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Masters in Public Health Research Report

Exploring the feasibility of using different cellular telephone based messaging platforms as demand creation channels for voluntary medical male circumcision in Gauteng, South Africa

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A research report submitted to the School of Public Health, University of Witwatersrand in partial completion of the requirements of the degree Master of Public Health: Social and Behaviour Change Communication

DECLARATION

I, Gareth Michael Coats (SN: 511 038), declare that this research report is my original work. It is submitted in partial fulfilment of the requirements for the degree of Master of Public Health, in the field of Social and Behaviour Change Communication, in the University of Witwatersrand, Johannesburg. This version has not been submitted before for any degree or examination to this, or any other university.

23 September 2014



DEDICATION

To my co-supervisors, Ms Sara Nieuwoudt and Dr Dirk Taljaard.

I've stood on the shoulders of giants. Your professionalism, your expertise, your dedication to teaching and especially your unwavering motivation have been invaluable. Without your guidance or your belief, I would surely have faltered. Thank you for lifting me up, and keeping the very distant horizon in my sight.

To my wife Kerry and our son Christian

To my darling Kerry, you have been my rock! Without your support and understanding, this journey would have been doomed. We have been through this together and I couldn't image achieving anything we've done together, without you at my side.

To my employers and colleagues at Southern African AIDS Trust.

The nurturing and dedicated support I've received from the whole organisation has meant the difference between having a dream, and having a chance. To Jonathan Gunthorp, Flanny Chiganze, my team in the Country Support and Programme Delivery department, to our partners and communities, I say Thank You.

To the Centre for HIV and AIDS Prevention Studies

Thank you to Dino Rech, Alexandra Spyrelis and Sasha Frade for your assistance and expertise during the study.

To my family and friends

Thank you all for showing such a keen interest, for understanding when I've let you down to finish a chapter, for hearing me moan, for baby-sitting, for being there for Kerry and Christian when I've been holed up in my study. I truly hope I get to return ALL the favours!

ABSTRACT

INTRODUCTION

Three randomised control trials in Kenya, Uganda and South Africa have shown that Voluntary Medical Male Circumcision (VMMC) reduces the risk of heterosexual HIV transmission to men by up to 60%. This has resulted in a WHO and UNAIDS recommendation to promote VMMC as part of comprehensive HIV prevention programming. In order for South Africa to achieve its 80% national coverage target of VMMC, significant investment needs to be made in demand creation programming. The Centre for HIV/AIDS Prevention Studies (CHAPS) provides free VMMCs through 28 community based clinics and hospitals in Gauteng, North West and Limpopo Provinces. In 2013, CHAPS demand creation activities have resulted in some increases in demand but CHAPS have committed to exploring additional demand creation opportunities. In terms of reach, mobile telephones are highly prevalent in South Africa, with more than 90% of South African households surveyed in 2011 reporting to have at least one cellular telephone in the home. The ongoing advancement of mobile phones to allow data transfer and internet access also means that more 'Technology-Poor' or 'ICT Have-nots' will be able to access the ever increasing knowledge content of the internet, participate in digital social-domains and be reached in shorter times and at lower costs.

MATERIALS AND METHODS

This was a secondary data analysis study of data from a cross-sectional study on uncircumcised men who chose to access the free VMMC provided at three CHAPS clinics in Soweto and Orange Farm, Gauteng, South Africa. This study had access to all data collected and captured for all uncircumcised primary study respondents aged 15 years and older who were surveyed by CHAPS clinic staff from March to October 2013. Analysis was conducted to assess associations between socio-demographic factors and mobile phone ownership. Associations were also assessed between messaging platforms used and mobile phone usage, networks utilised, and factors that influenced the VMMC seeking behaviours, knowledge and beliefs about VMMC and reasons to get circumcised.

RESULTS

Mobile phone ownership was high (92.7%) amongst study participants (n= 1,207) with the likelihood of mobile phone ownership, increasing with age (p< 0.001). The vast majority of participants lived with two or more people, but those living in smaller households or alone were more likely to own a mobile phone (p= 0.040). Participants who were single or did not live with their partner were also less likely to own a mobile (p= 0.015). SMS remains the most used message platform, but more than half the sample uses a combination of messaging platforms. Information sources that combined mass media and interpersonal channels were shown to most influential to participants in deciding to access VMMC and the most significant factor about the CHAPS clinic that lead to participants accessing the VMMC services was the clinics' convenient locations (p= 0.009). Nearly three quarters of participants had an above average knowledge of HIV and VMMC. The study data showed that uncircumcised men who did not use any mobile phone messaging platforms scored lower in knowledge while those who used a combination of platforms with SMS had the highest knowledge (p< 0.001). The opposite was shown for positive beliefs (p= 0.023). The HIV preventive benefits of VMMC was the most recorded reason for becoming circumcised, but when reported reasons were tested by messaging platforms used, improved hygiene was shown to be the most significant reason for getting circumcised.

CONCLUSION

Overall, the study found that the use of mobile phones is feasible for the promotion of VMMC. The data showed that mobile phone based messaging platforms provide a mix of demand creation opportunities. However, using platforms as a way to meaningfully segment target audience content delivery for may not be required, especially as 'Smart' phones become more prevalent in the mobile phone market. Smart phones allow multiple cost effective platforms to be used and it appears that the utilisation of costlier messaging platforms such as SMS is diminishing.

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AMPS	All Media and Products Survey
CHAPS	Centre for HIV and AIDS Prevention Studies
CI	Confidence Interval
HIV	Human Immunodeficiency Virus
HREC	Human Research Ethics Committee
ICT	Information and Communication Technology
IMS	Instant Messaging Service
IQR	Inter-Quartile Range
MC	Male Circumcision
MI	Mobile Internet
NGO	Non-Governmental Organisation
SAARF	South African Audience Research Foundation
SBCC	Social and Behaviour Change Communication
SD	Standard Deviation
SEM	Socio-Ecological Model
SMS	Short Message Service
SRHR	Sexual, Reproductive Health and Rights
UNAIDS	Joint United Nations Programme on HIV and AIDS
UNDP	United Nations Development Programme
VMMC	Voluntary Medical Male Circumcision
WHO	World Health Organization
WITS	University of the Witwatersrand

CHAPTER 1 INTRODUCTION, AIMS, OBJECTIVES AND LITERATURE REVIEW

1.1 INTRODUCTION

South Africa's Human Immunodeficiency Virus (HIV) epidemic remains the largest in the world with an estimated 6.1 million people living with HIV in 2012 [1]. The epidemic has seen a slight increase in size since 2009 [1, 2]. According to the Joint United Nations Programme on HIV/AIDS (UNAIDS) 2012 Global Epidemic Report, there has been a 25% decline in HIV-incidence among adults in sub-Saharan Africa since 2001, with South Africa's reduction exceeding this average with a reduction listed between 26 and 49% [1]. At particular risk of infection are youth and young adults aged 15 to 24 years old [1-3].

Although antiretroviral treatment coverage, access and literacy have increased significantly in South Africa over recent years, long term treatment of HIV positive citizens remains a costly option [3-5]. There is a need to capitalise on these recent reductions in HIV incidence by intensifying the prevention of transmission, particularly among youth, as a high priority public health approach [2, 6]. International agencies and local HIV and AIDS actors have called for prevention activities to be locally owned, resourced, driven and monitored [3-5]. This community ownership approach has been termed the 'Prevention Revolution' in the latest UNAIDS global strategy, "Getting to Zero" [2].

One biomedical prevention option that lends itself to community ownership is voluntary medical male circumcision (VMMC). Low prevalence of male circumcision or incomplete male circumcision, as is typical in traditional circumcision methods, is known to have a direct correlation to high HIV prevalence [7]. From as early as the mid to late 1980s, observational studies have suggested a protective effect of Male Circumcision (MC), with lower HIV prevalence associated with communities where MC was widely practiced [7, 8]. More recently, randomised control trials (RCTs) in Kenya, South Africa and Uganda have demonstrated that VMMC has a significant protective effect by up to nearly 60% on male HIV acquisition from heterosexual transmission [8-11]. Auvert et al. have stated that the prevention effect of this biomedical intervention is roughly equivalent to what a high-efficacy vaccine could provide, and indeed, a 2013 study report on the effectiveness of the

VMMC roll-out programme in Orange Farm found that VMMC had led to a reduction in HIV incidence of up to 61% in the circumcised men of the targeted community [8, 12]. The World Health Organization (WHO) and UNAIDS now recommend including VMMC as a necessary biomedical component of HIV prevention packages in countries with high heterosexual HIV transmission and low VMMC prevalence [3, 4, 8, 9, 13, 14].

