A SURVEY OF THE EXPERIENCES AND PERCEPTIONS OF MIDWIFERY NURSES ON THE MOMCONNECT PROGRAMME IN BOJANALA, SOUTH AFRICA

by

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SUPERVISOR: Dr H. van der Heever

2017
DECLARATION

I declare that the research dissertation hereby submitted to the University of Sefako Makgatho Health Sciences, for the degree of Master of Public Health, has not previously been submitted by me for a degree at this or any other university; that it is my work in design and in execution, and that all material contained herein has been duly acknowledged.

S.B. Pitse (Ms) 01 September 2017
Initials & Surname (Title) Date
Signature
Student no: 2016 02 539
Abstract

Introduction

MomConnect is a form of mobile health technology which requires healthcare workers to register and confirm the client’s pregnancy on a national database using a cell phone. Pregnant women will then receive pregnancy stage-specific messages, messages about good nutrition, danger signs in pregnancy, HIV and other messages that promote healthy living, as well as messages about the infant post-delivery for a year.

Purpose

The aim of this study was to investigate the experiences and perceptions of midwifery nurses on the MomConnect programme in Bojanala health district, North West Province in South Africa.

Method

A quantitative, cross-sectional survey was done with midwifery nurses offering antenatal care in Rustenburg sub-district primary healthcare facilities, in Bojanala district municipality within the North West Province, South Africa.

A self-designed, standardised questionnaire was used to collect data. Data were summarised using descriptive summary measures expressed as mean, median and range for numerical variables and percentages for categorical variables. Bivariate analysis using the Fisher exact test was also done in order to determine associations between variables.

Results

The majority of the respondents find MomConnect to be an acceptable way to provide continuous care (97%, n=97) and further support its continued use (87%, n=87). Mixed perceptions and experiences were also found. Despite the afore-mentioned positive perceptions and experiences, some respondents viewed MomConnect as extra work (52%, n=52), impossible to integrate into routine care (39%, n=39) and disrupting the workflow at times (44%, n=44).

According to the Pearson test for significance, positive associations were detected between perceived usefulness of MomConnect and its continued use (p=0.008);
perceived usefulness of MomConnect and its acceptability \((p= 0.031)\); MomConnect viewed as extra work and its integration into routine antenatal care \((p= 0.015)\); and MomConnect as disrupting the workflow and its integration into routine antenatal care \((p= 0.000)\).

**Conclusion**

Although midwifery nurses generally view MomConnect as an acceptable and potential way of improving the quality of care, there are mixed and sometimes conflicting perceptions and experiences. Follow-up of new programmes such as MomConnect are essential to obtain feedback from end users, clear any misconceptions, and hence promote implementation.

**Key words:** mobile health (mHealth), MomConnect, Midwifery nurses, maternal and child care, antenatal.
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I would also like to convey my sincere gratitude to my family: my mother Ruth; sister Boitumelo; younger brother Thato; niece Letlotlo, daughter Oabile; son Bokao and spouse Sam, for giving me the necessary time and courage that kept me going strong up to the end.

Above all, to the Almighty God, for showing me His mercies, grace and love that helped me to endure and overcome all obstacles.
# TABLE OF CONTENTS

Declaration ......................................................................................................................... i
Abstract ............................................................................................................................... ii
Acknowledgements ............................................................................................................ iv
List of acronyms and abbreviations .................................................................................... viii
Chapter 1: Introduction and Background ........................................................................... 1
  1.1 Introduction ................................................................................................................. 1
  1.2 Problem statement ..................................................................................................... 2
  1.3 Study aim .................................................................................................................... 3
  1.4 Research questions .................................................................................................... 3
  1.5 Study objectives ........................................................................................................ 3
  1.6 Significance of the study ........................................................................................... 3
  1.7 Layout of the research report .................................................................................... 4
  1.8 Concluding remarks ................................................................................................. 4
Chapter 2: Literature review ............................................................................................... 6
  2.1 Introduction ................................................................................................................. 6
  2.2 Description of the MomConnect programme ............................................................ 7
  2.3 Acceptance and adoption of mHealth by healthcare workers ................................... 10
      2.3.1 Demographic aspects ....................................................................................... 10
      2.3.2 Perceived usefulness and ease of use ............................................................. 11
  2.4 Perceived benefits of mHealth .................................................................................. 11
  2.5 Perceived risks of mHealth ...................................................................................... 11
  2.6 Practical benefits versus barriers of mHealth utilisation ........................................ 12
  2.7 Integration of mHealth programme into routine healthcare services .................... 12
  2.8 Concluding remarks ................................................................................................. 12
Chapter 3: Methodology ..................................................................................................... 14
  3.1 Introduction ................................................................................................................. 14
  3.2 Research design ........................................................................................................ 14
  3.3 Study setting .............................................................................................................. 14
  3.4 Research population ................................................................................................ 15
  3.5 Sample size and sampling ....................................................................................... 15
  3.6 Data collection, data collection tool and procedures ................................................. 16
3.7 Data management and analysis .................................................. 17
3.8 Reliability .............................................................................. 17
3.9 Validity .................................................................................. 18
3.10 Bias ....................................................................................... 18
3.11 Ethical considerations ............................................................ 19
  3.11.1 Permission to conduct the study ...................................... 19
  3.11.2 Informed consent .............................................................. 19
  3.11.3 Respect for persons and their autonomy ......................... 20
  3.11.4 Confidentiality and anonymity ........................................ 20
  3.11.5 Principle of beneficence ................................................... 20
  3.11.6 Principle of justice ........................................................... 21
3.12 Concluding remarks ............................................................... 21

Chapter 4: Data analysis and findings ........................................... 22
  4.1 Introduction ........................................................................... 22
  4.2 Section A: Demographic aspects of the respondents ............ 22
  4.3 Section B: Experiences of respondents on MomConnect utilisation .......... 24
  4.4 Section C: Perceptions of respondents on MomConnect programme .......... 28
  4.5 Relationship between demographics, experiences and perceptions .......... 31
  4.6 Concluding remarks ............................................................. 36

Chapter 5: Discussion of findings, recommendations and conclusions .... 38
  5.1 Introduction ........................................................................... 38
  5.2 Overview of the research ...................................................... 38
  5.3 Discussion of findings ........................................................... 39
  5.4 Limitations of the study ........................................................ 43
  5.5 Conclusions ......................................................................... 43
  5.6 Recommendations for practice and research ......................... 44

List of references ......................................................................... 46

ANNEXURES ............................................................................. 50
  Annexure A: Consent form ......................................................... 50
  Annexure B: Respondent Information sheet ................................ 51
  Annexure C: Questionnaire ....................................................... 52
  Annexure D: Permission-seeking letter to Bojanala health district .......... 54
  Annexure E: Permission-seeking letter to North West Provincial office .......... 55
Annexure F: Permission-seeking letter to Rustenburg health sub-district ............ 56
Annexure G: Approval letter from North West Province .................................. 57
Annexure H: Ethical Clearance ........................................................................ 58
Annexure I: Approval from Rustenburg health Sub-district ............................. 59

TABLE OF FIGURES

Figure 2.1: MomConnect registration summary. ............................................. 9
Figure 2.2: Examples of MomConnect maternal messages ............................ 10
Figure 4.1: Time it takes to register pregnant women on MomConnect (n=100) .... 27

TABLE OF TABLES

Table 4.1: Demographic details of Midwifery nurses at Rustenburg Sub-district (n=100) ........................................................................................................ 24
Table 4.2: Experiences of midwifery nurses at Rustenburg sub-district (n=100) .... 26
Table 4.3: Reasons that make MomConnect registration impossible (n=100) ........ 28
Table 4.4: MomConnect perceptions of midwifery nurses at Rustenburg sub-district (n=100) ........................................................................................................ 30
Table 4.5: Relationship between age and the use of MomConnect at Rustenburg Sub-district (n=100). ........................................................................................................ 31
Table 4.6: Relationship between gender and the use of MomConnect at Rustenburg Sub-district (n=100). .............................................................................................. 32
Table 4.7: Relationship between years of employment and the use of MomConnect at Rustenburg Sub-district (n=100). ........................................................................................................ 33
Table 4.8: Perceived usefulness and the use of MomConnect at Rustenburg Sub-district (n=100). ........................................................................................................ 33
Table 4.9: Perceived usefulness and acceptability of MomConnect at Rustenburg Sub-district (n=100). .............................................................................................. 34
Table 4.10: The relationship between MomConnect being seen as extra work and its integration into routine antenatal care (n=100) ............................................. 35
Table 4.11: The relationship between MomConnect being experienced as disruptive of the workflow and its integration into routine antenatal care (n=100). ............ 35
## List of acronyms and abbreviations

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>CoIA</td>
<td>Commission on Information and Accountability</td>
</tr>
<tr>
<td>HPCSA</td>
<td>Health Professions Council of South Africa</td>
</tr>
<tr>
<td>ID(s)</td>
<td>Identity Document(s)</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Developmental Goals</td>
</tr>
<tr>
<td>mHealth</td>
<td>Mobile Health</td>
</tr>
<tr>
<td>NDoH</td>
<td>National Department of Health</td>
</tr>
<tr>
<td>SA</td>
<td>South Africa</td>
</tr>
<tr>
<td>SDGs</td>
<td>Sustainable Developmental Goals</td>
</tr>
<tr>
<td>SMS</td>
<td>Short Message System</td>
</tr>
<tr>
<td>TAM</td>
<td>Technology Acceptance Model</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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Chapter 1: Introduction and Background

1.1 Introduction

Maternal and child health indicators form part of priority areas for the United Nations (UN), including South Africa, and they formed part of the Millennium Developmental Goals (MDGs), which were targeted by 2015. Goal 4 of the MDGs aimed to reduce child mortality and Goal 5 aimed to improve maternal health and reduce maternal mortality. The MDGs have now been extended to form the seventeen Sustainable Developmental Goals (SDGs), in which Goal 3 aims to promote good health and well-being of all people, with emphasis on women and children, by 2030 (ICSU & ISSC, 2015). The World Health Organisation (WHO) reported that 99% of maternal-related deaths occur in developing countries, which includes South Africa, and that most of these deaths are preventable (Coleman, 2014).

Coleman (2014) further mentions that one of the recommendations resulting from the Commission on Information and Accountability (CoIA) for women’s and children’s health established by the UN in 2011, is integration of information and communication technology in healthcare services. There is a need for multi-communication and capacity building for women and their families in order to promote safer pregnancies, for example increasing awareness by educating clients on danger signs of pregnancy.

