	0.046**	0.53 [0.17 - 1.68]	0.278
Other	16	0.32 [0.11 - 0.94]	0.039**	0.41 [0.11 - 1.48]	0.173
Years of Experience	221	1.00 [0.97 - 1.03]	0.894	1.06 [0.99 - 1.13]	0.101
IMCI training					
No	79	Reference		Reference	
Yes	142	1.11 [0.59 - 2.09]	0.752	1.60 [0.66 - 3.85]	0.293
Organisational support score	221	4.87 [2.68 - 8.83]	<0.001**	2.89 [1.34 - 6.25]	0.007**
Social relations and support score	221	3.93 [2.37 - 6.52]	<0.001**	3.21 [1.67 - 6.16]	0.001**

Note: CI: Confidence Interval; UOR: Unadjusted odds ratio; AOR: adjusted odds ratio. **Significant at p <0.05.

In the unadjusted model, working in a rural-based health facility; having midwifery; having other nursing specializations; organisational support score; and social relations and support score were significantly associated with acceptability of the implementation of the IMCI strategy in PHC settings. In the adjusted model, the odds of accepting the implementation of the IMCI strategy for nurses working in rural-based health facilities was 75% lower compared to that of nurses in urban-based facilities [adjusted odds ratio (AOR): 0.25 (95% CI:0.08 – 0.80)]. A one-unit increase in the organisational support score increased the odds of accepting the implementation of the IMCI strategy by 189%, [AOR: 2.89 (95% CI:1.34 – 6.25)]. While the odds of accepting the implementation of IMCI strategy in PHC settings increased by 221%, [AOR: 3.21 (95% CI:1.67 – 6.16)] for a one-unit increase in social relations and support score.

CHAPTER FIVE: DISCUSSION

5. Chapter introduction

This chapter discusses the main findings of the study, which were presented in chapter 4. The chapter begins with an overview of the main findings, and this is followed by the discussion of the results as per the objectives of this study. Conclusion and recommendations are made based on the findings of this study. The chapter ends with the strengths and limitations of this study. Given the limited literature on IMCI acceptability, discussion of the findings was aligned with findings on the acceptability of health interventions in general.

5.1 Overview of the main findings

This study evaluated acceptability and determinants of the IMCI strategy among nurses in Botswana, specifically in Tutume, Bobirwa, Francistown, and North-East health districts. The IMCI strategy was acceptable to 74.7% of the study participants. The identified critical determinants of acceptability included the location of health facility, social relations and support, as well as organisational support.

5.2 Measuring acceptability of the IMCI strategy

This study measured acceptability of the IMCI strategy using four constructs adapted from the TFA (39). Despite this, by the time of commencement of the current study, the developers of the TFA had not yet published validated quantitative tools with which to measure the TFA constructs (39). The findings of this study confirm that acceptability is a multi-facet construct that can be evaluated quantitively using well-adapted psychometric tools.

The affective attitude median score obtained in this present study indicated a generally positive attitude towards the IMCI strategy by HWs, similar to other IMCI implementation studies (37,92,93,105,132,133). On the contrary, qualitative studies have shown negative attitudes, where HWs fail to use or follow IMCI guidelines even when at their disposal, others are of the view that it is simple for use for their level of qualification (30,35,93,106,107,133). The discrepancies in these studies could be due to the methods used to assess or measure the construct of attitude and the contextual factors including the varying characteristics of the study populations. The affective attitude score was positively correlated with the acceptability score, indicating that HWs' attitude towards the IMCI strategy can facilitate acceptability of the strategy and is in agreement with other studies (47,133,134). In a study on the management of chronic kidney disease, a significant proportion (above 80%) of HWs believed that incorporation of the chronic kidney registries for management of chronic kidney disease in daily practice benefited the clinic work-flow and influenced practice and hence, the intervention was highly accepted (47).

The high perceived effectiveness score indicated that HWs perceived the IMCI strategy to be effective against childhood illnesses. This result is in agreement with the literature, which indicates that effective implementation of strategies contributes to improved quality of care and child health outcomes, as well as reduced U5MR (29,55,95,98,135). The current study also showed a positive correlation between IMCI effectiveness and acceptability. This is consistent with previous mixed-method studies, where interventions that were perceived to be effective were also found to be highly acceptable to HWs compared to those perceived less or non-beneficial (47,79,83). In addition, it is consistent with the results of a study which showed that rolling out the implementation of the Accelerated Chest pain Risk Evaluation (ACRE) project to other sites, was based partly on the fact that HWs believed it improved the management of cardiac chest pains, and they believed the benefits outweighed the time and efforts needed to adopt the intervention (60). Another supporting evidence of this finding comes from two systematic reviews which indicated that perceived ineffectiveness of health interventions by HWs resulted in low acceptability and use of the intervention (84,101). The authors of both the systematic reviews found that low level of awareness perceived lack of benefit (misconceptions) or lack of confidence in the effectiveness of health intervention therapies related to the management of acute stroke lead to HWs' unwillingness to use or follow the recommended guidelines.