It is believed that three biological factors contribute to the susceptibility of uncircumcised men to HIV transmission. Firstly, the inner-foreskin contains a high concentration of HIV target cells called Langerhans cells [15]. This area of the foreskin is also more susceptible to sexually transmitted infections (STIs), known enablers of HIV transmission [15]. Finally, the soft inner-foreskin is also prone to micro-tears and abrasions that can also facilitate the transmission of HIV. By surgically and thoroughly removing the foreskin through VMMC, these risk factors are removed [15-17].

South Africa has an adult male circumcision prevalence of 35% to 45% [5, 18]. This range likely includes traditional circumcisions that do not meet the standards set out by the WHO policy guidelines. A 2011 study has reported that in order for South Africa to reach 80% VMMC coverage by 2015, roughly 4.3 million VMMCs would have to be conducted, and to maintain the 80% coverage for the next decade, an additional 5.9 million circumcisions between 2015 and 2025 would be required [18]. If successful in meeting these targets, the VMMCs performed until 2025 are expected to reduce new HIV infections by seven percent in 2015 and a remarkable 20% by 2025 [18]. In monetary terms, the report estimates a cost of US$ 605 for each averted HIV infection and a lifetime-treatments saving of US$ 2,795 [18]. The same study also indicates that in the medium to long term, increased VMMC coverage will lead to reduced HIV incidence in the adult female population, since women's exposure to HIV positive men will decrease [18].

In order for the epidemiological benefits of wide scale VMMC uptake to be realised, the procedure must be acceptable to a large enough sector of the target population. A 2006 review of 13 previous VMMC acceptability studies in Southern African countries where circumcision was not traditionally practiced, found that roughly 65% of the uncircumcised men were willing to become circumcised, and more than two thirds (69%) of women surveyed indicated that they prefer circumcised partners [19]. Although much research and

literature was obtained in preparing for this report, additional uptake barriers must be considered in further research, such as knowledge of the procedures benefits, availability, distance to services and perceptions of service provider [20].

One local organisation in South Africa seeking to increase VMMC uptake is the Centre for HIV/AIDS Prevention Studies (CHAPS). CHAPS provides free VMMCs through 28 community based clinics and hospitals in Gauteng, North West and Limpopo Provinces as well as providing training to doctors and nurses from all other provinces. Currently CHAPS employs a number of strategies to create awareness and demand in the communities where it operates [21]. These demand creation activities typically start with engaging the community leadership via formal political structures such as Ward counsellors as well as informal community structures like street committees. Consultation has also included traditional circumcisers who are active in the communities. From here a number of community workshop are scheduled with community organisations, including non-governmental organisations (NGOs) working in the area [21]. Their ongoing demand creation activities extend to the distribution of information pamphlets and a regular local call-in radio show that provides information and gets feedback from the community. To increase the visibility of VMMC in community settings, CHAPS has also erected billboards and has distributed posters and stickers in popular places where there is high passer-by traffic. CHAPS staff also give information talks in School and clinic settings [21]. CHAPS has trained community outreach staff who move through their community in a structured way and engage in face to face conversations with residents about VMMC.

While CHAPS has not used mobile technologies directly, another NGO, John Hopkins Health and Education South Africa (JHHESA), operates a project called Brothers4Life that has recently introduced a SMS service that directs males interested in VMMC to the clinic nearest them, including CHAPS clinics. There is a growing interest in how mobile information and technologies can support health interventions, in an approach broadly termed mHealth by the WHO [22, 23]. This research report presents data from a 2013 survey conducted by CHAPS that included questions related to how mobile technologies, including Short Message Service (SMS), Mobile Internet (MI) and Instant Messenger Service (IMS) platforms were being used by VMMC clients.

1.2 STUDY AIM AND OBJECTIVES

The overall aim of the study was to explore if and how SMS, IMS services and MI platforms can be mobilised as additional methods of demand-creation for uncircumcised men to access the free VMMCs provided by CHAPS.

The specific objectives were to:

1. Describe the socio-demographic profile of VMMC clients surveyed over the study period, overall and by cell phone ownership status
2. Describe cell phone use among surveyed VMMC clients that own mobile phones
3. Compare factors influencing the VMMC seeking behaviour of surveyed clients who own mobile phones, by the platforms used
4. Compare knowledge and beliefs about VMMC of surveyed clients who own mobile phones, by the platforms used

1.3 LITERATURE REVIEW

A literature review was conducted to determine what is already known about the use of mobile information and communication technologies in health service demand creation. The review also considers theories that have been applied to increase service uptake.

1.3.1 mHealth Applications

One common mHealth strategy identified is the use of SMS technology. SMSs are being used in health promotion programmes across the world, such as weight control, diabetes case management, HIV and AIDS knowledge sharing, disease treatment management and even acting as a reminder for follow up services for young men that have received VMMC [24], with promising results such as smoking cessation, increased physical activity and improved diabetes self-management and treatment adherence [13, 23, 25-30]. These studies can be divided into those using SMS technology primarily to 1) increase knowledge and awareness or, 2) serve as prompts or reminders for recipients to either take a concrete action, e.g. attending a clinic visit, or to adopt or maintain a desired behaviour, e.g. physical activity.

Studies have already shown SMS and chat platforms for health promotion activities are increasing message recipients' adherence to follow up services and medication, as well as improved sexual health knowledge and even literacy and numeracy skills [31-34]. No published peer-reviewed studies were found to include other cellular telephone or mobile internet based messaging platforms as demand creation channels for VMMC seeking behaviour, although a 2013 World Bank report on mobile phone usage amongst the poorest sectors of South Africa's population found at least 12 locally produced mHealth applications and SMS services in operation, of which at least six were serving the HIV and AIDS response [35]. The WHO has reported that there is supporting logic for interventions that make use of mHealth approaches, but indicates that few studies have been conducted to show the efficacy of mHealth interventions, particularly in low income countries [3, 23, 30].

A critical consideration for developing communication strategies, including demand creation, is channel selection. Communication channels are defined as what means or medium are used to deliver a message or content to the target audience. Channels can include forms of interpersonal means of communication, or mass media etc [36]. In this case, mobile phones and the messaging platforms they offer (SMS, IMS, and MI) are of primary interest. More expensive handsets allow users to utilise instant messenger and mobile internet platforms that rely on data consumption while basic, low-cost, mobile phone models are able to receive and send SMS messages, thus catering to clients of all ages, mobile-phone-technology literacy and income groups [22].

In addition to channel selection, the content of demand creation messages must be appropriately tailored to account for the perceived barriers and motivations of the target audience. Accurate target audience segmentation is a key factor to enhancing the efficacy of a communication campaign as it allows the campaigner to better understand the specific communication habits and needs of the various target groups, as well as increasing the effectiveness and cost efficiency of the various demand creation approaches [37, 38].

Mobile phones also provide health promotion practitioners with multiple benefits in reaching target audiences in that they are portable, almost always switched on, and allow communicators to engage in mass communication activities that deliver messages directly into the hand of the intended recipients [26, 27, 31, 39]. Some limitations regarding the use

of mobile telephones have been identified as limited space in SMS' at 160 characters, language barriers, low literacy, limited or no access to electricity to charge mobile phones, and low access to technical support in rural areas, as well as low levels of security and privacy in settings where mobiles are shared amongst multiple users [23, 35].

In terms of reach, mobile telephones are shown to be highly prevalent in South Africa than any other Information and Communication Technology (ICT) device or channel, with less than 10% of South African households surveyed in 2011 reporting to not have at least one cellular telephone in the home [40-42]. According to data tables within the 2011 Statistics South Africa General Household Survey report, black men living in Gauteng were most likely to have access to a mobile telephone than any other group in South Africa [41]. The ongoing advancement of mobile phones to allow data transfer and internet access also means that more 'Technology-Poor' or 'ICT Have-nots' will be able to access the ever increasing knowledge content of the internet, socialise in digital domains and be reached in shorter times and at lower costs [43].

1.3.2 Behavioural Theory Review

According to Heckler et al (2013), behaviour change theories are generally applied for any of the following three broad outcomes: 1) To inform the design of SBCC programmes and technologies; 2) To guide the evaluation of SBCC programmes and strategies; and 3) to define target users or recipients [44]. In an effort to link this study with behaviour change and prediction theory, a review of various, well established theories and models showed the Integrated Model of behaviour change to have the most appropriate mix of constructs aligned with this study's own objectives and variables.

The Integrated Model brings together theoretical constructs from a number of theories and models of behaviour change, most notably the Theory of Planned Behaviour, as well as incorporating constructs from the Health Belief Model and the Social Cognitive Theory [45-49]. The model proposes that behaviour is determined largely by an individual's intentions to act which are influenced by the individual's attitude towards the behaviour, their perceived norms relating to the behaviour and their belief about their ability to perform the behaviour in the presence of barriers to the behaviour. The model integrates other external,

environmental factors as well as skills and abilities required to perform and sustain the behaviour [45, 49].