In the effort to promote safer pregnancy and possibly reduce maternal and child mortality rates, Peter et al. (2016) observe that a form of mobile health (mHealth) technology which requires healthcare workers to register and confirm the client’s pregnancy on a national database using a cell phone, were initiated by some countries. Through the short message system (sms), the pregnant women will then receive pregnancy stage-specific messages, messages about good nutrition, danger signs in pregnancy, HIV and other messages that promote healthy living as well as messages about the infant post-delivery, for one year. Pregnant women can also use the programme to send compliments, raise complaints or rate the services received at a particular health facility.

In South Africa (SA), this form of mHealth as launched by the National Department of Health (NDoH) in 2014 is known as MomConnect. The Department of Health trained staff members from different health facilities on registering women on MomConnect,
but the district MomConnect reports that were tabled during review meetings highlight that not all pregnant women were registered in 2014/15, with the majority of facilities registering less than 50% of pregnant women who were seen.

Low registration rates cannot mainly be attributed to a lack of cell phone ownership by clients because the majority of people have cell phones nowadays. This was confirmed by Coleman (2014), who found that in a sample of pregnant women living in rural areas of the North West Province, 93% had cell phones, irrespective of their socio-economic status. Peter et al. (2016) also state that 90% of South Africans own a cell phone.

Aranda-Jan et al. (2014) recommends a follow-up of projects or programmes in order to adapt designs in a way that suits the context and therefore increase chances of them being successful. This is the motivation for conducting this study.

1.2 Problem statement

Integration of mHealth programmes in the processes of health facilities is still poorly executed and not much has been written about mHealth projects in most African countries; the success of a programme depends to some extent on healthcare workers’ level of acceptance and motivation (Brinkel et al., 2014).

When the current situation was observed, it was found that some nurses see the registration of mothers on MomConnect as an additional and parallel programme, while other professional nurses leave this responsibility solely to data capturers, clerks or community health workers. Some progress is marked in terms of registering pregnant women on the national database; however, not much has been explored and documented on the acceptance levels, experiences and perceptions of healthcare workers before and throughout the implementation of this programme.

This is a challenge because failure to explore perceptions and experiences of healthcare workers, who are mainly the primary entry points, may impact negatively on the success, sustainability and expansion of the programme, as evidenced by studies conducted on mHealth (Brinkel et al., 2014).

Consequently, the potential of this programme to capacitate women and reduce maternal and child mortality rates will not be realised if frontline healthcare workers do
not implement it. Any health programme will stand a better chance of successful implementation and improvement if the voices of primary implementers such as nurses are heard. MomConnect depends on healthcare workers – even if women can self-register, they still need to go to the health facility for full registration and receipt of a full set of text messages.

This study is therefore necessary as it is concerned with active involvement of healthcare workers, who are vital to the success of the MomConnect programme in delivering health-related messages to the registered pregnant women.

1.3 Study aim

The aim of this study is to investigate the experiences and perceptions of midwifery nurses on the MomConnect programme in Bojanala health district, North West Province in South Africa.

1.4 Research questions

- What are the experiences of midwifery nurses regarding the utilisation of MomConnect?
- What are the perceptions of midwifery nurses regarding the MomConnect programme?

1.5 Study objectives

- To determine the experiences of midwifery nurses regarding the utilisation of MomConnect in Bojanala health district, North West Province in South Africa.
- To determine the perceptions of midwifery nurses regarding the MomConnect programme in Bojanala health district, North West Province in South Africa.

1.6 Significance of the study

Literature revealed that one of the primary drivers of programme success is the involvement of users (Brinkel et al., 2014). On the other hand, mobile programmes continue to be implemented, though on fragmented and small scales, and without seeking any feedback in terms of experiences, practices or perceptions of nurses as being part of primary implementers (Brinkel et al., 2014; Kaphle et al., 2015; Willcox et al., 2015). Determining the experiences of midwifery nurses regarding MomConnect
will lay a foundation for process evaluation, which focuses on implementation and hence strongly affects the programme outcomes and impact (Rychetnik, 2002).

This study will not only apply to Bojanala health district, but will also help the nurses and governments in the Sub-Saharan countries to reflect on the mobile health programmes. The study findings will contribute to future planning and decision-making in terms of the use and integration of mobile health programmes into routine health programmes, or the need for adaptation, scale-up or expansion of mobile health interventions as a way of improving healthcare.

Furthermore, nurses involved in mobile health interventions will also realise the importance of their voices and feedback, and will be motivated to strive for innovations in healthcare and in turn contribute positively to the population’s quality of life. Most importantly, the study will contribute to closing the identified gaps of limited involvement of frontline users of mHealth, such as midwifery nurses, and inadequate reflection on the implementation of the programme.

**1.7 Layout of the research report**

This research report consists of 5 chapters.

- Chapter 1 deals with the introduction and background of the problem.
- Chapter 2 focuses on the reviewed literature.
- Chapter 3 deals with the research methodology used.
- Chapter 4 focuses on data presentation, analysis and findings with the aim of answering the research questions.
- Chapter 5 discusses the conclusions of findings and states the recommendations.

**1.8 Concluding remarks**

This chapter mainly discussed the introduction and background of the problem. MomConnect, a form of mHealth technology that was initiated in SA in 2014, aims to empower pregnant women through educative short message system and potentially improve maternal and child health. The problem, though, is that primary implementers such as midwifery nurses are not adequately involved in terms of giving feedback or suggestions that will inform mHealth innovators of next steps to take. This problem
exists despite several researchers highlighting mHealth as being centred on primary users as well as the essence of involving these users as a way of facilitating programme success.

The study therefore is relevant for mHealth innovators, implementers and government. The next chapter (chapter 2) will further describe this significance through literature reviewed.
Chapter 2: Literature review

2.1 Introduction

Literature review entails searching, consulting and synthesising information from various sources that deal with the study topic. The purpose of reviewing literature is to gather as much knowledge about the topic as possible and to further establish the basis and significance of the study (Brink, 2010; O’Leary, 2014).

In ancient times, nursing care was known to be a mainly expressive and face-to-face interaction with clients. Little did nurses, other health workers, communities and governments know that the 20th century would be an information-age era, characterised by a technology explosion and a quest for information throughout all industries, including health. The visible increasing demands in healthcare, resulting possibly from the growing population, burden of diseases, etc., require other innovative ways of delivering healthcare. How do nurses then shift from only face-to-face interactions with clients, to incorporating complementary remote services through cell phones?

Some studies done in South Africa, other Sub-Saharan African countries (Botswana, Kenya, Madagascar, Malawi, Rwanda, Tanzania, Uganda, Ghana and Zambia), India and Australia, as well as global articles on mHealth point out that government and implementers are willing to implement mHealth. Several mobile health pilot projects also showed that mHealth has the potential to improve coverage of health interventions. However, developing countries are struggling to adopt, integrate and scale up these mHealth innovations and there is no adequate evidence that shows a positive impact on health outcomes (Leon et al., 2012; Labrique et al., 2013).

Furthermore, Brinkel et al. (2014); Kaphle et al. (2015) and Willcox et al. (2015) emphasise that mobile-based projects are fragmented, done on a small scale and not well documented in developing countries. On the other hand, Coleman (2014) found that the pregnancy short message system (sms) is necessary to provide continuous information remotely and to improve the quality of primary healthcare services.
mHealth is user-centred and user-driven, therefore efforts to evaluate the effectiveness of mHealth interventions should involve end-users, e.g. nurses, who will be able to identify constraints or gaps and assist innovators to come up with relevant mHealth strategies (Leon et al., 2012; Labrique et al., 2013; Vélez et al., 2014; Gagnon et al., 2016). Additionally, low end-user acceptance levels and a weak functioning primary healthcare system could negatively impact on implementation and expansion of mHealth innovations (Leon et al., 2012; Labrique et al., 2013; Vélez et al., 2014).

Some factors that may affect acceptance, adoption and utilisation of a mobile health programme include familiarity, accessibility, usefulness and easy to use technology, which will influence implementation success and hence positive perceptions of healthcare workers such as nurses (Aranda-Jan et al., 2014; Gagnon et al., 2016). Individual factors such as age also affect the adoption of technology (Brinkel et al., 2014; Kaphle et al., 2015; Willcox et al., 2015).

Different forms of mHealth have been implemented or tried by health departments, such as capturing clients’ information on smart phones, and using remote monitoring equipment, cell phones, etc. This study focuses specifically on the MomConnect programme that delivers health information to pregnant women through cell phones, by means of sms.

2.2 Description of the MomConnect programme

MomConnect is a form of mHealth in which:

a) A cell phone is used to register pregnant women on a national database.

b) Pregnant women receive pregnancy stage-specific messages, information on proper hygiene, nutrition, danger signs, child birth, child care information after the baby is born, etc. These messages will be received from the time the woman registers on a national database up until 1 year after delivery of the baby.

c) These women can send feedback, compliments or complaints about the service received (Peter et al., 2016).

Coleman (2014) mentions that the Commission on Information and Accountability for women’s and children’s health identified the need to use information and
communication technology in health. Multi-communication and capacity building for women and their families promote safer pregnancies through increasing awareness. Furthermore, cell phone ownership was found to be around 90% in South Africa (Coleman, 2014; Peter et al., 2016). Maternal, infant and child health are a priority and the mortality rates need to be reduced to acceptable rates. South Africa therefore was responsive to the Commission on Information and Accountability for women’s and children’s health recommendations and in its effort to reduce maternal and child mortality rates, MomConnect was launched in 2014.

Several studies documented that mHealth programmes have been implemented on a fragmented and small scale (Brinkel et al., 2014; Kaphle et al., 2015; Willcox et al., 2015). This is in contrast to the situation in South Africa, where MomConnect was implemented nationally and hence on a large scale. This study will contribute to providing information in terms of integration of MomConnect into routine antenatal care.

mHealth has not shown a positive impact on health outcomes (Leon et al., 2012; Labrique et al., 2013). However, the main interest seems to be on outcomes and less on the implementation processes, as not much has been documented on end users’ feedback. The implementation process is equally important because it forms the milestones of the realisation of the outcome, and therefore directly impacts on the outcome. Aranda-Jan et al. (2014) recommended follow-up of projects or programmes in order to adapt designs in a way that suits the context and therefore increase chances of them being successful.

MomConnect is also user-centred (Leon et al., 2012; Labrique et al., 2013; Vélez et al., 2014; Gagnon et al., 2016) and therefore efforts should be directed at involving users such as midwifery nurses. Although women can self-register at home and receive a limited set of messages, they still need to go to the health facility in order to receive a full set of messages. The involvement of users is also in line with the follow-up of programmes recommended by Aranda-Jan et al. (2014), and further supports the need for this study which focuses on the perceptions and experiences of midwifery nurses on MomConnect.
MomConnect registration summary is shown in figure 2.1 below.