In this study, the median score for self-efficacy was high, indicating that participants had confidence in their abilities to manage sick children as outlined in the IMCI guidelines. This is supported by a study conducted in Ethiopia, where a significant proportion (above 80%) of HWs indicated the ability to manage sick children as per IMCI guidelines (37). However, a recent qualitative study conducted in South Africa reported that HWs were not confident in using the IMCI guidelines to manage childhood illnesses (30). These different findings may be attributed to lack of IMCI training, duration since last training, as well as deployment practices for HWs immediately after training and loss of skill and knowledge over time in the absence of refresher courses (94,97,136). Self-efficacy was also shown to facilitate acceptability in this present study. This finding suggests that HWs who feel confident in their abilities to implement a specific intervention are likely to highly accept that intervention. This has been demonstrated in other studies, where participants with perceived self-efficacy highly accepted the use of chronic kidney registries in management of chronic kidney disease (47) and the use of text messages in an obesity prevention intervention (48).

In this study, it is essential to correctly interpret the scores obtained for the "experienced burden" construct as an indicator for acceptability. Therefore, high scores for "experienced burden" indicated that HWs believed the implementation of the strategy, including the use of IMCI guidelines in daily practice required less effort and time. Contrary to our finding, in several qualitative studies, HWs elaborated the use of IMCI guidelines as a tedious task requiring more consultation time, thus, leading to increased workloads and

long queues (30,31,45,90,107,132). However, in a South African qualitative study, program managers and coordinators were of the view that consultation times become shorter with consistent use of the guidelines and that the perception that their implementation resulted in "more time" was due to inconsistent use of IMCI guidelines by HWs (31). The current study also showed that experienced burden facilitates acceptability. This agrees with the results of a study where HWs, who perceived implementation of the illness management recovery program to be time consuming, also lacked motivation to continue using the program (83). In addition, it is consistent with a study that showed that participants who perceived the IMCI guidelines as easy to follow, also took a shorter time to follow the step by step algorithms and were more likely use the guidelines consistently (34).

In this study, the IMCI strategy was acceptable to 74.7% of the nurses. HWs are more likely to adhere to implementation recommendations and deliver the intervention as intended given that the intervention is acceptable to them (39). Thus, this finding suggests that most HWs offering child health services in these settings are likely to be consistently using and adhering to IMCI guidelines given their level of acceptability. A recent scoping review indicated that there is a dearth of information on how HWs, who are the key actors in IMCI implementation, perceive the IMCI strategy in terms acceptability (137). Therefore, the finding of this present study adds to the existing body of knowledge.

5.3 Determinants of IMCI acceptability

With high acceptability of the strategy, consistent use and adherence to IMCI guidelines amongst HWs is possible given further understanding of factors that influences acceptability. In this study, the identified critical determinants of acceptability of the IMCI strategy were the location of health facility, organisational support, as well as social relations and support.

5.3.1 Location of health facility

In this study, a higher percentage of participants were working in health facilities based in rural areas. This was due to study design, where three of the four districts (Tutume, North-East, and Bobirwa) were rural-based, while Francistown was a mix of urban-rural based facilities. However, urban-based facilities had a higher percentage of its participants accepting the IMCI strategy compared to rural-based health facilities. Furthermore, results indicate that participants working in rural-based health facilities were less likely to accept the strategy compared to those in urban-based facilities. This finding suggests that HWs based in rural areas are likely not to use IMCI guidelines to manage sick children; however, the situational analysis of children and their families in Botswana report indicate that UM5R is high in rural areas, and majority of children U-5 reside in rural areas (138). This implies that a high percentage of children U-5 in rural areas could receive suboptimal quality care compared to children in urban areas. Possible factors contributing to participants based in rural less likely to accept the strategy are currently not known.

However, three systematic reviews on HWs' motivation in developing and poor resource settings, found low levels of motivation among HWs based in rural areas associated with HW related characteristics, organisational, structural factors and societal factors, including working and living conditions, financial and social incentives (139–141). Hence, there is a need to explore other factors that may influence the acceptability of the IMCI strategy amongst rural-based HWs to facilitate effective implementation.

5.3.2 Organisational support

In this present study, results suggest a reasonable but not sufficient organisational support towards IMCI implementation as indicated by a median score corresponding to the midpoint of a five-point scale. Participants in this study indicated a lack of monitoring and feedback giving; lack of supervisory support visits; inadequate equipment and supplies to support IMCI implementation; inadequate IMCI training coverage; and lack of recognition of HWs who consistently use IMCI guidelines to manage sick children. These factors contributed to the average organized support score. The findings here are consistent with previous studies conducted in Botswana and elsewhere where inadequate support for full IMCI implementation by leaders, program managers and coordinators; low IMCI training coverage, inadequate follow up supervisory visits; lack of resources (e.g., equipment and materials for IMCI implementation); lack of monitoring and feedback giving; inadequate IMCI focal persons and coordinators; poor deployment practices for IMCI trained HWs; and lack of recognition were reported (17,30,31,34,35,90,92,104,105).