Mostly, the constructs that are concerned with how the perceptions of an individual motivate and influence their readiness to perform a specific behaviour [47]. The premise of the theory is that attitudes towards behaviours, subjective norms about what a person thinks others think about the behaviour and the individual's perceived behavioural control predict their intention to engage in the behaviour or the behaviour itself [47].

Another important theory that informs the design of communication interventions is the Socio ecological model (SEM). The core principles of the SEM are based on the premise that there are multiple spheres of influence on an individual's specific health decisions and behaviours. These include internal influencers within the individual, comprising of biological and psychological factors that can act as determinants of the health behaviours. The next sphere represents influential elements that can exist within an individual's immediate family and household. Beyond the familial, the next sphere of influence is the community which represents possible determinants associated with one's neighbourhood and community. The fourth, outer most sphere of influence considers factors that may influence a person's health decisions and behaviours from a broader societal sphere such as national legislation or economy. Some influences interact across these different spheres and as such, literature suggests that multi-level interventions, including those addressing demand creation, are more effective at changing behaviour than programmes that target a single sphere of influence [50, 51]. With the SEM, it is possible to integrate constructs from other theories, such as the Integrated Model for behaviour change.

A search for theory-based interventions using mobile technologies identified one mHealth study that used text messages to increase the self-efficacy of young type 1 diabetes mellitus sufferers to adhere to increased insulin treatment [52]. Self-efficacy is a construct that refers to the conviction that one can successfully execute the behaviour required to produce the outcome, and is thought to be a critical antecedent to behaviour change as well as an important factor for maintaining healthy behaviours [46, 53, 54]. Beyond this study, there seems to be a gap in theory-based demand creation interventions.

Having a better understanding of the communication habits of the target audiences, mHealth programmers should know what knowledge and beliefs pertaining to the health issue exist within the target population. Theories such as the Integrated Model of behaviour change can assist communication practitioners to frame questions in a particular way to gain insight both into the individual perceptions as well as the contexts that influence decision-making [49]. The use of different mobile phone platforms, e.g. SMS versus mobile internet, may be proxies for other factors, such as socio-economic status. This depth of audience segmentation can provide mHealth campaigns with valuable insight into what types of content to provide in their messaging campaign, as well as what beliefs may influence the message recipients acceptability of the content [55].

1.4 STATEMENT OF THE PROBLEM

As noted in the introduction, three RCTs in Kenya, Uganda and South Africa have shown that VMMC reduces the risk of heterosexual HIV transmission to men by up to 60% [17, 18]. This has resulted in a WHO/UNAIDS recommendation to promote VMMC as part of comprehensive HIV prevention programming [5, 17, 56]. In order for South Africa to achieve the level of VMMC uptake required to meet targets, significant investment needs to be made in generating demand [18]. CHAPS is leading the VMMC drive in Gauteng, North West and Limpopo Provinces of South Africa with over 24,000 free VMMCs provided in 2011; 42,000 in 2012 and 67,000 in 2013 [44].

At the conceptualisation of the primary study, literature suggested that mobile technologies could offer CHAPS additional channels for contacting and inviting potential clients in their catchment communities [13, 23, 25-30]. No studies were identified that specifically explored the use of SMS, IM and MI technologies as a means to recruit young men to access free VMMC services. Furthermore, the theoretical basis for using mobile technologies for demand creation was largely unexplored, despite literature showing generally that mHealth interventions were achieving desired results in some applications. Finally, there was a lack of literature available that outlines what demand creation content would be most effective for mHealth campaigns targeting uncircumcised men in Gauteng, South Africa. Questions about client mobile phone ownership and use were included in the study, but not analysed.

1.5 JUSTIFICATION FOR THE STUDY

Given the high prevalence of mobile phones in South African society, combined with the importance of increasing VMMC demand for HIV prevention, this study proposed to analyse the data collected by CHAPS to contribute practical information on whether or not they should consider adding mobile technologies to their existing demand creation channels. In addition to CHAPS, such information could inform other organizations and government initiatives as to how to increase VMMC demand in the province, particularly since there have not been any studies on the feasibility of using SMS, MI and IM as demand creation channels for VMMC in South Africa.

1.6 SUMMARY

The utilisation of cellular telephony messaging platforms to increase demand for free VMMC services may enable HIV and AIDs prevention practitioners such as CHAPS to use a modern and widely prevalent communication tool to incorporate additional channels into their demand-creation activities. It is expected that the proposed study will generate knowledge of the types of messaging platforms that could feasibly be used as communication channels to enhance demand for the CHAPS VMMC services, as well as providing insight into relevant content that could be used to inform demand creation messages by platform type, if significant differences are identified by platform.

CHAPTER 2 METHODOLOGY

2.1 STUDY DESIGN

The study design was a secondary analysis of cross-sectional quantitative questionnaire data collected from a sample of uncircumcised VMMC clients over a seven month study period from 1 March to 7 October, 2013. The quantitative questionnaire formed part of a larger research agenda on VMMC demand creation initiated by CHAPS.

2.2 STUDY SETTING

The primary study survey questionnaire was administered by study assistants at three CHAPS clinics in the Gauteng province in South Africa where CHAPS provides free VMMC services within the Gauteng Province. The selection of the sites was determined by the high numbers of VMMC clients accessing the free services.

Gauteng is the smallest of nine provinces in South Africa. With a population in 2011 of over twelve million, within a geographical land area of a little more than eighteen thousand square kilometres resulting in an average population density ratio of 675 people per square kilometre [57, 58]. This population density, along with two major economic business centres located within and around the cities of Johannesburg and Pretoria have led to the province serving as the economic hub of South Africa with a national Gross Domestic Product contribution of more than 30% [59].

The three CHAPS Clinics are located within Gauteng Province; Chiawelo and Zola clinics are situated in the urban township of Soweto on the outskirts of Johannesburg. Soweto has a population slightly more than 1.25 million covering a geographical area of 200 square kilometres, resulting in a population density of 6,357 people per square kilometre[60]. The third clinic is located in the semi-urban township of Orange Farm located approximately 45 kilometres outside of Johannesburg; the community covers an area of roughly 12 square kilometres. The Orange Farm community population density is 6,311 per square kilometre, slightly lower than in Soweto but is also far exceeding the provincial average [61].

The clinics provide services to boys and men above the age of 10. All adult men have to consent and boys younger than 18 also have to provide parental consent. The target population is the catchment area around each clinic, although there is no restriction for males from other areas attending the clinics. Similarly, all males who present themselves for the service, even non-South Africans, are provided with the VMMC service. CHAPS includes men of all sero-status, but HIV positive men generally have to get a CD4 test first; they are not routinely excluded.

2.3 POPULATION

The study population for the primary quantitative study were uncircumcised males aged 15 and older who sought out the free VMMC services from the Orange Farm, Zola and Chiawelo circumcision clinics in Gauteng, which are managed by CHAPS. To be eligible, they had to be literate in English, isiZulu or SeSotho.

2.4 SAMPLE STRATEGY

The study sample was comprised of all uncircumcised males over the age of 15 who consented to participating in the study and completed a pre-surgery questionnaire at their first visit to one of the three VMMC clinics run by CHAPS over the study period.

After piloting a systematic cluster sampling approach in February 2013, CHAPS decided to offer every eligible client an opportunity to participate in the survey. It was intended that the questionnaire would be administered at each clinic every day, from Monday until Saturday, over the course of the study period, with a target to achieve a sample size of 1920, based on the primary study research questions and sampling power calculations. However, in practice, some clinic staff decided to suspend offering the questionnaire during particularly busy periods, e.g. school holidays, leading to gaps in information. As such, it was not possible to calculate actual response rates. Rather, the data available merely shows the proportion of all VMMC clients who actually participated in the study. The low participation rates should not be read as synonymous with refusal rates, as many eligible males were never offered a chance to complete the questionnaire.

Furthermore, during the study period there was a policy change that enabled patients under age 18 to give VMMC consent directly, without parental consent, while the study still required parental consent for this age group, creating a barrier for their involvement.

Table 1 summarises the proportion all VMMC clients that participated in the study, by clinic:

Table 1: Study Participants as Proportion of All VMMC Clients, Per Clinic (%)

Clinic	**Eligible males**			**Study Participants**			**Proportion (%)**		
Age	***15-17***	***18 +***	***Total***	***15-17***	***18 +***	***Total***	***15-17***	***18 +***	***Total***
Orange Farm	1056	1514	2570	1	497	498	0.1	32.8	19.4
Zola (Soweto)	1050	2929	3979	2	460	462	0.2	15.7	11.6
Chiawelo (Soweto)	363	1091	1454	1	238	960	0.3	21.8	66.0
Totals	***2469***	***5534***	***8003***	***4***	***1195***	***1199***[1]	***0.2***	***21.6***	***15.0***

In the end, 1207 completed questionnaires were received, captured and used for this secondary data analysis study.