Figure 2.1: MomConnect registration summary. (Source: http://www.kznhealth.gov.za/Momconnect/Lines.pdf).
Examples of MomConnect maternal messages sent to pregnant women are shown in figure 2.2 below.

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANC and accessing care in labour</td>
<td>Your clinic visits may take all day. You can get a letter from the clinic for your work (It doesn’t have to say that you are pregnant)</td>
</tr>
<tr>
<td></td>
<td>Ask at the clinic where you need to go for the birth. You need to know in advance so you don’t go to the wrong place in an emergency</td>
</tr>
<tr>
<td></td>
<td>Plan ahead to make sure you can get help. Make sure you have airtime, write down the ambulance number or arrange with someone to transport you</td>
</tr>
<tr>
<td>Diet and Nutrition</td>
<td>Healthy diet is important for you and baby. Try to eat beans, dark green leafy veg or red meat every day. Take the iron tablets from the clinic!</td>
</tr>
</tbody>
</table>

*Figure 2.2: Examples of MomConnect maternal messages*  

2.3 Acceptance and adoption of mHealth by healthcare workers

Adoption levels of mHealth by healthcare workers vary from no adoption to adoption of certain aspects and full adoption. Several aspects affect the adoption and acceptance of mHealth programmes:

2.3.1 Demographic aspects

Age, education, gender and years of work experience can influence the adoption of mHealth programmes, although some studies found that these aspects have less significance on some of the programmes. Young people, men and people with more years of education were found to be quick to adopt mHealth technologies in studies done in Asian countries (Bangladesh, Pakistan, India, Sri Lanka, the Philippines and
Thailand) (De Silva et al., 2009). However, in another study done in India, Kaphle et al. (2015) found that although age and literacy could influence the adoption and use of mHealth, only age was significant. Putzer and Park (2010) found in a study in the United States of America that demographic aspects were less significant in the adoption of mHealth, but identified a low adoption rate of mHealth technology by nurses with more years of work experience.

2.3.2 Perceived usefulness and ease of use

mHealth programmes that are perceived to be useful and easy to use were found to be more easily accepted and adopted by users (Davis, 1989; Park & Chen, 2007; Kaphle et al., 2015; Willcox et al., 2015; Gagnon et al., 2016). Some midwives found mHealth programme to be a valuable supplement to information provided during face-to-face maternal care since at times not all the information is communicated (Van Zutphen et al., 2009; Willcox et al., 2015). However, some midwives also viewed the information provided through mHealth as too simple, unsuitable for their clients and adding little value to the already existing information (Van Zutphen et al., 2009).

Furthermore, Chaiyachati (2013) and Willcox et al. (2015) argue that healthcare workers found information transmitted through mHealth technology more acceptable than that on paper because it reduces the use of paper documents that are sometimes not even read or that are lost.

2.4 Perceived benefits of mHealth

Healthcare workers agree that mHealth text messages have the potential to improve the quality of healthcare through providing women with support, motivation, information and guidance on healthy lifestyles (Soltani et al., 2012). These messages may also prevent women from obtaining information from non-credible sources (Willcox et al., 2015).

2.5 Perceived risks of mHealth

Some healthcare workers are concerned about the security, control and confidentiality of data contained in and transferred through mHealth. Healthcare workers used to be
in control of the information given to clients, but with mHealth, it is not possible for
them to maintain this control. As a result, some healthcare workers felt that their
professional integrity, as well as accountability relating to the safeguarding of clients,
are somehow minimised. Furthermore, there is a chance that women may misinterpret
messages sent to them (Soltani et al., 2012; Brinkel et al., 2014; Kaphle et al., 2015;
Willcox et al., 2015; Gagnon et al., 2016).

2.6 Practical benefits versus barriers of mHealth utilisation

Healthcare workers agree that mHealth can improve healthcare, but some reported
that it increases the workload, is time-consuming and sometimes disrupts the flow of
work (Gagnon et al., 2016). In contrast, others mention that mHealth provides faster
contact, active engagement and communication with clients (Soltani, 2012;
Chaiyachati, 2013; Gagnon et al., 2016). Other concerns included clients not having
cell phones and therefore not being able to be registered to receive mHealth
messages (Willcox et al., 2015).

2.7 Integration of mHealth programme into routine healthcare services

Some studies in South Africa and Australia identified a struggle to integrate mHealth
into routine healthcare, with health workers being more likely to see mHealth as
running parallel to other services (Leon et al., 2012; Labrique et al., 2013; Willcox et
al., 2015). In contrast, Van Zutphen et al. (2009) found that midwives in Netherlands
could integrate mHealth into their routine services.

2.8 Concluding remarks

Most of the articles reviewed view frontline users such as nurses, as part of the driving
forces for the success of mobile health programmes. The gap that was identified while
reviewing these articles is that frontline mHealth users like nurses have not been
adequately involved and not much has been studied and documented on their
experiences, perceptions or views.

Perceptions have the potential to influence utilisation of mHealth programmes. This
study is therefore relevant and important because it involves midwifery nurses, who
are the frontline users of the Mom-connect programme when providing antenatal care. The next chapter (chapter 3), will discuss the methodology used in conducting the study.
Chapter 3: Methodology

3.1 Introduction

The methodology explains how the study was carried out in order to answer the research questions. It includes information on the study design, study setting, population, sampling and data collection method, processing and analysis (Brink, 2010; O'Leary, 2014). Other considerations concern how reliability, validity, bias and ethical aspects were addressed.

3.2 Research design

The research design is the cornerstone of the study as it determines the methodology used to achieve the study purpose and answer the study questions (Sarantakos, 2012; O'Leary, 2014). A quantitative, cross-sectional survey was done. This type of design is descriptive and non-experimental in nature. It is used when there is a variable of interest in the study population and there is not much information documented. It is therefore carried out in a natural setting through observation only, with no intervention or manipulation of the variables. Data are collected from different study population respondents at a single point in time (Brink, 2010).

The objectives of this study were to merely determine the experiences and perceptions of midwifery nurses on the MomConnect programme, as they occur. There was no intention to establish any causal relationships or manipulate any variables. The literature review also confirms that there is not much information documented on the experiences and perceptions of midwifery nurses on mHealth programmes. Data were collected once from midwifery nurses over a period of two weeks.

3.3 Study setting

The study setting refers to the environment in which the study is conducted. This setting is important because it helps to determine the feasibility of the study as well as the applicability or generalisability of the findings. In a controlled setting, the environment is manipulated; whereas in an uncontrolled setting, the environment is natural (Avan & White, 2001).

The study was conducted in a natural setting, at primary healthcare facilities of the Rustenburg health sub-district, which fall under the Rustenburg local municipality in
Bojanala Platinum District Municipality in the North West Province, South Africa. There were twenty primary healthcare facilities in Rustenburg sub-district during the time of this study, all offering antenatal care. The selection of the study setting was guided by the study objectives. MomConnect is mainly used during basic antenatal care, which is the core function of primary healthcare facilities.

3.4 Research population

The research population refers to all members of a particular group of people or objects from whom the sample will be selected, and for whom the research findings are intended to be generalised (O’Leary, 2014). The population in the current study is all midwifery nurses working in Rustenburg sub-district primary healthcare facilities and who have provided antenatal care after the launch of the MomConnect programme in 2014.

The selection of the target population was also based on the study objectives. The study did not only seek information on perceptions of the MomConnect programme, but also the experiences regarding utilisation of this programme. Midwifery nurses offering antenatal care at primary healthcare facilities and using or having used MomConnect are the relevant population to provide both perceptions and experiences regarding the MomConnect programme.

3.5 Sample size and sampling

A sample is a subset of the population of interest that is selected by the researcher to participate in the study because the entire population is too large to be studied (Brink, 2010; O’Leary, 2014). The sample size therefore refers to how large or small the sample is in order to be regarded as representative of the population (Sarantakos, 2012). The process of selecting a sample is known as sampling. Sampling can be random, allowing everyone in the population a chance to be selected and thus promoting representativeness, or can be non-random (Brink, 2010, Sarantakos, 2012; O’Leary, 2014).

The number of midwifery nurses in the twenty clinics was found to be 144, but only 100 midwifery nurses had offered antenatal care and used MomConnect. Using 100 midwifery nurses as the study population, a 95% confidence interval and a 5% margin of error, the sample size would be 80 (Raosoft Inc. 2004). Therefore, due to the
scarcity and hence the small size of the study population, all 100 nurses were included in the study to ensure that study objectives would be met as well as to minimise sampling error.

The inclusion criteria was all midwifery nurses working in primary healthcare facilities who have been providing antenatal care and using MomConnect, who were willing to participate and who gave informed consent. The exclusion criteria was professional nurses and any other staff members who worked in these primary healthcare facilities but who were not providing antenatal care, as well as midwifery nurses who have never used MomConnect.

3.6 Data collection, data collection tool and procedures

Data collection is the process of collecting data from the respondents, e.g. through surveys. A data collection tool is an instrument that is used to collect and measure data, e.g. a questionnaire. The data collection procedure covers the steps that were taken to collect data from the respondents (Punch, 2005; O'Leary, 2014).

The purpose of the study was explained to the respondents, a respondent information leaflet was given to them and consent forms were signed. A structured, self-administered questionnaire was used to collect data relevant to the study’s objectives from the midwifery nurses working in the twenty primary healthcare facilities in Rustenburg health sub-district, who were all included in the study.

The questionnaire, designed in English (see annexure C), captured the midwifery nurses’ experiences and perceptions of MomConnect and comprised the following sections: Section 1 – demographic aspects of participants, which help to contextualise the study findings; Section 2 – experiences on utilisation of MomConnect; and Section 3 – perceptions of the MomConnect programme. The questionnaires were given to all midwifery nurses working in the twenty facilities and meeting the inclusion criteria, and they had the option to complete them immediately or during their own time.

The researcher collected the questionnaires on the same day from respondents who were able to complete them immediately and set up drop-in box in facilities for respondents who opted to complete it at a later stage. Two facilities were visited every day for two weeks during November and December 2016, one in the morning and one
in the afternoon, making time in-between to return to clinics where respondents opted to complete the questionnaires at a later stage. Time was also made to return to facilities to cover other respondents who were working shifts.

Prior to the study, 15 midwifery nurses from Swartruggens community health centre and Reagile clinic in Kgetleng health sub-district in Bojanala (who were not part of the main study) participated in pre-testing the questionnaires during November 2016, over a period of 3 days. Respondents found the questionnaire to be understandable and easy to complete. Therefore, no adjustments were made to the questionnaire.