This present study also showed an association between organisational support as perceived by the participants and the acceptability of the strategy. Participants with higher organisational support scores were more likely to accept the strategy. This finding is in line with other studies where implementation effectiveness occurred with organisational support for HW continual training, engagement in decision making and performance feedback to HWs (15,68,73). A recent systematic review found that education and training of HWs, active and engaged leaders, managers and supervisors, appropriate feedback giving mechanisms and availability of champions advocating for the implementation of health interventions, contributed to effective implementation of health interventions, including acceptability (68). On the other hand, the lack of training and development for the implementation of health intervention amongst HWs were key barriers to successful implementation among some of the studies reviewed (68).

Previous IMCI studies showed that organisational support in the form of adequate support supervision, training of HWs offering child health services, adequate staffing was associated with the extent to which HWs would use IMCI guidelines in daily practice (30,31,37,94,95,97,136). In another setting, incentives in the form of recognition, acknowledgement and appreciation of HWs lead to improved uptake and use of health interventions in daily practice (46).

5.3.3 Social relations and support

The social relations and support median score were high, indicating good relations and great support amongst the HWs in these settings. A significant percentage of the participants indicated that their colleagues were supportive, helpful, respectful, and encouraging towards the implementation of the strategy. Furthermore, participants with high social relations and support scores were more likely to accept the IMCI strategy. This finding is consistent with two systematic reviews which found that sharing of experiences among co-workers, and getting advice from seniors facilitated consistent use and implementation of the guidelines for the management of acute stroke (84,101). The same systematic reviews also found that inadequate peer support and disapproval of the use these guidelines by other co-workers contributed towards lack of enthusiasm and limited use of guidelines for the management of acute stroke in health facilities. The finding of this current study also agrees with a study conducted in Kenya where, positive attitudes and perceptions of HWs regarding the delivery of the isoniazid preventive therapy, positively influenced acceptability by their co-workers (142). On the other hand, negative attitudes and misconceptions from HWs influenced other co-workers negatively, towards the delivery of the intervention (142).

5.3.4 Other findings

In this present study, HW's IMCI training status, level of qualification, years of experience offering child health services, nursing specialization, age, sex, health district and type of health facility were not associated with acceptability of the IMCI strategy.

Contrary to our finding, a study in mental health settings found that HWs' characteristics such as level of qualification, and being earlier in one's career was associated with a positive attitude towards health interventions, a proxy for acceptability (59). Also, previous IMCI implementation studies indicated that HWs of a higher level of care or expertise, and with more experience were reluctant to use of the IMCI guidelines in daily practice compared to lower-level cadres (35,95,103). Conversely, other studies reported consistent use of IMCI guidelines among HWs of higher cadre levels compared to lower cadres (34,36,91,133). Regarding the age of HWs, studies have reported poor IMCI implementation practices among older HWs (3,103). The differences between these findings may be attributed to different organisational setups and social settings, as well as differences in HWs' characteristics (15,69,71,143). In this present study, the reason for lack of association between acceptability and level of qualification could be that the percentage of the nurses prepared at degree level in the study population was relatively small.

5.4 Strengths and limitations of the study

This study is the first to report the level of acceptability of the IMCI strategy and its determinants amongst HWs offering child health services in Botswana. Acceptability was assessed as a multi-construct to provide a holistic view and a broader understanding of the acceptability of the IMCI strategy as defined by Sekhon et al. (39). The tools used to measure indicators and key determinants of acceptability were examined for validity and reliability using exploratory factor analysis to ensure that even with adaptation, they could still measure what they were originally intended for.

However, the study had limitations. First, the study has limitations in its data. The researcher employed a cross-sectional study design, which limited the researcher's ability to establish causal effects. The use of self-reported measures as proxies for acceptability is subject to common method bias, including social desirability. Moreover, three constructs from the TFA (e.g., intervention coherence, opportunity costs and ethicality) and other proposed determinants of implementation effectiveness (e.g., organisational culture and climate) were not applied in this study which might have influenced the outcome and findings otherwise. Thus, future studies may explore the inclusion of these variables in acceptability assessment.

Additionally, converting acceptability score into a binary outcome without standardized cut off-points, or existing threshold criterion for acceptability might have contributed to the loss of some information leading to possible overestimation of the difference in the outcome between two groups (144). Also, bigger sample size is needed in future studies to achieve normal distribution of the score. This study was confined to only four health districts located in the north-eastern region of the country, and thus, the participants in these districts may not be the accurate representation of all the health districts in Botswana. In keeping with this limitation, there is a need for caution in generalizing the findings of the study to other health districts not in the study.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.0 Conclusion

This study is the first to report the level of acceptability of the IMCI strategy among PHC nurses in Botswana. Acceptability of the strategy by HWs was high; however, it could be further improved through organisational support for ongoing IMCI training; availability of resources (e.g., equipment, drugs and supplies); adequate support supervisions; recognition of HWs; consultation; performance feedback; and mechanisms for problem-solving. Also, social relations and support amongst HWs should be encouraged and supported by all leaders across the organisational levels.