2.5 DATA SOURCE AND MANAGEMENT

The source of secondary data for this study was derived from of a self-administered questionnaire consisting of 20 questions (See Appendix A). Participants who consented to the study filled out the questionnaire prior to group education sessions at the clinic. Participants were given a choice of language in which they wanted to complete the questionnaire. The counsellors read through each question in English and explained the answer format, e.g. single choice, multiple choice, or ranking, while participants completed the questionnaire themselves. They also provided questionnaires and clarifications in isiZulu or SeSotho, if required. The questionnaires were collected prior to continuing with the regular clinic procedures. They were collected weekly from each clinic and entered centrally into an Excel database.

[1] Primary study n= 1,207 however 8 observations were missing age data

Counselors from the three clinics were trained on study recruitment processes and the questionnaire itself in mid-February, 2013. During the training, they provided additional feedback on the isiZulu and SeSotho translated surveys. Following the training, they were given one week to pilot the study in their clinics prior to initiating the formal study.

The 20 questions were grouped into sections pertinent to the objectives of the primary study. It captured data to describe socio-demographic profile of the study sample as well as data to enable a comparison of factors that influenced the VMMC seeking behaviour of the surveyed clients who own mobile phones, by the platforms they used on their mobile phones, including cell phone use amongst the surveyed VMMC clients.

Quality assurance measures for research data from tool development to analysis is a key consideration for the research to produce results and knowledge of high standards, built from sound procedure [62]. A number of quality assurance measures were put into place in both the primary study design and implementation and the secondary data management phases and analysis. The primary study sought to collect data by sampling respondents from multiple sites within the Gauteng province, ensuring a wide range of catchment areas and serviced community members were targeted by the study. The questionnaire tool was piloted and revised, first in 2012 and then again in February, 2013, prior to data collection.

Clinic counsellors were trained on recruiting respondents in February 2013, ensuring that informed consent was correctly and consistently received and they were also trained to be able to provide assistance to respondents who were completing the self-administered questionnaire. Each questionnaire was given a unique code for identification in the event that the data had to be checked at a later stage.

CHAPS utilised existing data-capture staff to receive and capture the questionnaires into a Microsoft excel database. The data capturers were trained on the tool and they were included to participate in the design of the database. Based on their experience in capturing the data from the pilot questionnaires, combined with their past experience in capturing similar study variables, a coding protocol was developed to ensure standardised data capturing took place with the proper study data as it came in over the course of the data collection phase.

For the secondary study the statistical analysis software package Stata (version 9, STATA Corp., College Stations, Texas, USA) was used for all descriptive and analytical tests. Prior to analysis for the secondary study, the data were carefully inspected in a number of layouts and formats to identify and correct or exclude any data that were incomplete, inconsistent or not relevant for each variable [62]. This phase of the data processing proved invaluable as it enabled the development and saving of the Stata 9 syntax or 'do file', required for statistical analysis.

The data cleaning process involved scrutinising the filtered variable columns and data tables for accuracy of capture as well as generating graphic representations of the data in stem and leaf plots and graphs to quickly identify any outliers or unusual data distributions [63]. Any inconsistencies or questionable data identified were noted and the corresponding completed survey was located and cross checked with the database on the CHAPS premises. The data cleaning also led to the identification of problematic coding procedures, thereby enabling recoding to be planned and implemented prior to statistical tests and analysis being conducted.

Open ended questions in the pre-surgery survey required careful coding into meaningful categories. Initial coding was done by CHAPS staff, but was reviewed by myself and the study supervisors for quality assurance purposes and to ensure goodness-of-fit for statistical tests.

In addition, data for a number of variables were re-coded following the data cleaning process and preliminary significance and distributions tests revealed coding flaws, low cell counts, or skewed distributions that would have prohibited meaningful analysis. A further benefit realised during the data cleaning process was that the analysis plan, as proposed in the study protocol, could be more carefully assessed for validity.

2.7 DATA PROCESSING METHODS AND ANALYSIS

Any variables that were transformed for this study were re-coded in Stata 9.

The study protocol had proposed five objectives for the study. However, the original third and fifth objectives be combined as they were technically very similar and were better discussed as a single objective.

The first objective of this secondary data analysis study aimed to describe the demographic characteristics of the surveyed VMMC clients, which included information about age, household composition, marital status, and primary language.

The questionnaire had respondents indicate their age at last birthday, in years. For analysis, age was explored as both a continuous and a categorical variable. Age data were re-coded into five categories: 15 to 20 years, 21 to 25 years, 26 to 30 years, 31 to 35 years, and the final category included ages 36 years and old. This was done so as to make analysis easier when comparisons and associations would be conducted and presented.

For household size and composition, the questionnaire provided a list of possible cohabiters and required the respondent to indicate how many of each person they lived with. To calculate household size, these numbers were added together. Each type of cohabiter data, e.g. mother, father, brother(s), etc. were also tested separately.

Respondents indicated their marital status based on nine response options. Upon initial data checking and cleaning, it was decided, for this secondary analytical study, to collapse some of the categories given the small numbers of people selecting some options. The final categories used in analysis were: Single; Committed and Living Apart; Committed and Living Together; Married; and Divorced and Widowed.

The questionnaire invited participants to write in their primary language. Each of the 11 Official South African languages, as well as Shona, Shangaan (predominantly spoken in Zimbabwe) and Portuguese (Mozambique) were coded during the data capture phase. Given the low counts for some languages, the five most prevalent were included while all other languages were combined into a category ‘Other’.

To address the second objective, mobile phone ownership and use patterns were explored. To assess mobile phone ownership, a dichotomous Yes/No question was used. The questionnaire asked respondents to write in the mobile network(s) they use. During data

capture, it was noted that there were four networks that featured predominantly in the responses, and there were also a number of participants who listed multiple networks. These were re-coded into a 'Multiple' category for easier analysis.

The primary survey tool contained a number or questions that asked participants to identify what types of messaging platforms they used on their mobile phones, as well as asking respondents to indicate whether they shared their mobile phone with anyone else in their family, also by way of a closed ended question with dichotomous response, "Yes" or "No". During the analysis planning phase, it was conceived that a high number of participants would likely indicated "Yes" for more than one type of messaging platform; therefore a number of categories were devised to address this possibility: No Platform, SMS Only, Instant Messenger Service (IMS) and Mobile Internet (MI), and any combination of IMS and / or MI and SMS. It was decided to keep SMS as a standalone option as the high prevalence of 'feature' phones in the South African market indicated many users were relying on mobile handsets with lower technology functionality.

The third objective of the secondary data analysis study sought to compare factors and reasons that the surveyed participants reported had influenced them to access the VMMC services. Respondents were asked to select what the main sources of information were that influenced their decision to access the VMMC at the study clinic. The respondents were asked to rank the top three sources, with one being the most influential and three being the 3rd most influential.

During data capture it was noted that the ranking was not properly completed and this required a new approach to analysing the data. A count of all selected information sources replaced the ranking approach and all captured data were re-coded so that each option became a dichotomous variable, yes or no. The top three scoring information sources were then selected and analysed by messaging platform used and were tested for significance using Pearson's chi squared test and are displayed in *Table 6.*

To determine whether interpersonal or mass media channels were considered more influential, the variables under each broad information type were combined to create three new categorical variables: Interpersonal, Mass Media and any combination of the two. The

categorised information source data were then compared by messaging platforms used and are described in *Figure 9.*

Respondents were asked to select the additional factors that they felt had influenced them to attend the VMMC clinic. *Table 7* displays the proportion of respondents that selected each factor by messaging platforms used. Each variable was tested for significance using Pearson's Chi Squared test or Fishers Exact test, as appropriate.

For analysis of the reasons that led to the participants accessing VMMC, the data for each reason was tabulated to produce a count of all coded responses, displayed in *Figure 11*. Each options was then analysed by messaging platform used and tested using Pearson's chi squared test, except for the option 'Other' which was tested using Fisher's exact test due to the small cell counts.

A final re-code was conducted on this same data so that categories of reasons were created: options pertaining to the health of the respondent or that of their sex partner were categorised as "Health". Options pertaining to social norms and values were categorised "Social" and all options relating to sex and penile aesthetics were categorised "Sexual". The percentage scores for each category are displayed in *Figure 11*. These categories were then analysed by messaging platform used, and tested using Pearson's chi squared tests. The data are described in *Table 9*.