3.7 Data management and analysis

The raw data were captured, cleaned and coded in Microsoft Excel (Microsoft Office 2013) and also verified for correctness. After capturing raw data into Microsoft Excel spreadsheet, STATA 13 (Small Stata 13.0) software was used to import and analyse data. The results were described in frequency distribution for demographics and summarised by means of descriptive summary measures expressed as mean, median and range for numerical or continuous variables and percentages for categorical variables.

The Fisher exact test was carried out to determine whether perceptions, experiences and socio-demographic aspects (e.g. age, gender) indicate a relationship with the use of the MomConnect programme. Fisher exact is one of the statistical tests that determine the relationship between variables and is the most accurate when the expected cell frequencies are less than 5 (Freeman & Julious, 2007). The results were measured at a 95% confidence interval, with a p-value less than or equal to 0.05 considered statistically significant.

3.8 Reliability

The reliability of an instrument deals with its ability to produce the same results over a period of time when used with the same respondents (Punch, 2005; Brink, 2010; O'Leary, 2014). A standardised data extraction tool was used to ensure consistency of the data to be collected. Only data which were in line with the set objectives were collected. A pre-test was carried out on 15 midwifery nurses who share the same
characteristics as the study respondents but who did not form part of the study, in order to assess the clarity of the items.

Close-ended questions in simple English language were asked in order to promote consistency. The researcher assessed for any unclear or ambiguous items in the questionnaire during the pre-test, to ensure that the study objectives were truly met by the tool. The researcher checked and ensured that data were collected and captured correctly through comparing 10% of the completed data extraction tools with their corresponding source files and computer database.

3.9 Validity

Validity deals with the extent to which the instrument measures that which it is intended to measure (Punch, 2005; Brink, 2010; O’Leary, 2014). Validity was ensured by using the same questionnaire that was standardised prior to data collection. Content validity refers to the degree to which an instrument has an adequate sample of items of the construct being measured (Brink, 2010).

To ensure content validity, a thorough study of relevant literature was done before constructing the questionnaire, and thereafter the questionnaire was discussed with the supervisor. Validity was further strengthened through the review of the proposal, and the study was representative of the target population because all midwifery nurses who provided antenatal care and use the MomConnect programme were included in the study.

3.10 Bias

Bias refers to any aspect that may influence the study outcomes in a way that they become falsified (Brink, 2010). To minimise bias, the researcher ensured that the questions were clear and followed in a logical manner. To avoid issues of language bias, the questionnaire was constructed in English because all participants had tertiary qualifications. Vaguely phrased questions were avoided.

Bias was further minimised by encouraging participants to provide honest answers to the questions and by explaining to them that their names would be withheld during the publication of findings. Selection bias or sampling error was minimised because all
midwifery nurses providing antenatal care and using MomConnect were included in the study, provided they consented to participation.

3.11 Ethical considerations

All studies involving human beings need to be carried out in a morally justifiable manner that protects their rights. Safety of respondents and prevention of human rights violation must be ensured through observing ethical guidelines and principles. Ethical considerations are therefore activities or issues that need to be addressed in order for the study to be morally acceptable (Punch, 2005; Brink, 2010; HPCSA, 2008).

3.11.1 Permission to conduct the study

According to the ethical guidelines for research, ethics committees need to approve the study before it can be conducted. Further permission is then obtained from the relevant authorities governing the area to be studied (HPCSA, 2008).

The research proposal was reviewed by Sefako Makgatho Health Sciences University School Research Ethics Committee, which provided recommendations. Further review of the proposal was done by Sefako Makgatho Health Sciences University Research Ethics Committee, which provided recommendations and then the ethical clearance certificate, with reference number SMUREC/H/215/2016: PG (see annexure H).

Permission was requested from and granted by the North West Province Health Policy, Planning and Research Department; Bojanala health district; Kgetleng health sub-district (for pre-testing the questionnaire) and Rustenburg health sub-district, where the study was conducted (see annexures E, G, D, F and I respectively).

3.11.2 Informed consent

The obtaining of informed consent is an ethical process of providing full information regarding the study, e.g. objectives, consequences, participants’ rights, etc. so that the potential respondent can decide whether to participate in the study or not (Punch, 2005; Nijhawan et al., 2013). The study objectives were explained to the operational managers of the facilities that participated in the study, and they granted access to the facilities. They also provided information on which midwifery nurses had been providing antenatal care and using MomConnect.
Respondents were fully informed of the aims and objectives of the study, given an information leaflet (see annexure B), and those willing to participate in the study signed the consent form (see annexure A).

3.11.3 Respect for persons and their autonomy

Respect is one of the core ethical values and uplifts the individual’s value, dignity, freedom, rights and opinions (HPCSA, 2008; Brink, 2010). The respondents were informed that participation was voluntary, and that they could withdraw at any time during the process if they felt uncomfortable, without supplying any reasons. The respondents were allowed to complete the questionnaires in their consulting rooms, staff rooms or any convenient place at times that suited them.

3.11.4 Confidentiality and anonymity

Confidentiality means that the researcher must not disclose respondent’s information to other people or allow unauthorised people to gain access to the information. Anonymity means that the respondent’s identity will not be revealed when publishing findings, and even the researcher must not be able to link information to a particular respondent (HPCSA, 2008; Brink, 2010).

Anonymity and confidentiality were ensured by not putting respondents’ names on the questionnaires, and not sharing information with people known to respondents. They were also requested to be as truthful and objective as possible in their responses since they were reassured of anonymity. Consent forms were also separated from questionnaires to make sure that the respondents’ names could not be traced back to the responses in the questionnaires.

Furthermore, the research report would only portray figures, statistics and discussions without giving any names. The district, sub-districts, facility managers as well as respondents were provided with the explanations.

3.11.5 Principle of beneficence

It is important to ensure the well-being of respondents through weighing the risk-benefit ratio and ensuring that respondents are free from harm and exploitation (HPCSA, 2008; Brink, 2010). This study did not put respondents at any risk or harm. Although respondents were not benefiting directly from the study, the study has the
potential to contribute to improving maternal healthcare, which is what the health department and respondents strive to achieve.

3.11.6 Principle of justice

The principle of justice refers to fair selection of study respondents and their treatment throughout the study (Brink, 2010). All midwifery nurses who were using MomConnect or who have used it before were recruited and offered a chance to participate. They were treated fairly and equally through providing information and allowing them freedom to complete the questionnaire at their own time and space. Privacy was also not invaded in any way.

3.12 Concluding remarks

This chapter dealt with the methodology used in conducting the study. The aspects addressed include the study design, setting and population, sampling, data collection tools and procedures, study variables and data analysis. Measures were also taken to address reliability, validity and bias, as well as ethical considerations that ensure safety and protection of human rights.

The next chapter, chapter 4, will deal with analysis and discussion of data obtained from structured questionnaires completed by midwifery nurses offering antenatal care in the twenty primary healthcare facilities of the Rustenburg health sub-district. Data on the experiences and perceptions of midwifery nurses regarding the MomConnect programme were collected.
Chapter 4: Data analysis and findings

4.1 Introduction

This chapter deals with data analysis and findings from 100 questionnaires completed by midwifery nurses who offer antenatal care and have used the MomConnect programme. The questionnaire had three sections:

Section A: Demographic aspects, which collected data on age in years, gender, highest qualification, type of employment and years of employment in the primary healthcare setting.

Section B: Experiences concerning MomConnect utilisation were assessed out of 9 questions, which were in a form of statements and had 3-level responses, that is, ‘agree or yes’, ‘not sure’ and ‘disagree or no’.

Section C: Perceptions concerning MomConnect were assessed out of 8 questions, with 3-level responses, that is, ‘agree or yes’, ‘not sure’ and ‘disagree or no’.

The aim of this study was to determine the experiences and perceptions of midwifery nurses on the MomConnect programme in Bojanala health district, North West Province in South Africa. The study objectives were:

1) To determine the experiences of midwifery nurses on the utilisation of MomConnect in Bojanala health district, North West Province in South Africa.
2) To determine the perceptions of midwifery nurses on the MomConnect programme in Bojanala health district, North West Province in South Africa.

The study was initiated in an attempt to address the problem of limited involvement of frontline health workers such as midwifery nurses in programmes that affect them. Literature has shown that involving health workers, for example by obtaining their experiences and perceptions, may lead to successful implementation and sustainability of programmes.

4.2 Section A: Demographic aspects of the respondents

4.2.1 Age in years

The mean age of the respondents was 44 years and the age range was 23-64 years. The standard deviation was 10 years, which suggested that more responses were
between 34 and 54 years. The age differences were further classified into 4 categories: below 36 years; 36-45 years; 46-55 years and 56 years and above. Out of 100 midwifery nurses, 23% (n=23) were in the category aged below 36 years; 28% (n=28) were in the category aged 36-45 years; the majority of midwifery nurses, 38% (n=38), were in the category 46-55 years; and 11% (n=11) were in the category aged 56 years and above (see table 4.1 below).

4.2.2 Gender

Out of 100 respondents, 8% (n= 8) were males and 92% (n= 92) were females (see table 4.1 below).

4.2.3 Highest health qualification

The majority of respondents, 85% (n= 85), had a diploma in nursing, while 15% (n=15) had a degree in nursing (see table 4.1 below).

4.2.4 Type of employment

Of the 100 employed respondents, 90% (n=90) were permanently employed, 8% (n=8) were community service nurses and 2% (n=2) were on contract or temporary employment (see table 4.1 below).

4.2.5 Years of employment in the primary healthcare setting

The mean years of employment among the midwifery nurses were 13.83, and the range was between 0-33 years. The standard deviation was 9.29, which suggested that the years of employment for most respondents were between 4.5 and 23 years.

The duration of more than 10 years of employment in the primary healthcare setting was regarded as extensive primary healthcare experience and will be used to determine possible links with the use of MomConnect. More respondents, 62% (n=62), had more than 10 years of primary healthcare work experience (see table 4.1 below).
Table 4.1: Demographic details of Midwifery nurses at Rustenburg Sub-district (n=100).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n=100)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;36 years</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>36-45 years</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>46-55 years</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>56 years and above</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Females</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Highest health qualification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma in nursing</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Degree in nursing</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Type of employment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Permanent</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Community service</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Contract</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Years of employment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 10 years</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td>62</td>
<td>62</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

4.3 Section B: Experiences of respondents regarding MomConnect utilisation

The respondents were measured in terms of how they experienced the MomConnect programme. This includes MomConnect registration practices and time dimensions, interaction with pregnant women and overall impressions with the programme.