7.0 Recommendations

It is recommended that the Ministry of Health and Wellness in collaboration with IMCI program coordinators and DHMTs should invest in strengthening the health systems to facilitate organisational support. This can be achieved through continual training of HWs offering child health services and ensuring that they are deployment to relevant units, adequate staffing with skilled HWs, provision of refresher courses, onsite mentorship and coaching, adequate supportive supervisory visits and availability of equipment and materials for IMCI implementation (17,30,31,91,104). In addition, there is a need for supportive leadership and management that can assist in identification and engagement of implementation champions, local focal persons, and coordinators that would facilitate effective social relations and support amongst HWs.

There is a dearth of information on how the acceptability of the IMCI strategy influences implementation fidelity (adherence) to IMCI guidelines by HWs (137). To bridge this gap, there is a need to further develop knowledge in the acceptability of the IMCI strategy across PHC settings to inform the development of strategies promoting acceptable child health interventions aimed at reducing U5MR. There is also a need to develop a standardised methodology for assessment and reporting of acceptability of the IMCI strategy in PHC settings. Future research should focus on examining the relationship between acceptability and implementation fidelity (adherence) to IMCI guidelines and identifying factors that may hinder or facilitate the two outcomes. Also, there is a need to understand the acceptability of the strategy from other stakeholders' perspectives since successful implementation of the strategy depends on the role of each stakeholder that makes up the IMCI implementation system (i.e., recipients, leaders and managers, program coordinators, health providers). Assessments should focus on anticipated acceptability to identify what could be modified or improved to enhance acceptability as this study focused on experienced or current acceptability. In addition, future studies should explore the development of psychometric tools to measure the constructs of TFA; and the establishment of standardized acceptability threshold.

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APPENDICES

APPENDIX A: Plagiarism declaration form

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

FACULTY OF HEALTH SCIENCES

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I JANE SCOTCH (Student number: 1689419) am a student registered for the degree of MSc Epidemiology -Implementation Science in the academic year 2020.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: jscotch Date: 20/04/2020

APPENDIX B: Questionnaire

SECTION A: Participant's demographic and work-related information

In this section, kindly select the responses applicable to you. Responses will be captured by a research assistant who will be assisting you to complete the survey.

1. Age in years _____
2. Sex 1] Female 2] Male
3. Type of health facility 1] Health Post 2] Clinic
4. Location of health facility 1] Urban 2] Rural
5. What is your highest level of qualification?
   1] Diploma 2] Bachelor's degree 3]Master's degree
6. What is your nursing specialisation?
   1] None 2] Midwifery 3] Family nursing practice 4] Psychiatric/Mental nursing
   5] Community Health Nursing 6] Public health 7] Other
7. How many years of experience do you have offering child health services? _____
8. Have you been trained on IMCI case management? 1] Yes 2] No

SECTION B: DETERMINANTS OF ACCEPTABILITY

ORGANISATIONAL SUPPORT
Using the rating scale provided, please indicate to what extent do you agree with each of the following statements

		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
1. 1 a	Resources needed to promote the implementation of the IMCI strategy are easily availed					
1. 2 b	I can count on support from the management of this health district, when faced with challenges relating to the implementation of the IMCI strategy					
1. 3 c	The management of this health district listens to the views of the health providers offering child health services that are related to the implementation of the IMCI strategy.					
1. 4 d	The management of this health district is helpful with the implementation of the IMCI strategy.					
1. 5 e	Most health providers I have worked with are trained on IMCI case management.					

1.6 f	Nurses are initially oriented on how to use IMCI guidelines before they could make decisions of whether to make it part of their routine practice.	
1.7 g	The health facility receives at least one supervisory visit that include observation of IMCI case management by health provider every six months.	
1.8 h	Health providers are given the necessary assistance to promote the delivery of the IMCI strategy.	
1.9 i	This health facility has enough equipment and supplies to support full implementation of the IMCI strategy.	
1.10 j	In this health district, there are measures in place to recognize health providers that consistently use the IMCI guidelines to manage childhood illnesses.	
1.11 k	Health providers are given feedback on the evaluation of the implementation of the IMCI strategy	

SOCIAL RELATIONS AND SUPPORT

Using the rating scale provided, please indicate to what extent do you agree with each of the following statements

		Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
2.1a	Most of the people that I am close to, encourages me to use the IMCI guidelines when managing childhood illnesses.					
2.2b	Most of my colleagues constantly uses the IMCI guidelines to manage childhood illnesses					
2.3c	My colleagues are always willing to listen to my views related to the implementation of the IMCI strategy.					
2.4d	My colleagues are always helpful when it comes to addressing the issues that affect the implementation of the IMCI strategy					
2.5e	I know I can always count on my colleagues when faced with challenges that are related to the implementation of the IMCI strategy.					

SECTION C: ACCEPTABILITY OF THE IMCI STRATEGY

AFFECTIVE ATTITUDE

Using the rating scale provided, please indicate to what extent do you agree with each of the following statements

		Strongly Disagree (1)	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
3.1a	My clinical experience assists me to manage childhood illnesses better than relying on the IMCI guidelines.					
3.2b	Though the development of the IMCI strategy was informed by researches conducted, it is not clinically useful.					
3.3c	Clinical experience in managing childhood illnesses is more important than following the IMCI guidelines.					