In line with the fourth objective of this study's protocol, data were collected to compare knowledge and beliefs about HI and VMMC of surveyed clients who own mobile phones, by the messaging platforms used. Knowledge about VMMC, prevention of HIV and other sexually transmitted infections as well as VMMC healing were tested based on "Agree", Disagree" or "Unsure" responses to the six statements and an 'Unsure' response was counted and reported as 'Unsure' as this remains an important consideration for the demand-creation campaigner when developing content for this sub-group of the target audience.

A knowledge scale comprising of four re-coded categories was developed based on the total number of correct responses. The data was re-coded so that a correct response was coded

as '2' in the dataset, an unsure was coded as '1' and any incorrect response was coded as '0' therefore a higher score was achieved as more correct responses were given. The categories for knowledge are Low Knowledge (0 – 49%), Average Knowledge (50%), Partial Knowledge (51 – 91%) and Full knowledge (100%). Analysis was then conducted on the sum and the scores could therefore range from 0 (no correct responses) to 12 (all responses correct). It is important to note that three statements were reverse coded in the questionnaire, requiring the respondents to select 'Disagree' as the correct response. The data were analysed by messaging platform used, source of VMMC information, as well as by age category and are described in *Figure 12* and in *Table 10*. Significance testing was conducted using either the Pearson's Chi Squared tests.

Personal beliefs about VMMC, prevention of HIV and other sexually transmitted infections as well as VMCC healing were tested, and were also based on "Agree", Disagree" or "Unsure" responses to belief testing statements. The belief statements data was re-coded so that responses to belief statements were scored '2' for a response considered to be a positive belief, '1' if the respondent indicated they were unsure or neutral to the statement, or '0' if their response was negative and one statement was reverse coded in the questionnaire.. The first category was titled Poor Belief Score (0-7 score), the second was titled Average Belief Score (8), the third category was titled Positive Belief Score (9 – 15 score), and the last category titled Strong Positive Belief Score (16). The data of the distribution of the belief scores are displayed in *Figure 13.* These data were analysed by messaging platform used and are presented in *Table 10*. Significance testing was conducted using either the Pearson's Chi Squared or the Fishers Exact test, as appropriate.

2.8 ETHICS

In accordance with the South African National Health Act 61 of 2003 [64] , CHAPS applied for and received WITS Human Research Ethics committee (HREC) approval for the primary study (See Appendix B), as did this secondary data analysis research (See Appendix C).

Both study protocols included ethical considerations in line with the ethical principles of the Belmont Report on ethical principles and guidelines for the protection of human subjects in research [65].

As the primary study's protocol proposed, all males who attended the education session were invited to participate in the pre-surgery questionnaire, including an informed consent process for all study participants. As described in the limitations section of this report, the sampling of participants deviated from the original sampling plan. Specifically, due to high demand for services during the study period, clinic counsellors did not offer every eligible VMMC seeking client an opportunity to participate in the survey.

Study participants aged younger than 18 years were required to seek parental consent and ascent to participate in the study. The informed consent included the purpose of the study, the protection of confidentiality, and the lack of benefits or negative consequences from participating and also indicated the data would be shared for secondary analysis, but all data would be anonymous.

For this secondary data analysis study, data security was a key ethical consideration. CHAPS provided their Excel database containing the primary survey data, as well as access to the participants completed questionnaires, for quality checking. Data were provided to the researcher in Excel table form by electronic transfer directly onto a password and antivirus protected laptop as well as location-based desktop personal computer. Back-ups were performed once weekly onto an external hard drive.

Data have not been shared with any third party other than the researcher's supervisors and will not be distributed via any electronic means other than direct transfer between devices. No questionnaires left the CHAPS premises and all data cleaning and checking was conducted at the CHAPS offices.

CHAPTER 3 RESULTS

The purpose of this study was to determine whether demand creation strategies for promoting VMMC to uncircumcised South African men could feasibly include mobile messaging platforms such as SMS, Mobile Internet (MI) and Instant Messenger Services (IMS). The study therefore undertook to gather data that would describe the measureable characteristics of uncircumcised men already voluntarily accessing the free VMMC services provided by CHAPS, as well as collecting data to inform demand creation programmers about the mobile platform based messaging preferences of the VMMC clients participating in the study.

Figure 1: Responses Per Community (%)

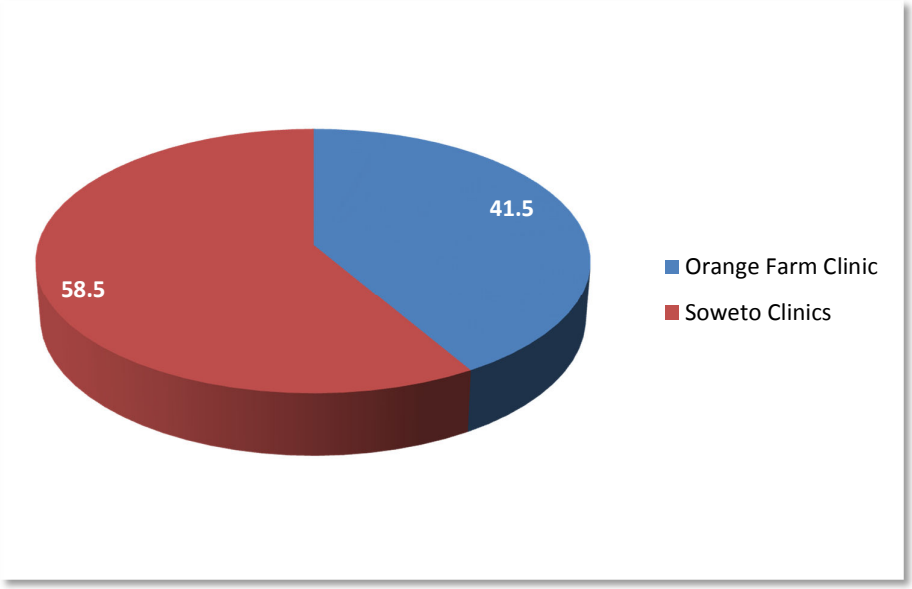


Figure 1 displays the proportion of respondents per community. The clinic at Orange Farm provided the most completed surveys with 41.5% of survey respondents seeking VMMC treating at the facility during the study period. The Zola clinic in Soweto submitted 38.5% of completed surveys. Only 19.9% of the study respondents' surveys were received from Chiawelo clinic in Soweto. Considering the population sizes in each community along with the fact that VMMC have been provided and promoted in Orange Farm for longer than in Soweto, it is not surprising that the combined proportions (58.5%) from the two Soweto clinics exceed the proportion of respondents from Orange Farm.

This chapter presents the study findings, beginning with a description of VMMC clients' socio-demographic factors; mobile phone usage preferences; factors that influence VMMC decisions within the study population; and associations with their knowledge and beliefs about VMMC and as well as reasons for accessing the CHAPS VMMC services.

3.1 SOCIO-DEMOGRAPHIC PROFILE

For this secondary data analysis study, the socio-demographic characteristics collected were Age, Household Characteristics, Relationship Status and First Language. The variables were analysed for all respondents (n=1,207) and are displayed in *Table 2* and then compared by mobile phone ownership in *Table 3.*

Table 2: Socio-demographic Profile of Sample

Characteristic	Yes (%)
Age (%) n= 1,199	
15-20	19.1
21-25	31.3
26-30	22.2
31-35	12.8
36->	14.7
Language (%)n= 1,166	
IsiZulu	49.1
SeSotho	28.1
Setswana	8.4
Xitsonga	4.7
IsiXhosa	4.6
Other	5.2
Household Size (%) n= 1,127	
Lives Alone	7.7
Lives with one other	29.8
Lives with two others	17.8

Lives with three or more	44.6

Live With (Yes %)

Mother *n= 1,205*	45.1
Father *n=1,204*	23.7
Brothers *n=1,166*	42.1
Sisters *n= 1,163*	33.2
Sex Partner *n= 1,196*	23.2
Other *n=1,192*	19.6

Married (%) n= 1,084

Single	34.9
Committed apart	40.6
Committed together	13.2
Married	10.2
Divorced / Widowed	1.1

Mobile Phone Owned (%) n= 1,196

Yes	92.7

Platform Combinations Used (%) n= 1,095

No Platform Used	8.0
SMS only	27.3
IM and Internet	3.7
Combination with SMS	61.0

The primary study survey required the respondents to indicate their age at last birthday, in years only. In analysing the respondents age as a continuous variable, 1,199 observations were analysed after excluding observations with missing data. As per *Tables 2 and 3,* most respondents were located in the second and third age categories between 21 and 30 years old.