Of the 100 responses, the majority of midwifery nurses, 88% (n=88), agreed that it is easy to register pregnant women on MomConnect. However, 11% (n=11) and 1% (n=1) respectively were not sure and disagreed with the statement that MomConnect registration is easy (see table 4.2 below). In terms of MomConnect registrations, 16% (n=16) of midwifery nurses have registered all pregnant women on MomConnect,
while 12% (n=12) were not sure and 72% (n=72) disagreed about registering all women (see table 4.2 below).

During registrations of pregnant women on MomConnect, 43% (n=43) of midwifery nurses agreed that integration is possible. However, 18% (n=18) were not sure about possible integration and 39% (n=39) responded that integration was not possible (see table 4.2). 44% (n=44) of midwifery nurses agreed that MomConnect registrations could disrupt the workflow, while 10% (n=10) were not sure and 46% (n=46) disagreed with this statement (see table 4.2 below).

In terms of interaction, the majority of midwifery nurses, 89% (n=89), agreed that MomConnect facilitates communication between them and pregnant women; while 8% (n=8) were not sure and 3% (n=3) disagreed (see table 4.2 below). 28% (n=28) of midwifery nurses reported that pregnant women come back to the facility to ask for clarity regarding messages they have received, while 14% (n=14) were not sure and 58% (n=58) never had clients coming back for clarity (see table 4.2 below). Most midwifery nurses, 87% (n=87), support the continued use of MomConnect, while 12% (n=12) were not sure and 1% (n=1) did not support continued use of MomConnect (see table 4.2 below).
Table 4.2: Experiences of midwifery nurses at Rustenburg sub-district (n=100)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n=100)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is easy to register women on MomConnect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Not sure</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>I have registered all pregnant women that I offered antenatal care to on MomConnect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Not sure</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Disagree</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>It is possible to integrate MomConnect registration into routine antenatal care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>Not sure</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Disagree</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Do women registered on MomConnect ever come back to the health facility to ask for clarity about messages they have received?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Not sure</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>No</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>MomConnect programme facilitates communication between the women and nurses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>89</td>
<td>89</td>
</tr>
<tr>
<td>Not sure</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Disagree</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Registering women on MomConnect can disrupt the workflow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Not sure</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Disagree</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>I support continued use of MomConnect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>87</td>
<td>87</td>
</tr>
<tr>
<td>Not sure</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Disagree</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
The mean time it takes to register pregnant women on MomConnect is approximately 9 minutes. The registration time was categorised into 3 categories of less than 5 minutes; 5-10 minutes; and more than 10 minutes. Of the 100 respondents, it respectively takes 5% (n=5) less than 5 minutes to register; 80% (n=80) 5-10 minutes to register and 15% (n=15) more than 10 minutes to register women on MomConnect (see figure 4.1 below).

![Figure 4.1: Time it takes to register pregnant women on MomConnect (n=100).](image)

Respondents were further given the opportunity to choose from a list of predetermined reasons or to state their own reasons that may hinder MomConnect registrations. This was a multiple-response question, where respondents could choose as many applicable responses as possible.

Out of 100 midwifery nurses, 45% (n=45) mentioned clients not having a cell phone as a challenge; 42% (n=42) mentioned that other staff categories such as counsellors assisted with registrations; 26% (n=26) had challenges with clients not having identity documents (IDs); 15% (n=15) mentioned poor network conditions while trying to register clients; 12% (n=12) reported not having enough time as a barrier; 4% (n=4) reported language barriers in terms of clients from other countries who do not understand languages that are used for MomConnect messages; and 2% (n=2) could not register women because their facility-specific MomConnect code did not work (see table 4.3 below).
Table 4.3: Reasons that make MomConnect registration impossible (n=100).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n=100)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cell phone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>No</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Other staff categories assist with MomConnect registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>No</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>No ID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>No</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Poor network</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>No</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>No enough time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>No</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Language barriers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Code not working</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

4.4 Section C: Perceptions of respondents regarding MomConnect programme

Respondents were measured on how they construed the MomConnect programme in terms of acceptability, its importance and barriers. Of the 100 respondents, the majority of midwifery nurses, 97% (n=97), perceived the MomConnect programme as acceptable in providing continuous healthcare, 2% (n=2) were not sure and 1% (n=1)
disagreed (see table 4.4 below). Most midwifery nurses (96%, n=96) agreed that MomConnect has the potential to improve the quality of maternal and child care, while 4% (n=4) were not sure; and no respondents disagreed (see table 4.4 below).

Most midwifery nurses, 97% (n=97) agreed that MomConnect is useful in empowering women in terms of self- and child-care. 3% (n=3) of the midwifery nurses were not sure about the usefulness of MomConnect programme. None of the midwifery nurses disagreed with this statement (see table 4.4 below). However, only 49% (n=49) of midwifery nurses agreed that women registered on MomConnect would refrain from consulting non-trusted sources of information, while 35% (n=35) were not sure; and 16% (n=16) felt that women would still consult non-trusted sources of information despite MomConnect registration (see table 4.4 below).

The MomConnect programme was seen by 88% (n=88) of the midwifery nurses as a midwifery nurses’ support system that complements face-to-face care provided to pregnant women, while 9% (n=9) were not sure about this statement and 3% (n=3) did not regard MomConnect as a support system for them (see table 4.4 below).

In terms of MomConnect barriers, 52% (n=52) of midwifery nurses viewed MomConnect registrations as extra work, 7% (n=7) was not sure and 41% (n=41) did not view MomConnect as extra work (see table 4.4 below). Furthermore, 41% (n=41) of midwifery nurses agreed that there is a chance for women to misinterpret MomConnect messages sent to them, 38% (n=38) was not sure, while 21% (n=21) stated that there is no chance for women to misinterpret these messages (see table 4.4 below).

In terms of issues of confidentiality, 6% (n=6) of midwifery nurses agreed that confidentiality of the women’s information was violated through MomConnect registration and 7% (n=7) were not sure about this. However, most midwifery nurses, 87% (n=87), were of the opinion that MomConnect registration did not violate any confidentiality of the women’s information (see table 4.4 below).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n=100)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MomConnect is an acceptable way of providing continuous healthcare to pregnant women</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>97</td>
<td>97</td>
</tr>
<tr>
<td>Not sure</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Disagree</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>MomConnect has the potential to improve the quality of maternal and child care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td>Not sure</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Disagree</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>MomConnect is useful in empowering pregnant women on self-care and child care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>97</td>
<td>97</td>
</tr>
<tr>
<td>Not sure</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Women registered on MomConnect will refrain from consulting non-trusted sources for information</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>Not sure</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Disagree</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>MomConnect programme is the nurses’ support system that complements face-to-face maternal care given to women by nurses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Not sure</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Disagree</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Registering women on MomConnect is extra work</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>Not sure</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Disagree</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>There is a chance that women registered on MomConnect will misinterpret the messages sent to them</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>Not sure</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Disagree</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
4.5 Relationship between demographics, experiences and perceptions

The Fisher exact test was performed to determine the significant values between socio-demographic variables, experiences and the perceptions of the respondents in terms of the MomConnect programme offered to antenatal clients.

4.5.1 Age and continuous use of MomConnect

The purpose of analysing age and the support of continued use of MomConnect is to determine if there is a difference between younger and older people in terms of MomConnect adoption and use. The results indicated that the difference in age is less significant in the use of the MomConnect programme \( (p = 0.959, \text{ Fisher's exact test}) \). This means that a weak association was detected between age and the use of MomConnect programme (see table 4.5 below).

<table>
<thead>
<tr>
<th>RECODE of Ageinyears (Age in years)</th>
<th>Support continued use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree</td>
<td>Disagree</td>
</tr>
<tr>
<td>23-35 years</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>20.00</td>
<td>0.00</td>
</tr>
<tr>
<td>36-45 years</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>25.00</td>
<td>0.00</td>
</tr>
<tr>
<td>46-55 years</td>
<td>33</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>33.00</td>
<td>1.00</td>
</tr>
<tr>
<td>56 and above</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>9.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>87.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Pearson chi2(6) = 2.1610  Pr = 0.904
Fisher's exact = 0.959
4.5.2 Gender and the use of MomConnect

In terms of gender, the results indicate less significant difference between female and male respondents in the use of MomConnect programme ($p = 0.623$, Fisher exact test). This suggests that there was a weak association detected between gender and the use of MomConnect programme (see table 4.6 below).

Table 4.6: Relationship between gender and the use of MomConnect at Rustenburg Sub-district (n=100).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Support continued use</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree</td>
<td>Disagree</td>
<td>Not sure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>79</td>
<td>1</td>
<td>12</td>
<td>92</td>
<td>92.00</td>
</tr>
<tr>
<td></td>
<td>79.00</td>
<td>1.00</td>
<td>12.00</td>
<td>92.00</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>8.00</td>
</tr>
<tr>
<td></td>
<td>8.00</td>
<td>0.00</td>
<td>0.00</td>
<td>8.00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>1</td>
<td>12</td>
<td>100</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>87.00</td>
<td>1.00</td>
<td>12.00</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

Pearson chi2(2) = 1.2994  Pr = 0.522
Fisher's exact = 0.623

4.5.3 Years of experience in the primary healthcare setting and the use of MomConnect

There was less significant difference in the use of MomConnect between midwifery nurses with less than 10 years of work experience in the primary healthcare setting and those with more than 10 years ($p = 0.605$, Fisher exact test). There was therefore a weak association between the years of experience in the primary healthcare setting and the use of the MomConnect programme (see table 4.7 below).
Table 4.7: Relationship between years of employment and the use of MomConnect at Rustenburg Sub-district (n=100).

<table>
<thead>
<tr>
<th>RECODE of Yearsofemployment in PnPHCsetting (Years of employment in PHC setting)</th>
<th>Support continued use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree</td>
<td>Disagree</td>
</tr>
<tr>
<td>less than 10 years</td>
<td>35.00</td>
<td>0.00</td>
</tr>
<tr>
<td>more than 10 years</td>
<td>52.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>87.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Pearson chi2(2) = 1.6573  Pr = 0.437  
Fisher's exact = 0.605

4.5.4 Perceived usefulness and support of continued use

A significant difference was detected \((p = 0.008, \text{ Fisher’s exact test})\) between the perceived usefulness of the MomConnect programme in terms of empowering pregnant women on self- and child-care, and the use of MomConnect. This suggests that when midwifery nurses perceive MomConnect programme to be useful in empowering women on self- and child-care, they are more likely to support its continued use. Therefore, an association was detected between these two variables (see table 4.8 below).

Table 4.8: Perceived usefulness and the use of MomConnect at Rustenburg Sub-district (n=100).