3.4d	It is critical to use the IMCI guidelines to manage childhood illnesses.	
3.5e	If new research-based components are to be incorporated in the existing IMCI guidelines, that will not stop me from using the guidelines consistently.	
3.6f	If I received IMCI case management training, I would adopt the strategy if it is appealing to me.	
3.7g	If I received IMCI case management training, I would adopt the strategy if it "made sense" to me.	
3.8h	If I received IMCI case management training, I would adopt the strategy if it was required by my supervisor.	
3.9i	If I received IMCI case management training, I would adopt the strategy if it was required by my organization.	
3.10j	If I received IMCI case management training, I would adopt the strategy if it was required by my country.	
3.11k	If I received IMCI case management training, I would adopt the strategy if it was being used by my colleagues who are happy with it.	
3.12l	Even If I were to receive enough training to use the IMCI guidelines correctly, I would not adopt the strategy.	
3.13m	My chances of implementing the IMCI strategy that was developed by researchers (not health providers offering child health care services directly to the patients) are very low.	

INTERVENTION EFFECTIVENESS

Using the rating scale provided, please indicate to what extent do you agree with each of the following statements

		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
4.1a	The use of the IMCI strategy when managing childhood illnesses is more effective than the other interventions I have used.					
4.2b	It is more convenient to use the IMCI strategy when managing childhood illnesses than other interventions I have used.					
4.3c	The incorporation of the use of the IMCI guidelines in the daily clinical routine practice fits well with the way I like to work.					
4.4d	The use of the IMCI guidelines is aligned well with my clinical judgement.					
4.5e	The IMCI guidelines are clear and understandable.					
4.6f	The IMCI guidelines are easy to use.					
4.7g	Use of the IMCI guidelines when managing childhood illnesses makes it easier for me to do my job					
4.8h	The use of IMCI strategy produces improvements in my clients that I can actually see.					
4.9i	The application of the IMCI guidelines to manage childhood illnesses have improved the quality of health services I provide to children.					
4.10j	The IMCI strategy can be applied in management of childhood illnesses without disturbing the child's overall therapy.					
4.11k	It is easy to start using IMCI guidelines even without being trained on IMCI case management.					
4.12l	It is easy to tell whether patients are benefitting from the IMCI strategy					

4.13m	The IMCI strategy can always be adapted to fit my treatment setting	
4.14n	The IMCI strategy can always be adapted to meet the needs of my patients.	
4.15o	The knowledge required to learn about the IMCI strategy can be effectively taught.	
4.16p	The skills required to implement the IMCI strategy can be effectively taught.	
4.17q	The IMCI guidelines have assisted health providers to identify HIV infection in children who could have been missed earlier during their first six weeks of life.	
4.18r	The use of the IMCI guidelines have improved the caregiver's knowledge on the care of the sick child at home.	

EXPERIENCED BURDEN

Using the rating scale provided, please indicate to what extent do you agree with each of the following statements

		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
5.1a	My overall work performance is respected by my colleagues.					
5.2b	It is just too much for me to even assess for HIV infection in children below the age of 5 years using the IMCI guidelines.					
5.3c	IMCI guidelines makes it easy for me to manage childhood illnesses at any given time.					
5.4d	Managing childhood illnesses following the IMCI guidelines is just a tiresome process.					
5.5e	My colleagues are willing to listen to the challenges I face when applying the IMCI strategy to manage childhood illnesses.					
5.6f	My interaction with my supervisors is good.					
5.7g	Besides implementation of the IMCI strategy in routine nursing practice, I can actively participate in the other daily activities of the health facility					
5.8h	I can handle constructive feedback.					
5.9i	I can keep personal problems out of my daily work routine					
5.10j	My colleagues' support relieves me.					

SELF-EFFICACY

Using the rating scale provided, please indicate to what extent do you agree with each of the following statements

		Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
6.1a	I can apply the IMCI guidelines with ease when assessing for HIV infection in children below the age of 5 years					
6.2b	I am confident that I can use the IMCI guidelines to manage childhood illnesses even when my colleagues do not.					
6.3c	Even when I have little time to attend to the patient, I can confidently follow the IMCI guidelines.					
6.4c	Even when a caregiver is not motivated about the use of the IMCI guidelines to manage the sick child, I can confidently use it.					