Figure 2: Age Distribution

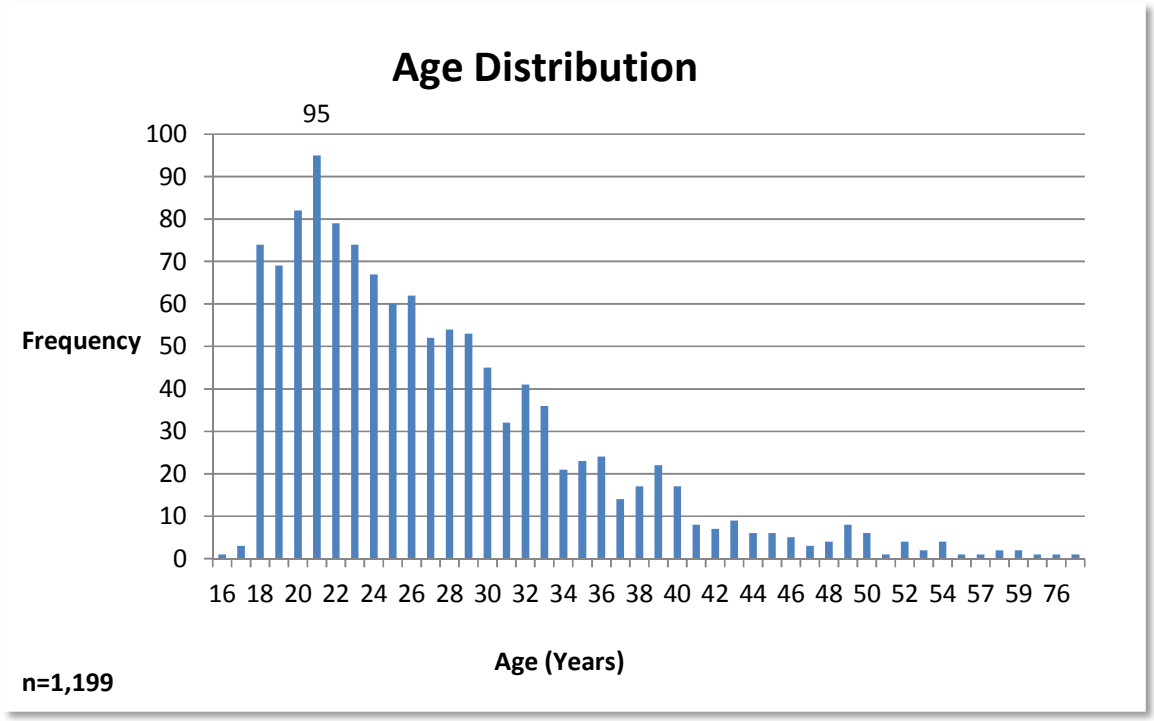
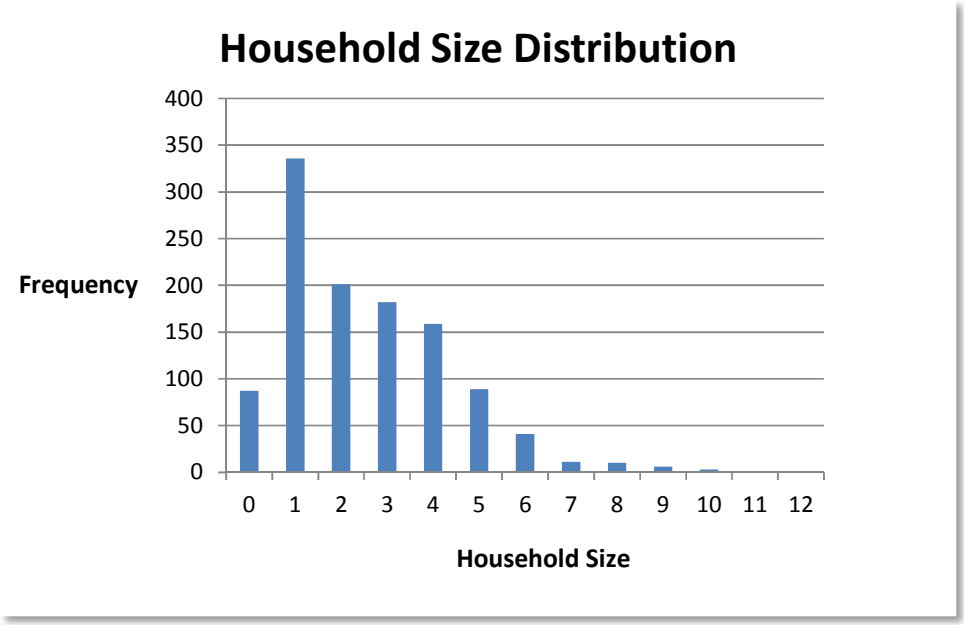


Figure 2 presents the age distribution of the study participants. The ages of the respondents were positively skewed around the late teens to mid-twenties in a unimodal distribution. The youngest respondent was 16 years old with the oldest being 77 years. The mean age was 27.4 years with a standard deviation (SD) of 8.1 years. The interquartile (IQR) range for the age data was 21 to 31 years and the median age was 25 years.

Figure 3: Household Size Distribution

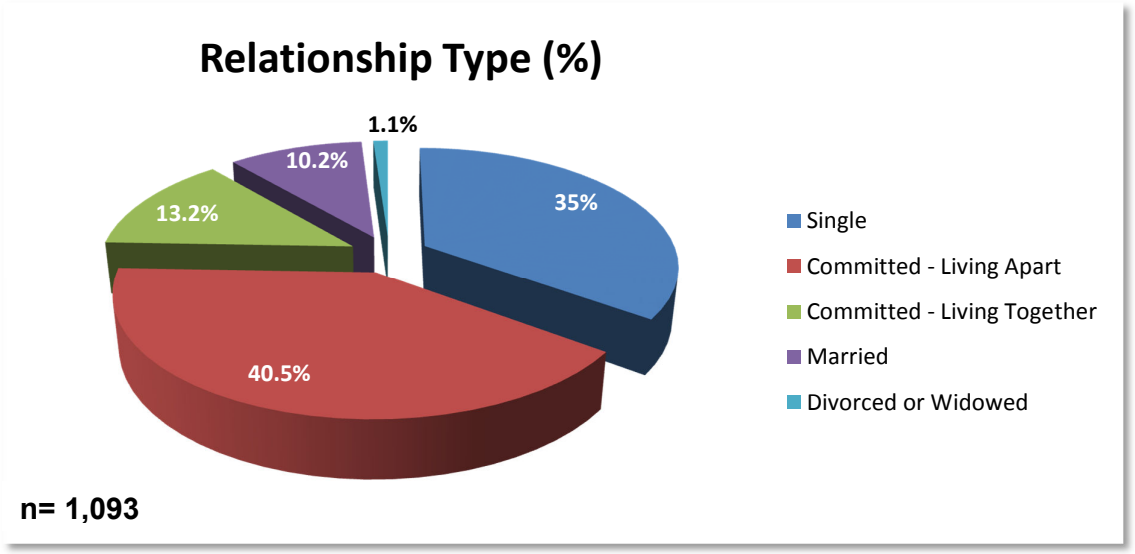


The continuous variable for household size was analysed for distribution and is presented in *figure 3.* There was a broad range in the size of households in which participants lived, ranging from living alone (7.7%) to living with 12 other people (0.1%). The distribution was positively skewed towards living with one (29.8%) to three other (16.2%) people. The mean number of cohabiters per household was 2.6 (SD= 1.9), with a 95% confidence interval of 2.4 to 2.7. The median number of cohabiters was 2.0 and the IQR was 1.0 – 4.0.

Nearly half (45.1%) of all respondents indicated that they lived with their mother but less than one quarter of respondents (23.7%) lived with their fathers. Slightly less than half of study participants lived with at least one brother (42.1%), roughly a third lived with at least a sister (33.2%) and almost a quarter of respondents reported living with a sex partner(23.2%).

Figure 4 presents the relationship types that the clients reported they were involved in (n= 1,093)

Figure 4: Relationship Type (%)



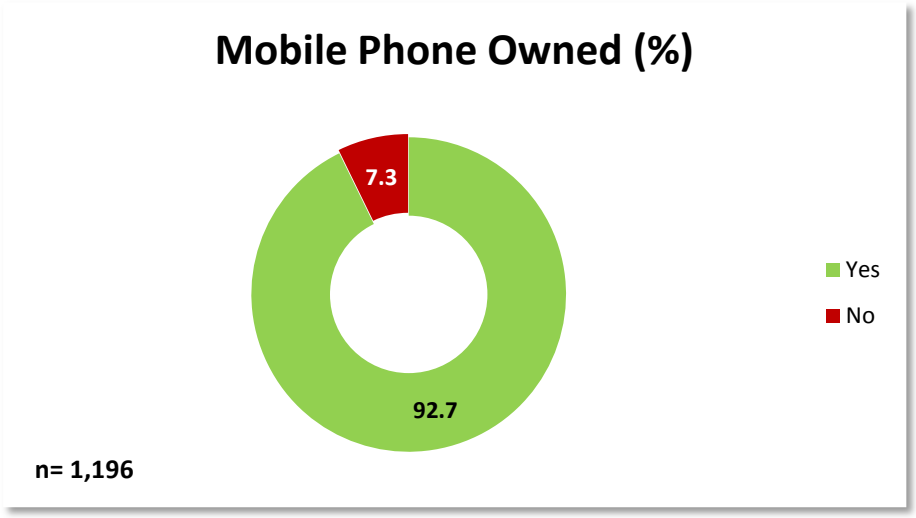
It is interesting to note from *Figure 4* that the type of relationship most reported by the study's respondents is being in a committed relationship and they do not live with their partner (40.5%) and yet respondents in a committed relationship who are living with their partner were only third most prevalent (13.2%). Single respondents were the second largest group by type of relationship (35.0%).