<table>
<thead>
<tr>
<th>Useful in empowering women on self- and child care</th>
<th>Support continued use</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree</td>
<td>Disagree</td>
</tr>
<tr>
<td>Agree</td>
<td>86.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Not sure</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>87.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Pearson chi2(2) = 34.5302  Pr = 0.000  
Fisher’s exact = 0.008
4.5.5 Perceived usefulness and acceptability of MomConnect

A significant difference was also detected between perceived usefulness and the acceptance of MomConnect programme by the midwifery nurses (p= 0.031, Fisher exact test). This suggests that if midwifery nurses perceive the MomConnect programme as useful in empowering women on self- and child-care, they are likely to accept it as a way of providing continuous healthcare. An association was therefore detected between perceived usefulness and acceptability of the MomConnect programme (see table 4.9).

Table 4.9: Perceived usefulness and acceptability of MomConnect at Rustenburg Sub-district (n=100).

<table>
<thead>
<tr>
<th>Useful in empowering women on self- and child care</th>
<th>Acceptable way of providing continuous health care</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>95</td>
<td>0</td>
<td>2</td>
<td>97</td>
</tr>
<tr>
<td></td>
<td>95.00</td>
<td>0.00</td>
<td>2.00</td>
<td>97.00</td>
</tr>
<tr>
<td>Not sure</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2.00</td>
<td>1.00</td>
<td>0.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Total</td>
<td>97</td>
<td>1</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>97.00</td>
<td>1.00</td>
<td>2.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Pearson chi2(2) = 32.6886  Pr = 0.000
Fisher's exact = 0.031

4.5.6 MomConnect viewed as extra work and its integration into routine antenatal care

A significant difference was detected (p= 0.015, Fisher exact test) between the perception that MomConnect registration is extra work and its integration into routine antenatal care. This finding suggests that if midwifery nurses perceived MomConnect registrations as extra work, they were less likely to see the possibility of its integration into routine antenatal care. An association was therefore found between the view of MomConnect registrations as extra work and its integration into routine antenatal care (see table 4.10 below).
Table 4.10: The relationship between MomConnect being seen as extra work and its integration into routine antenatal care (n=100).

<table>
<thead>
<tr>
<th>Registration is extra work</th>
<th>Integration into routine antenatal care</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree</td>
<td>Disagree</td>
</tr>
<tr>
<td>Agree</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>18.00</td>
<td>25.00</td>
</tr>
<tr>
<td>Disagree</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>22.00</td>
<td>14.00</td>
</tr>
<tr>
<td>Not sure</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>43.00</td>
<td>39.00</td>
</tr>
</tbody>
</table>

Pearson chi2(4) = 12.7494  Pr = 0.013
Fisher's exact = 0.015

4.5.7 MomConnect registration experienced as disruptive to the workflow and its integration into routine antenatal care

A significant association was detected between the number of midwifery nurses who found MomConnect registration to be disruptive to the workflow and its integration into routine antenatal care (p= 0.000, Fisher exact test). This finding suggests that midwifery nurses were less likely to integrate MomConnect programme into routine antenatal care if they experienced it as disrupting the flow of work (see table 4.11 below).

Table 4.11: The relationship between MomConnect being experienced as disruptive of the workflow and its integration into routine antenatal care (n=100).

<table>
<thead>
<tr>
<th>Registering can disrupt workflow</th>
<th>Integration into routine antenatal care</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree</td>
<td>Disagree</td>
</tr>
<tr>
<td>Agree</td>
<td>9</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>9.00</td>
<td>28.00</td>
</tr>
<tr>
<td>Disagree</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>31.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Not sure</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>43.00</td>
<td>39.00</td>
</tr>
</tbody>
</table>

Pearson chi2(4) = 35.6830  Pr = 0.000
Fisher's exact = 0.000
4.6 Concluding remarks

This chapter presented the statistical analysis of data provided by the sample. The analysis started with the description of the respondents in terms of demographic variables. The respondents comprised midwifery nurses who offer antenatal care and use the MomConnect programme in the Rustenburg health sub-district, Bojanala district in South Africa \((n=100)\). The majority of respondents were females, 92% \((n=92)\), fell into the age category of 46-55 years (38%, \(n=38\)), possessed a diploma in nursing as the highest qualification (85%, \(n=85\)), were permanently employed (90%, \(n=90\)), and had more than 10 years’ work experience (62%, \(n=62\)).

The MomConnect programme was experienced as easy to use by the majority of respondents, and it takes an average of 5-10 minutes to register pregnant women on the programme. Most respondents have not registered all their antenatal clients due to multiple factors. The top three factors that limited MomConnect registrations by midwifery nurses are clients not having cell phones (45%, \(n=45\)), other staff categories such as counsellors being responsible for such registrations (42%, \(n=42\)) and clients not having IDs (26%, \(n=26\)). The majority of respondents were able to integrate MomConnect into the routine antenatal care and disagreed that MomConnect disrupted the workflow.

In terms of communication, most respondents mentioned that MomConnect facilitates communication between them and the pregnant women, and that pregnant women did not return to the facilities to seek for clarity about messages received. Generally, most respondents support continued use of MomConnect. MomConnect was construed by most respondents as improving the quality of care without breaching the confidentiality of the pregnant women’s information, empowering women on self- and child-care, being a support system for midwifery nurses that complements the face-to-face care that they provide, and generally acceptable for providing continuous healthcare. Despite these benefits mentioned by respondents, most respondents viewed MomConnect registration as extra work.

To determine associations between variables, the Fisher exact test was carried out. Possible associations were detected between these variables:

- Perceived usefulness of MomConnect programme and its continued use;
• Perceived usefulness of MomConnect programme and its acceptability;
• MomConnect registration viewed as extra work and its integration into routine antenatal care; and
• MomConnect registration experienced as disrupting the workflow and its integration into routine antenatal care.

The next chapter, chapter 5, will discuss the findings, conclusions and recommendations of this study.
Chapter 5: Discussion of findings, recommendations and conclusions

5.1 Introduction

This chapter concludes this research report and provides an overview of the research, discussion of findings, recommendations for practice and research, limitations of the study, and conclusions.

5.2 Overview of the research

The aim of the study was to determine the experiences and perceptions of midwifery nurses concerning the MomConnect programme. MomConnect is a form of mHealth programme that registers pregnant women on a centralised national database to empower them through health promotion messages sent to them. It could also potentially contribute to reducing preventable maternal and child deaths, if used correctly. Although pregnant women can self-register, they still need to visit a health facility to receive the full set of health promotion messages. This highlights the fact that MomConnect is user-centred and user-driven – midwifery nurses are the users and also the primary entry points.

However, literature shows that not much has been studied and documented about nurses’ experiences and feedback on mHealth. This is a problem because the voices of the primary implementers of the programme are not heard. The study is significant as it will inform the Department of Health about the experiences, perceptions and challenges that need to be modified to improve implementation, and hence the quality of service provided to women and children, who fall under the vulnerable groups.

A cross-sectional, quantitative survey was conducted in primary healthcare facilities in the Rustenburg sub-district of the Bojanala district, in North West, South Africa. The study population was the midwifery nurses who provide antenatal care and have used or are still using the MomConnect programme. A representative sample which is randomly selected is ideal, but due to the scarce nature of this population, sampling was not done, but all midwifery nurses who met the inclusion criteria were included in the study.

100 midwifery nurses were identified and recruited, and consented to participate in the study. Self-administered questionnaires were used to collect data, and after repeated attempts, all 100 midwifery nurses completed the questionnaires.
5.3 Discussion of findings

These findings will be discussed in line with the demographic aspects and the two research questions that the study aimed to answer. These research questions are:

1) What are the experiences of midwifery nurses on the utilisation of MomConnect?
2) What are the perceptions of midwifery nurses on the MomConnect programme?

5.3.1 Demographic aspects

100 respondents completed the questionnaires. The majority of respondents were females, 92% (n=92), fell into the age category of 46-55 years (38%, n=38), possessed a diploma in nursing as the highest qualification (85%, n=85), were permanently employed (90%, n=90), and had more than 10 years' work experience (62%, n=62).

Associations between demographics, experiences and perceptions concerning MomConnect were explored, and it was found that age, gender and years of experience were less significant in this study. In contrast with these findings, De Silva et al., (2009) conclude that young people, men and people with more years of education were quick to adopt mHealth technologies, while Kaphle et al. (2015) found that although age and literacy could influence the adoption and use of mHealth, only age was significant. The aforementioned contrasts may be due to gender inequalities which were possibly still prevailing in Asian countries during the time of conducting these studies, as compared to South Africa in 2016.

Moreover, the current study involved midwifery nurses, all with a tertiary qualification, while the contrasting studies included general community members (De Silva et al., 2009) and community health workers with some form of schooling, but not tertiary education (Kaphle et al., 2015). In addition, although Putzer and Park (2010) found that demographic aspects were less significant, a low adoption rate of mHealth technology was found among nurses with more years of work experience. This contrasting finding may be because MomConnect was experienced and perceived by respondents as easy to use and also as useful in empowering women in self- and child care. Several studies found that mHealth programmes that are perceived to be useful
and easy to use, are more easily accepted and adopted by users (Davis, 1989; Park & Chen, 2007; Kaphle et al., 2015; Willcox et al., 2015; Gagnon et al., 2016).

5.3.2 Experiences of midwifery nurses on utilisation of MomConnect

The majority of respondents indicated that it is easy to register women on MomConnect, with the registration time ranging from five to ten minutes. However, some respondents had not registered all women on MomConnect due to several reasons. These reasons are, from the highest to the lowest frequencies: client not having a cell phone; other staff categories such as counsellors assist with registrations; clients not having an ID; poor network while trying to register clients; not enough time; language barriers in terms of clients from other countries who do not understand languages that are used for MomConnect messages; and facility-specific MomConnect code not working.

Coleman (2014) found that 93 % of pregnant women living in rural areas of the North West Province in South Africa had cell phones, irrespective of their socio-economic status; and Peter et al. (2016) also report that 90% of South Africans own a cell phone. However, respondents in the current study mentioned that some clients still did not have cell phones. This finding needs to be interpreted with caution, though, because respondents could not quantify clients who did not have cell phones. Similarly, in a qualitative study by Willcox et al. (2015) in Australia, health workers raised concerns that some clients do not have cell phones, which makes it difficult to register them to receive educational messages.

The majority of respondents noted that MomConnect facilitates communication between them and clients and also supported its continued use. This finding is similar to that of studies done by Soltani (2012), Chaiyachati (2013) and Gagnon et al. (2016), who found that mHealth provides faster contact, active engagement and communication with clients. While 58 out of 100 respondents reported that women did not return to seek clarity regarding the messages they received, other respondents were either not sure or agreed that women did return to seek clarity.