APPENDIX C: Additional figures and tables

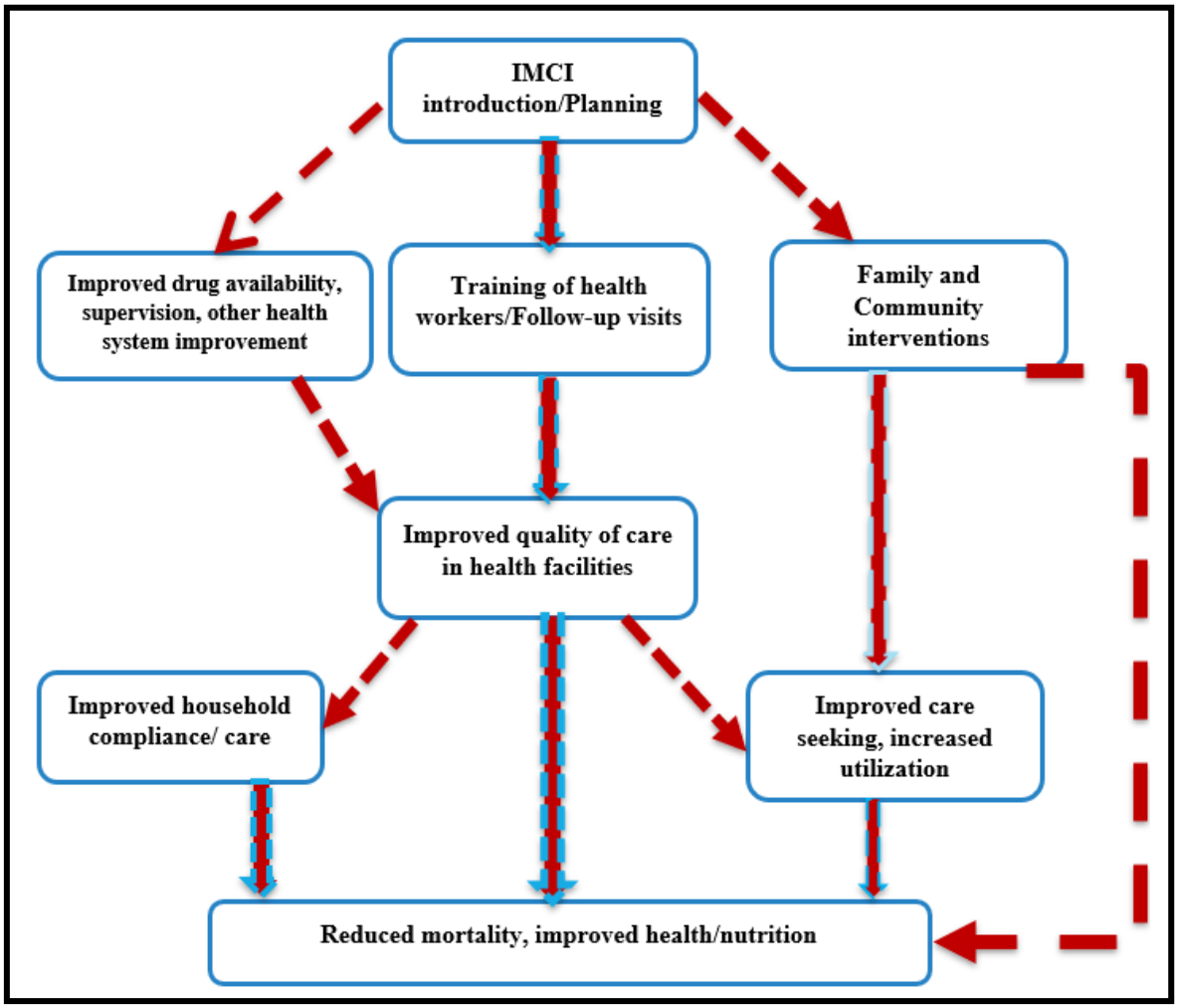


Figure C1: Integrated Management of Childhood Illness (IMCI) impact model developed by Bryce et al, 2004

Table C1: Spearman correlation analysis N= 221)

N = 221	Organisational support	Facilitation strategy*	Social influence	IMCI effectiveness	Self efficacy	Affective attitude	¤Burden	Acceptability
Organisational support	1.0000							
IMCI facilitation strategy	0.5555	1.0000						
	0.0000							
Social influences	0.3992	0.4050	1.0000					
	0.0000	0.0000						
IMCI effectiveness	0.4170	0.3413	0.4398	1.0000				
	0.0000	0.0000	0.0000					
Self-efficacy	0.2710	0.2280	0.3648	0.6176	1.0000			
	0.0000	0.0006	0.0000	0.0000				
Affective attitude	0.2054	0.1027	0.2182	0.4565	0.2012	1.0000		
	0.0021	0.1279	0.0011	0.0000	0.0027			
Experienced burden	0.2828	0.2039	0.3862	0.5585	0.5128	0.3399	1.0000	
	0.0000	0.0023	0.0000	0.0000	0.0000	0.0000		
Acceptability	0.3653	0.2694	0.4397	0.8602	0.7616	0.6212	0.7415	1.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

Note:*IMCI facilitation strategy; ¤:Experienced burden; Spearman correlation coefficient; 0.90 – 1.00 indicating very strong correlation, 0.70 – 0.89 (strong correlation), 0.40 – 0.69 (moderate correlation), 0.10 – 0.39 (weak correlation) and 0.00 – 0.10 (negligible correlation).