This questionnaire asked participants to identify their primary language. isiZulu speakers made up the biggest language group, accounting for almost half (49.2%) of the study sample. The next largest group were seSotho speakers, with slightly more than one quarter (28.0%) followed by seTswana speakers at almost one tenth (8.4%) of the study sample.

3.2 MOBILE PHONE USE PATTERNS

As demonstrated in *Figure 5*, Mobile phone ownership amongst the study participants was high (92.7%) with only one fifth of mobile phone users (20.6%) indicating that they share their phone with any other person.

Figure 5: Proportion of Sample Owning a Mobile Phone



One of the fundamental objectives of the primary study was to generate data that could be used to attempt segmentation of clients into target groups with different mobile phone usage behaviours. To that end, *Table 3* displays the socio-demographic data by mobile phone ownership.

Table 3: Socio-demographic Data by Mobile Phone Owned

		Mobile Owned		
Characteristics	**(%)**	**Yes**	**No**	**p Value**
Age (years) *n=1,188*				
15-20	19.0	85.0	15.0	p< 0.001
21-25	31.3	92.5	7.5	
26-30	22.1	95.0	5.0	
31-35	12.9	96.7	3.3	
36->	14.7	96.6	3.4	
Household Size *n= 1,116*				p= 0.041*
Lives Alone	7.7	96.5	3.5	
Lives with one other	29.8	95.2	4.8	
Lives with two others	17.6	91.8	8.2	
Lives with three or more	44.9	90.6	9.4	

* Denotes Fishers exact test of association was used due to at least one cell count being less than 5

Lives With				
Mother *n= 1,205*	45.1	90.5	9.5	P= 0.008
Father *n=1,204*	23.7	90.1	9.9	p= 0.048
Brothers *n=1,166*	42.1	90.8	9.2	p= 0.029
Sisters *n= 1,163*	33.2	90.3	9.7	p= 0.043
Sex Partner *n= 1,196*	23.2	95.6	4.4	p= 0.035
Other *n=1,192*	19.6	92.2	7.8	p= 0.782
Married *n= 1,084*				p= 0.015*
Single	34.9	91.8	8.2	
Committed apart	40.6	91.8	8.2	
Committed together	13.2	94.4	5.6	
Married	10.2	98.2	1.8	
Divorced / Widowed	1.1	75.0	25.0	
Language *n= 1,166*				p= 0.904*
IsiZulu	49.1	93.0	7.0	
SeSotho	28.1	92.1	7.9	
Setswana	8.4	94.9	5.1	
Xitsonga	4.7	90.9	9.1	
IsiXhosa	4.6	92.5	7.5	
Other	5.2	91.7	8.3	

As shown in *Table 3*, age categories were analysed by mobile phone ownership. Analysis shows that most respondents were located in the second and third age categories between 21 and 30 years old. Mobile phone ownership in the study cohort was also concentrated within these same age range (53.8%). These data were tested for significance using a Pearson's chi square test, which showed that age is significantly associated with mobile

phone ownership. Clients under the age of 21 were significantly less likely to own a mobile than any other age group.

Analysis of household size by mobile phone ownership was conducted using four household size categories (*see Table 3)*. This analysis showed that respondents living alone or with one other person were significantly more likely to own a phone than those living with two or more people (p=0.040). The Fishers Exact test was used to measure this association, since the counts for some of the table cells were less than five. The data infer that the fewer number of people the respondents lived with, the greater the likelihood they would own a mobile phone. Slightly more than 96.0% of respondents living alone reported owning their own phone, versus 90.6% of respondents living with three or more other people.

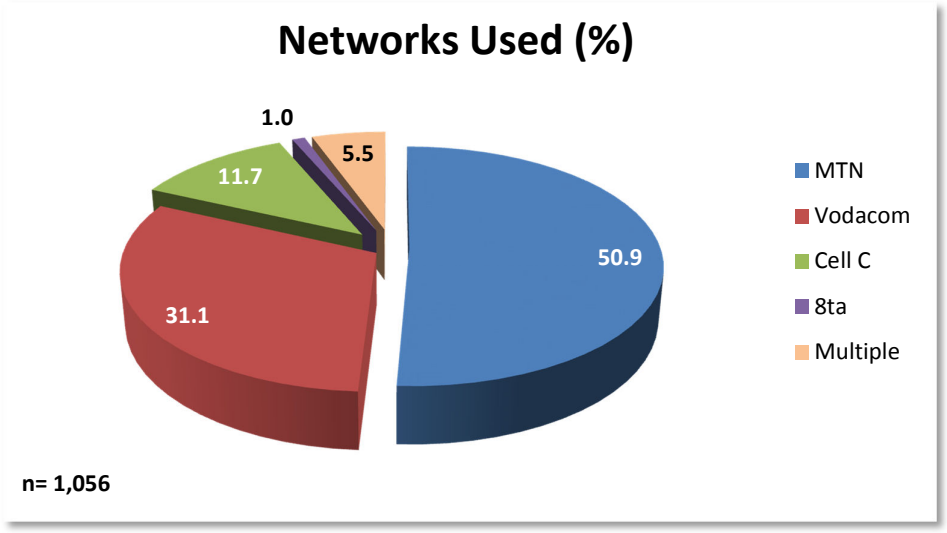
Mobile phone ownership was also analysed by the type of people the respondents were living with. A significantly higher (p=0.008) proportion of clients that did not own a mobile phone lived with their mothers (58.6%) compared to clients who did own a mobile phone (44.0%). Similarly, a significantly higher percentage (p= 0.048) of clients that did not own a mobile phone (32.6%) lived with their fathers than with mobile phone owning clients (23.1%). Living with at least one sibling and owning a mobile was also shown to be significant. A significantly greater proportion (p= 0.029) of clients who did not have their own mobile phone lived with one or more brothers (53.6%) than mobile phone owning clients (41.4%); this was also true (p= 0.043) for respondents living with at least one sister, as nearly half of respondents who did not own a mobile phone (43.0%) lived with a sister compared to approximately one third of mobile phone owning respondents (32.4%). The only cohabiter where the reverse was true was sex partners. The association between mobile phone ownership and living with a sex partner was also significant (p= 0.035) however a greater proportion of clients who owned a mobile phone (23.9%) lived with their sex partner than clients that did not own their mobile phone (14.0%). For participants who lived with at least one other person, and owned a mobile phone were most likely to live with their mother (44.0%), and / or at least a brother (41.4%). Mobile phone ownership for clients who lived with any other person was not significantly different (p= 0.782).

As shown in *Table 3*, respondents who were married, or in a committed and cohabiting relationship were significantly more likely (p=0.015) to own a mobile phone than single,

divorced / widowed or respondents that were in a committed relationship but were living apart from their partner. The data suggest that living with their partner is a strong indicator that the client will own a mobile phone. According to the data, the proportion of isiZulu speakers and Setswana speakers who owned mobiles was slightly higher than other language groups, but this difference was not statistically significant (p= 0.904).

The study also sought to determine how mobile phone owners used their mobile phones by network, platform, e.g. for SMS, other instant messenger platforms, and mobile internet, and sharing. *Figure 6* displays the proportion of respondents using different mobile networks.

Figure 6: Mobile Network Operators Used (%)



Two service providers clearly dominate the mobile network market amongst the respondents of this study, with a combined market share of more than 80%. The most represented networks were MTN (50.9%) and Vodacom (31.1%), with the third most represented operator, Cell C, being reported by slightly more than one tenth of respondents (11.7%). A fourth operator, 8ta, was used the least amongst the surveyed VMMC clients (1.0%). Some clients (5.5%) reported using multiple networks.

The questionnaire also collected data on the types of mobile based messaging platforms used by phone owners, through closed-ended dichotomous questions for mobile phone owners. These findings are presented in *Table 4.*

The majority (89.1%) of mobile owners indicated that they used SMS as a communication platform. Both Mobile Internet (MI) and Instant Messenger Service (IMS) platforms were used less than SMS, but both were used by more than half of the study's mobile phone users with MI being used by 56.5% and IMS by 55.6% of mobile phone owners. To better understand mobile phone use, these data also were analysed to see what combinations of these platforms were being used by the clients participating in the study. The sharing of phones was also assessed. These findings are also included in *Table 4*.