Most respondents, although less than 50%, found it possible to integrate MomConnect into routine antenatal care and indicated that MomConnect does not disrupt the workflow. Respondents who were not sure about this and those who experienced
MomConnect as disruptive and not possible to be integrated were collectively more than 50%. This finding supports a systematic review by Gagnon (2016), where participants found mHealth to be disruptive to the workflow.

Furthermore, some studies identified a struggle to integrate mHealth into routine healthcare, with health workers being more likely to see mHealth as running parallel to other services (Leon et al., 2012; Labrique et al., 2013; Willcox et al., 2015). In a contrasting finding, Van Zutphen et al. (2009) found that midwives in Netherlands could integrate mHealth into their routine services. This contrast may be due to a well-developed health system and adequate allocation of midwifery nurses who care for antenatal and postnatal women in Netherlands, as opposed to the increased workload versus the limited number of midwifery nurses that are available in some primary healthcare facilities in South Africa.

5.3.3 Perceptions of midwifery nurses regarding MomConnect programme

Most respondents perceived MomConnect as acceptable and as having the potential to improve the quality of maternal and child care. MomConnect was also viewed by the majority of participants as useful in empowering women in self- and child care, although only 49% of participants felt that women registered on MomConnect would not consult non-trusted sources of information. Willcox (2015) also found that mHealth messages have the potential to prevent women from searching for information from non-credible sources.

Although most respondents felt that MomConnect programme acts as the midwifery nurses’ support system that complements the face-to-face care they provide to pregnant women, they still viewed MomConnect registrations as extra work. This finding affirms the conclusion of Gagnon et al. (2016) that health workers experience mHealth as increasing their workload.

Although the majority of respondents stated that MomConnect facilitated communication, and that none of their clients returned to seek clarity about messages sent to them, very few indicated that there is no chance for women to misinterpret messages sent to them. Similarly, according to Soltani et al. (2012), Brinkel et al. (2014), Kaphle et al. (2015), Willcox et al. (2015) and Gagnon et al. (2016), health workers were concerned about women misinterpreting messages sent to them.
In terms of issues of confidentiality, the majority of respondents thought that MomConnect registration does not breach any confidentiality concerning the women's information. In contrast, health workers in a study by Gagnon et al. (2016) were concerned about issues of confidentiality and they felt that they did not have control over messages that women receive. These contrasting findings may possibly be because this study focused on text messaging only, which respondents may view as less intrusive, while the systematic review by Gagnon et al. (2016) also included other mobile technologies such as the mobile electronic medical record system, smartphone, tablet, etc., which may be viewed as less confidential.

5.3.4 Determining associations between experiences and perceptions

Possible associations were detected between perceived usefulness of MomConnect and its continued use; perceived usefulness of MomConnect and its acceptability; MomConnect viewed as extra work and its integration into routine antenatal care; and MomConnect as disrupting the workflow and its integration into routine antenatal care. Similarly, easy-to-use technology, familiarity and perceived usefulness were associated with acceptability, adoption and use of mHealth (Aranda-Jan et al., 2014; Gagnon et al., 2016).

Furthermore, perceived usefulness and ease of use form the internal constructs of the Technology Acceptance Model (TAM), while complexity and technology fit, among other aspects, form the external constructs (Farnani et al., 2012). These factors are important in predicting the acceptance and intention to use technology. The MomConnect programme uses a cell phone to register pregnant women on MomConnect, and these women will then receive health promotion messages through their cell phones. Most people in South Africa own cell phones (Coleman, 2014; Peter et al., 2016), and are familiar with this form of technology; therefore the MomConnect programme fits well in the work of midwifery nurses.

In addition, there are no costs involved for the users, and the registration process is made simple by the instructions that appear on the cell phone screen during every step. Midwifery nurses view the MomConnect programme as useful in empowering pregnant women in self- and child care, and hence as having the potential to improve the quality of maternal and child healthcare. All the aforementioned factors imply that
the simplicity and ease of use of the MomConnect programme, the perceived usefulness of the MomConnect programme and the familiarity of the population with the cell phone’s short message system facilitate the acceptance and use of the MomConnect programme.

On the other hand, integration of MomConnect programme into routine antenatal care is negatively affected when midwifery nurses experience MomConnect as extra work and as disruptive to the workflow. However, Farmani et al. (2012) remark that even if people have a negative attitude towards a particular technology, they will use it if they believe that it is useful. This is possibly why midwifery nurses support the continued use of MomConnect programme even if they view it as being extra work and disruptive.

5.4 Limitations of the study

The sample size was small and this could impact negatively on generalisation of the findings. However, the researcher conducted a census of the study population to promote representativeness. Some respondents stated that the MomConnect programme can be disruptive to the workflow and is impossible to integrate into their routine, but due to the nature of the study design, it was not possible to further explore the ways in which this disruption occurred, or what factors limit the integration.

5.5 Conclusions

The study achieved its aim of determining the experiences and perceptions of midwifery nurses regarding the MomConnect programme in the Rustenburg sub-district of the Bojanala district in South Africa. It also showed the importance of the follow-up of processes, including follow-ups on how users implement a particular programme, instead of merely focusing on the end results.

Although midwifery nurses generally view MomConnect as an acceptable and potential way of improving the quality of care, and also support its continued use, there are mixed and sometimes conflicting perceptions and experiences, in line with the findings of other mHealth studies. This study also emphasised that there is an interplay between user perceptions and experiences or utilisation of mHealth, with some specific associations that arose from this study, namely the perceived usefulness of MomConnect programme and its continued use; the perceived usefulness of MomConnect programme and its acceptability; MomConnect registration being
viewed as extra work and its integration into routine antenatal care; and MomConnect registration experienced as disrupting the workflow and its integration into routine antenatal care.

Reasons for non-registration of women on MomConnect were highlighted, and the misconception that ID numbers are a necessity for registration was picked up. The implications are that health promotion messages do not reach some women, and this impacts negatively on the aim of MomConnect of improving the quality of maternal and child care through continuous communication.

5.6 Recommendations for practice and research

Follow-up of projects or programmes must be conducted by relevant staff, such as mother-and-child care coordinators, in order to gather information on good practices and challenges, and to clear any misconceptions. This study revealed that some women were not registered on MomConnect because they did not have IDs, but women can still be registered with their date of birth, and not with ID numbers only. Although there is an increased workload in primary healthcare facilities, all midwifery nurses must at least be familiar with MomConnect so that they can interact with women where necessary.

Furthermore, MomConnect registrations can be reviewed monthly or quarterly during facility and sub-district performance reviews, so that its value can consistently be emphasised. Respondents viewed these text messages as having the potential to improve the quality of maternal and child care through empowering pregnant women from pregnancy up until at one year after birth. Although the MomConnect costs were not evaluated, these messages may be useful if expanded to other priority programmes like tuberculosis, whereby both nurses and clients can receive educational and supportive messages, and possibly improve TB outcomes such as TB treatment success rate and reduce lost to follow-up rate.

In terms of research, more usability studies that will include other categories of staff, as well as clients that use mHealth, are needed in order to get the bigger picture of experiences and perceptions of frontline users on mHealth. Since some midwifery nurses were not familiar with MomConnect, it may be valuable to also study their
awareness and knowledge of NurseConnect (an extension of MomConnect in which supportive messages are sent to nurses).
List of references


Kaphle, S., Chaturvedi, S., Chaudhuri, I., Krishnan, R., & Lesh, N. 2015. Adoption and Usage of mHealth Technology on Quality and Experience of Care Provided by Frontline Workers: Observations from Rural India. *Journal of Medical Internet Research mHealth and uHealth*, 3 (2), p. e61.


Annexure A: Consent form

Title: A Survey of the Experiences and Perceptions of Midwifery Nurses on the MomConnect Programme in Bojanala, South Africa

I have heard the aims and objectives of the proposed study and was provided the opportunity to ask questions and given adequate time to rethink the issue. The aim and objectives of the study are sufficiently clear to me. I have not been pressurized to participate in any way.

I understand that participation in this project is completely voluntary and that I may withdraw from it at any time and without supplying reasons.

I know that this project has been approved by the Sefako Makgatho University Research Ethics Committee (SMU REC). I am fully aware that the results of this project will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

I hereby give consent to participate in this project.

_________________________________________  __________________________
Name of respondent                        Signature of respondent

_________________________________________
Place                                      Date

_________________________________________
Witness

Statement by the Researcher
I provided verbal information regarding this project
I agree to answer any future questions concerning the project as best as I am able.
I will adhere to the approved protocol.

_________________________________________
Name of Researcher                        Signature

_________________________________________
Date                                      Place
Annexure B: Respondent Information sheet

The department of health launched the MomConnect programme in 2014 as one of the efforts to respond to the high numbers of maternal and child mortality rates. Several studies on mobile health show that involving health workers such as nurses, who are the first point of entry, is very important for the success of programmes like MomConnect. The study, titled ‘A Survey of the Experiences and Perceptions of Midwifery Nurses on the MomConnect Programme in Bojanala, South Africa’ is therefore necessary as it has the potential to provide the department of health with insights that can be used to suitably adapt its programmes where needed, and hence improve the quality of care.

The aim of this survey is to determine the experiences and perceptions of midwifery nurses on the MomConnect programme. The objectives of this survey are: 1) to determine the experiences of midwifery nurses on the utilisation of MomConnect, and 2) to determine the perceptions of midwifery nurses on the MomConnect programme.
Annexure C: Questionnaire

Instructions

- There are three (3) sections in this questionnaire: Section A, B, and C.
- Please answer all 3 sections as honest as you can by ticking (✓) the relevant option box and then writing the answer in words where necessary. This information is confidential and your contribution is highly valuable!