Spearman correlation coefficient (rho)
Significance level

APPENDIX D: Ethics approval human research development committee of the Ministry of Health and Wellness of Botswana

PRIVATE BAG 0038
GABORONE
BOTSWANA
REFERENCE:

REPUBLIC OF BOTSWANA
MINISTRY OF HEALTH AND WELLNESS

TEL: (+267) 363 2500
FAX: (+267) 391 0647
TELEGRAMS: RABONGAKA
TELEX: 2818 CARE BD

REFERENCE NO: HPDME 13/18/1 **27th February 2019**

Health Research and Development Division

Notification of IRB Review: **New application**

Jane Scotch
P.O. Box 2395
Francistown

Dear Jane Scotch

Protocol Title: **ACCEPTABILITY AND DETERMINANTS OF INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS STRATEGY AMONG NURSES IN BOTSWANA, 2019**

HRU Approval Date:	27 February 2019
HRU Expiration Date:	26 February 2020
HRU Review Type:	Expedited Review
HRU Review Determination:	Approved
Risk Determination:	Minimal risk

Thank you for submitting new application for the above referenced protocol. The permission is granted to conduct the study.

This permit does not however give you authority to collect data from the selected sites without prior approval from the management. Consent from the identified individuals should be obtained at all times.

The research should be conducted as outlined in the approved proposal. Any changes to the approved proposal must be submitted to the Health Research and Development Division in the Ministry of Health for consideration and approval.

Furthermore, you are requested to submit at least one hardcopy and an electronic copy of the report to the Health Research, Ministry of Health and Wellness within 3 months of completion of the study. Approval is for academic fulfillment only. Copies should also be submitted to all other relevant authorities.

Continuing Review

In order to continue work on this study (including data analysis) beyond the expiry date, submit a Continuing Review Form for Approval at least three (3) months prior to the

protocol's expiration date. The **C**ontinuing Review Form can be obtained from the Health Research Division Office (HRDD), Office No. 7A.7 or Ministry of Health website: www.moh.gov.bw or can be requested via e-mail from Mr. Kgomotso Motlhanka, e-mail address: kgmmotlhanka@gov.bw As a courtesy, the HRDD will send you a reminder email about eight (8) weeks before the lapse date, but failure to receive it does not affect your responsibility to submit a timely **C**ontinuing Report form

Amendments

During the approval period, if you propose any change to the protocol such as its funding source, recruiting materials, or consent documents, you must seek HRDC approval before implementing it. Please summarize the proposed change and the rationale for it in the amendment form available from the Health Research Division Office (HRDD), Office No. 7A 7 or Ministry of Health website: www.moh.gov.bw or can be requested via e- mail from Mr. Kgomotso Motlhanka, e-mail address: kgmotlhanka@gov.bw . In addition submit three copies of an updated version of your original protocol application showing all proposed changes in bold or "track chang**es**".

Reporting

Other events which must be reported promptly in writing to the HRDC include:

- Suspension or termination of the protocol by you or the grantor
- Unexpected problems involving risk to subjects or others
- Adverse events, including unanticipated or anticipated but severe physical harm to subjects.

If you have any questions please do not hesitate to contact Ms Seeletso Mosweunyane at smosweunyane@gov.bw, Tel +267-3632018 and Mr. K. Motlhanka at kgmmotlhanka@gov.bw, Tel +267-3632751. Thank you for your cooperation and your commitment to the protection of human subjects in research.

Yours sincerely

PP K.M

Ms S. Mosweunyane

for /PERMANENT SECRETARY

MINISTRY OF HEALTH
RESEARCH DIVISION
2019 -02- 27
P/BAG 0038
GABORONE
REPUBLIC OF BOTSWANA

APPENDIX E: Permission letters to conduct the study from respective health districts

GREATER FRANCISTOWN DHMT

ALL CORRESPONDENCE TO BE ADDRESSED TO DHMT COORDINATOR

PRIVATE BAG F372
FRANCISTOWN BOTSWANA
TELEPHONE: 2413808
FAX: 2406178

Republic of Botswana

REF: GFDHMT 1/7/25

DATE: 13th March 2019

TO: Jane Scotch
University of Witwatersrand
Johannesburg
School of Public Health

Dear Madam

PERMISSION TO CONDUCT RESEARCH: ACCEPTABILITY AND DETERMINATION OF INTERGRATED MANAGEMENT OF CHILDHOOD ILLNESS STRATEGY AMONG NURSES IN BOTSWANA, 2019

The above captioned matter refers:

Reference is made to your request letter dated 5th February 2019 in which you requested for permission to conduct research in all health facilities under Greater Francistown DHMT.

This letter serves to inform you that your request to conduct research under Greater Francistown DHMT health facilities has been acceded to.

You are therefore advised to contact nurses in charge of the health facilities you will be visiting, they will take all the necessary steps to enable you to conduct the research.

By copy of this letter, nurses in charge of all the clinics are duly informed.

Thank you.