<table>
<thead>
<tr>
<th>SECTION A: DEMOGRAPHIC DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age in years</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>2. Gender</td>
</tr>
<tr>
<td>☐ Male</td>
</tr>
<tr>
<td>☐ Female</td>
</tr>
<tr>
<td>3. Highest health qualification obtained</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>4. Type of employment</td>
</tr>
<tr>
<td>☐ Permanent</td>
</tr>
<tr>
<td>☐ Community service</td>
</tr>
<tr>
<td>☐ Contract</td>
</tr>
<tr>
<td>5. Years of employment in the primary healthcare setting</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SECTION B: EXPERIENCE QUESTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is easy to register pregnant women on MomConnect</td>
</tr>
<tr>
<td>☐ Agree</td>
</tr>
<tr>
<td>☐ Not sure</td>
</tr>
<tr>
<td>☐ Disagree</td>
</tr>
<tr>
<td>2. The time (in minutes) it takes to register a pregnant woman on MomConnect is</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>3. I have registered all pregnant women that I offered antenatal care to on MomConnect</td>
</tr>
<tr>
<td>☐ Agree</td>
</tr>
<tr>
<td>☐ Not sure</td>
</tr>
<tr>
<td>☐ Disagree</td>
</tr>
<tr>
<td>4. If your answer to question 3 above is ‘Not sure’ or ‘Disagree’, what are factors that may have made registration impossible? You may tick multiple options.</td>
</tr>
<tr>
<td>☐ Client did not have a cell phone</td>
</tr>
<tr>
<td>☐ Client did not have a South African ID</td>
</tr>
<tr>
<td>☐ There is not enough time</td>
</tr>
<tr>
<td>☐ No other staff members who can assist with registration after I have provided antenatal care</td>
</tr>
<tr>
<td>☐ Other factors. Please specify .................................................................................</td>
</tr>
<tr>
<td>5. It is possible to integrate MomConnect registration into routine antenatal care services</td>
</tr>
<tr>
<td>☐ Agree</td>
</tr>
<tr>
<td>☐ Not sure</td>
</tr>
<tr>
<td>☐ Disagree</td>
</tr>
</tbody>
</table>
6. Do women registered on MomConnect ever come back to the health facility to ask for clarity about messages they have received?
   - Yes
   - Not sure
   - No

7. MomConnect programme facilitates communication between the women and nurses
   - Agree
   - Not sure
   - Disagree

8. Registering women on MomConnect can disrupt the workflow
   - Agree
   - Not sure
   - Disagree

9. I support continued use of MomConnect
   - Agree
   - Not sure
   - Disagree

**SECTION C: PERCEPTION QUESTIONS**

1. MomConnect programme is an acceptable way of providing continuous healthcare to pregnant women
   - Agree
   - Not sure
   - Disagree

2. MomConnect programme has the potential to improve the quality of maternal and child healthcare
   - Agree
   - Not sure
   - Disagree

3. MomConnect programme is useful in empowering pregnant women on self-care and child care
   - Agree
   - Not sure
   - Disagree

4. Women registered on MomConnect will refrain from consulting non-trusted sources for information
   - Agree
   - Not sure
   - Disagree

5. MomConnect programme is the nurses’ support system that complement maternal care given to women by nurses
   - Agree
   - Not sure
   - Disagree

6. Registering pregnant women on MomConnect is extra work
   - Agree
   - Not sure
   - Disagree

7. There is a chance of women registered on MomConnect to misinterpret the messages sent to them
   - Agree
   - Not sure
   - Disagree

8. Registration on MomConnect breaks confidentiality of the women’s information
   - Agree
   - Not sure
   - Disagree

Thank you for taking time to complete this questionnaire.
Annexure D: Permission-seeking letter to Bojanala health district

Sefako Makgatho Health Sciences University
P O Box 163
MEDUNSA
0204
15 September 2016

The District Manager
Bojanala District Department of Health
Rustenburg
3000

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY

I am a student of Masters in Public Health at the Sefako Makgatho Health Sciences University. Conducting a research project is one of the requirements for completing my degree. I hereby request permission to conduct the study at the clinics and health centres in Rustenburg sub-district, and a questionnaire pre-test at Kgetleng sub-district, under the supervision of Dr Hendry van der Heever.

The title of the study is ‘A Survey of the Experiences and Perceptions of Midwifery Nurses on the MomConnect Programme in Bojanala, South Africa’. The objectives of the study are 1) To determine the experiences of midwifery nurses on the utilisation of MomConnect, and 2) To determine the perceptions of midwifery nurses on the MomConnect programme. This study will further contribute to future planning in terms of the use and integration of mobile health programmes into healthcare services. I have enclosed proof of approval of the study by the Sefako Makgatho University Research Ethics Committee, as well as the consent form for the participants.

I hope that my request shall receive your favourable consideration and an early reply.

Yours sincerely,
Bonolo Pitse

Contact: 082 850 1384
Annexure E: Permission-seeking letter to North West Provincial office

Sefako Makgatho Health Sciences University  
P O Box 163  
MEDUNSA  
0204  
21 September 2016

The Director  
Provincial Policy and Planning Department  
Mafikeng

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY IN BOJANALA

I am a student of Masters in Public Health at the Sefako Makgatho Health Sciences University. Conducting a research project is one of the requirements for completing my degree. I hereby request permission to conduct the study at the clinics and health centres in Rustenburg sub-district, and a questionnaire pre-test at Kgetleng sub-district, under the supervision of Dr Hendry van der Heever.

The title of the study is ‘A Survey of the Experiences and Perceptions of Midwifery Nurses on the MomConnect Programme in Bojanala, South Africa’. The objectives of the study are 1) To determine the experiences of midwifery nurses on the utilisation of MomConnect, and 2) To determine the perceptions of midwifery nurses on the MomConnect programme. This study will further contribute to future planning in terms of the use and integration of mobile health programmes into healthcare services. I have enclosed proof of approval of the study by the Sefako Makgatho University Research Ethics Committee, as well as the consent form sample for the participants.

I hope that my request shall receive your favourable consideration and an early reply.

Yours sincerely,
Bonolo Pitse

Contact: 082 850 1384
Annexure F: Permission-seeking letter to Rustenburg health sub-district

Sefako Makgatho Health Sciences University
P O Box 163
MEDUNSA
0204
21 November 2016

The Sub-district Manager
Rustenburg Health Sub-district
Rustenburg
3000

Dear Sir/Madam

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY IN BOJANALA

I am a student of Masters in Public Health at the Sefako Makgatho Health Sciences University. Conducting a research project is one of the requirements for completing my degree. I hereby request permission to conduct the study at the clinics and health centres in Rustenburg sub-district under the supervision of Dr Hendry van der Heever.

The title of the study is ‘A Survey of the Experiences and Perceptions of Midwifery Nurses on the MomConnect Programme in Bojanala, South Africa’. The objectives of the study are 1) To determine the experiences of midwifery nurses on the utilisation of MomConnect, and 2) To determine the perceptions of midwifery nurses on the MomConnect programme. This study will further contribute to future planning in terms of the use and integration of mobile health programmes into healthcare services. I have enclosed proof of approval of the study by the Sefako Makgatho University Research Ethics Committee, as well as the consent form sample for the participants.

I hope that my request shall receive your favourable consideration and an early reply.

Yours sincerely,
Bonolo Pitse

Contact: 082 850 1384
POLICY, PLANNING, RESEARCH, MONITORING AND EVALUATION

Name of researcher : Ms. S.B. Pitse
Sefako Makgato Health Sciences University

Physical Address
(Work/Institution)
43 PAUL MOLEFE STR, TLHABANE WEST
THE AURUM INSTITUTE
50 STEEN STR, RUSTENBURG

Subject : Research Approval Letter- A survey of the experiences and perceptions of midwifery nurses on the Mom-Connect Programme in Bojanala, South Africa.

This letter serves to inform the Researcher that permission to undertake the above mentioned study has been granted by the North West Department of Health. The Researcher is expected to arrange in advance with the chosen facilities, and issue this letter as proof that permission has been granted by the Provincial office.

This letter of permission should be signed and a copy returned to the department. By signing, the Researcher agrees, binds him/herself and undertakes to furnish the Department with an electronic copy of the final research report. Alternatively, the Researcher can also provide the Department with electronic summary highlighting recommendations that will assist the department in its planning to improve some of its services where possible. Through this the Researcher will not only contribute to the academic body of knowledge but also contributes towards the bettering of health care services and thus the overall health of citizens in the North West Province.

Kindest regards

Dr. FRM Reichel
Director: PPRM&E

LEPAFA LA BOITEKANELO
DEPARTMENT OF HEALTH
Republic of South Africa

27/10/2016
Date

Researcher

28/10/2016
Date
Annexure H: Ethical Clearance

Sefako Makgatho Health Sciences University
Research & Postgraduate Studies Directorate
Sefako Makgatho University Research Ethics Committee
(SMUREC)

Molotlegi Street, Ga-Rankuwa 0208
Tel: (012) 521 5617/3698 | fax: (012) 521 3749
Email: lorato.phiri@smu.ac.za
P.O. Box 163 Medunsa 0204

APPROVAL NOTICE - NEW APPLICATION

01 September 2016
Ms SB Pitse
Department of Public Health
P.O Box 215
Medunsa, 0204

MEETING: 07/2016
SMUREC Ethics Reference Number: SMUREC/H215/2016: PG

The New Application received on 18 August 2016, was reviewed by members of Sefako Makgatho University Research Ethics Committee 01 September 2016 and was approved on 01 September 2016.

Title: A survey of experiences and perceptions of healthcare workers on the Mumi Connect Programme in Sojanesla, South Africa

Researcher: Ms SB Pitse
Supervisor: Dr H van der Heever
Department: Public Health
School: Health Care Sciences
Degree: MPH

Please note the following information about your approved research protocol:

Protocol Approval Period: 01 September 2016 – 01 September 2017

Please remember to use your protocol number (SMUREC/H215/2016: PG) on any documents or correspondence with the REC concerning your research protocol.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modification, or monitor the conduct of your research and the consent process.

After Ethical Review: Please note a template of the progress report is obtainable in the Research Office and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit. Translation of the consent document in the language applicable to the study participants should be submitted.

International Organisation (IORG00008691), Institutional Review Board (IRB000010386) Expiry date: 09 December 2018, Federal Wide Assurance (FWA000023943) Expiry date: 31 August 2017 and NHREC No: REC 210406-003

Sincerely

DR C BAKER
DEPUTY CHAIRPERSON SMUREC

SMUKAGO MAKGATHO
HEALTH SCIENCES UNIVERSITY
SMU RESEARCH ETHICS COMMITTEE
Chairperson
Date: 01/09/2016
Annexure I: Approval from Rustenburg health Sub-district

THE MANAGER
RUSTENBURG SUB – DISTRICT
RUSTENBURG
0300
25/11/2016

Dear: Operational Manager
Health Facility Staff

SUBJECT: AUTHORIZATION OF MS S.B.PITSE TO DO RESEARCH WORK IN RUSTENBURG FACILITIES

The North West Department of Health Policy and Research unit has approved the application of Ms Pitse to do a study in the facilities within our sub-district following an ethical clearance from Sefako Makgatho University. In view of this we are required to give Ms Pitse access to our facilities including our staff for her to interact with them in the interest of the study in question.

It is against this background that this office authorize Ms Pitse the opportunity to interact with you and your team as she perform this study. Kindly give her your support and cooperation.

Kind regards

L. K. Thowe (Mr.)
Sub-District Manager
Rustenburg