Yours Faithfully

Dr Muchapa Imili
For Greater Francistown DHMT Coordinator

cc: Nurse in charge – All clinics

THE COORDINATOR
GREATER FRANCISTOWN DHMT
★ 1 MAR 2019 ★
RECORDS MANAGEMENT UNIT
P/BAG F372, FRANCISTOWN
TEL: 2413808 FAX: 2406178

2415328

MEMORANDUM

FROM: DHMT-Head
Tutume DHMT
Dr I. Kgetse

TO: Nurse In charge – Clinics and Health Facilities
Tutume DHMT

REF: DHMT/3/43 A I 08 March 2019

RE: ACCEPTABILITY AND DETERMINANTS OF INTERGRATED MANAGEMENT OF CHILDHOOD ILLNESS STRATEGY AMONG NURSES IN BOTSWANA - MS JANE SCOTCH

Please not that the above mentioned officer have been granted permission to do the research in the facilities

Please assist her accordingly.

Thank you.

BOBIRWA DISTRICT HEALTH MANAGEMENT TEAM
Fax : (+267) 2619168
Telephone: (+267) 2619223
Private Bag 007
Bobonong,
Botswana

11 March 2019

Jane Scotch

P.O Box 2395

Francistown

Dear Sir/Madam

PERMIT: ACCEPTABILITY AND DERTERMINANTS OF INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS STRATEGY AMONG NURSES IN BOTSWANA 2019

The above mentioned study has been approved following Bobonong Cluster IRB review. Consent from the identified individuals should be obtained at all times. The anticipated study will be beneficial to Bobirwa District as well as the Botswana health system.

The research should be conducted as outlined in the approved proposal. Any changes to your study require review and approval by IRB before implementation. Upon study completion or if you wish to terminate the study, please notify IRB.

Furthermore, you are requested to submit at least one hardcopy and an electronic copy report to Bobirwa DHMT.

We wish you all the best in your endeavors.

Yours faithfully

Ms Mathame

CHIEF MEDICAL OFFICER
BOBONONG PRIMARY HOSPITAL
2019 -03- 12
REGISTRATION
PRIVATE BAG 007 BOBONONG
TEL: 2619223 FAX: 2619168

APPENDIX F: Ethical clearance certificate Wits Human Research Ethics Committee (HREC)

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Miss Jane Scotch

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M190111

NAME: (Principal Investigator)	Miss Jane Scotch
DEPARTMENT:	School of Public Health Epidemiology and Biostatistics Health districts: Tutume, Francistown, Bobirwa and North-East District
PROJECT TITLE:	Acceptability and determinants of the Integrated Management of Childhood Illness strategy among nurses in Botswana, 2019
DATE CONSIDERED:	25/01/2019
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Ms Ntobizodwa Ndlovu and Dr Ejemai Eboreime
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	12/04/2019

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary on the Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. 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 resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in January and will therefore be due in the month of January each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

jscotch
Principal Investigator Signature

14/04/2019
Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX G: Informed Consent



UNIVERSITY OF WITWATERSRAND

INFORMED CONSENT:

I hereby confirm that I have been informed by the research assistant *(Insert name of research assistant*)……..……......., about the nature, conduct, benefits and risks of this study *(Insert protocol number and title of study below)* : ……

……

1. I have also received, read and understood the above written information (Participant Information Leaflet and Informed Consent) regarding the above-mentioned title of the study.
2. I am aware that the results of the study will be shared with the public. Nonetheless, the information that would have been collected from me will be anonymously processed into a study report.
3. I am aware that I may, at any stage, without prejudice, withdraw my consent and participation in the study.
4. I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

Therefore, I give my consent voluntarily to participate in this research

Participant's Full Names	Signature	Date

(For use by Research Assistant)

I, *(insert name of research assistant in full*) ……....., herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Research Assistant Full names.	**Signature**	**Date**

APPENDIX H: Research Assistant confidentially agreement

I, _____ *(enter full name and surname),* employed as a research assistant on the research project titled "**Acceptability and determinants of the Integrated Management of Childhood Illness strategy among Nurses in Botswana, 2019**" being undertaken by Jane Scotch, a postgraduate student at the University of Witwatersrand, School of Public Health, Johannesburg, South Africa. Therefore, I agree to:

1. Keep all the information shared with me by the participants or data collected for this project confidential, only share it with the Principal investigator of the project
2. Maintain confidentiality all the times as well as an appropriate professional attitude understanding that I have a professional obligation to this project and affiliated stakeholders.
3. Keep the data collected and consent form safe while it is still in my possession as well as returning all necessary research information collected to the Principal investigator upon completion of data collection.

Moreover, I also understand that:

4. Professional misconducts such as professional and ethical breaches such as sharing confidential information, taking pictures of or copying or distributing sensitive material among others are serious offenses that undermine personal and organisational integrity and will not be tolerated.
5. Any of such unprofessional behaviours, or acts or, breaches will be dealt with appropriately.

Therefore, I accept the position of Research Assistant for the **"Acceptability and determinants of the Integrated Management of Childhood Illness strategy among nurses in Botswana, 2019"** project, and will endeavour to fulfil the responsibilities and obligations to the best of my ability.

_____ _____

Research Assistant Signature **Date**

_____ _____

Signature of Principal Investigator **Date**