Table 4: Mobile Messaging Platforms Used (%)

Platforms Used (%)	**Yes**
Uses SMS (n= 1,056)	89.1
Uses Mobile Internet (n= 1,099)	56.5
Uses Instant Messengers (n= 1,094)[2]	55.6
Platform Combinations Used (%)	
No Platform	8.0
SMS Only	27.3
Instant Messenger and Mobile Internet	3.7
Combination, including SMS	61.0

Table 4 demonstrates the dominance of SMS amongst the participants in the study. While most handsets are capable of SMS and at least one other platform, slightly more than one quarter of all respondents utilise only SMS (27.3%). In addition, nearly two thirds of respondents reported using at least one other platform alongside SMS in their message platform use (61.0%). A very small percentage of the surveyed clients used IM or IMS

[2] The n size for each of the platforms used is due to the design of the primary study questionnaire which asked participants to indicate if they used this platform or not, thus resulting in some missing data when respondents did not select a platform

without using SMS at all (3.7%). Eight percent of respondents reported using no message platform at all.

Platform data were analysed by network as well as by age category data as depicted in *Figures 7 and 8*.

Figure 7: Platforms Use by Network (%)

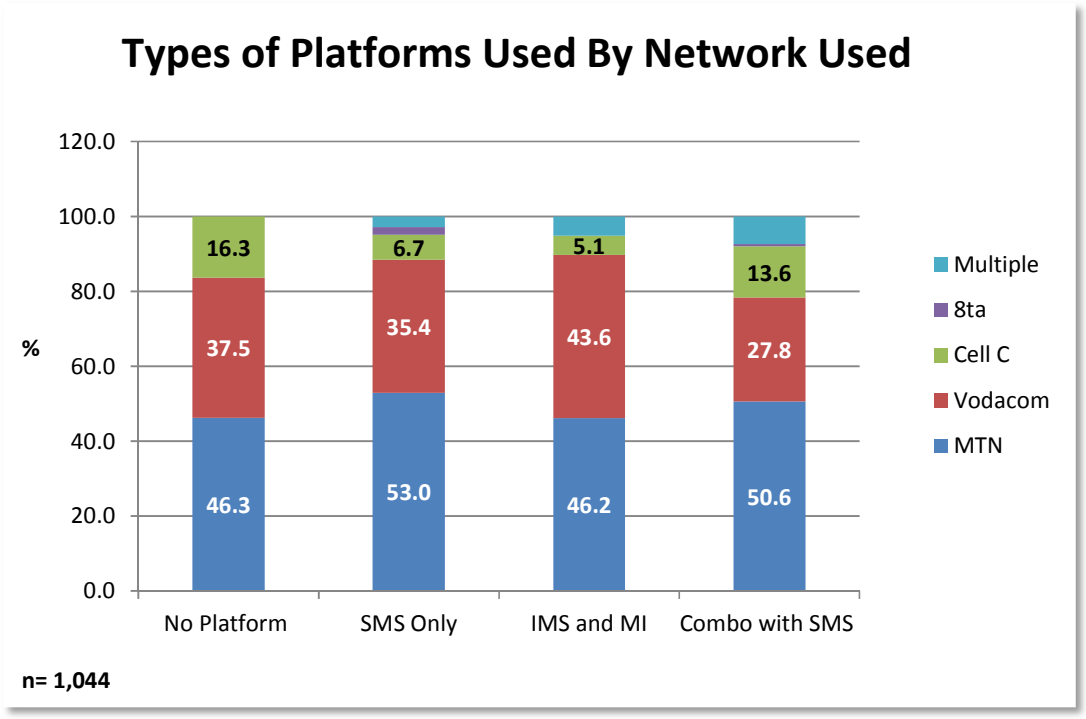


Figure 7 (n= 1,044) shows how dominant MTN is as the main mobile network service provider amongst the participants in the study as it is the most reported network used in each platform of combination used. The platform category where MTN was only marginally more reported was for IMS and MI. For this category, 43.6% of respondents reported Vodacom as their network service provider, compared with MTN who were reported by 46.2% of participating clients. The association between network provider and platform used was tested using the Chi squared test, and was shown to be extremely significant ($p<0.001$).

Figure 8: Platforms by Age Category (%)

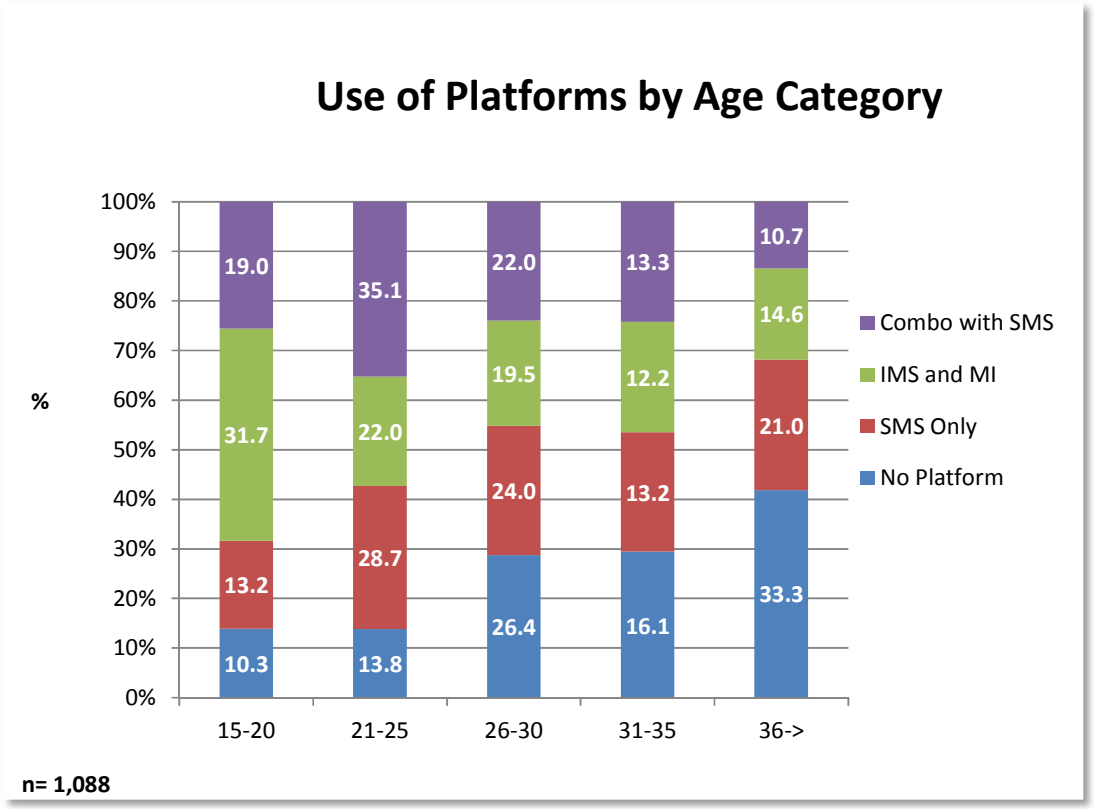


Figure 8 displays the proportion of platforms used by each age category. The use of IM and Internet without SMS was most likely to be used by participants aged 15 to 25 years old (31.7% and 22.0%), with SMS being the least popular message platform amongst 15 to 20 year olds (13.2%). The youngest age group were also the least likely to not use messaging platforms at all (10.3%). The respondents aged 21 to 25 were more likely to use all of the platforms (35.1%) than any other age group. They reported using SMS the most (28.7%) out of all age groups and IMS and MI second most (22.0%) while they also reported not using any messaging platform second least (13.8%) after the youngest age group. It should be noted that there is an increasing likelihood of no messaging platform being used as age increases, and an increase in the use of IMS and MI amongst younger users. These association between age and platform was shown to be highly significant using Pearson's chi squared ($p<0.001$).

3.3 SOURCES OF HIV AND VMMC INFORMATION

Table 5 displays the information sources that the study participants indicated had most influenced their decisions to come to the VMMC clinic. These sources are categorised as being either interpersonal or mass media sources.

Table 5: Information Sources (%)

n= 1,204	
Interpersonal Communication	**(%)**
Friend	56.9
Clinic Recruiter	30.1
Male Family Member	24.5
Sex Partner	17.9
Female Family Member	11.0
Someone Circumcised	7.8
School Talk	7.5
Mass Media	**(%)**
Radio Programme	27.7
Billboard	13.4
Pamphlet	13.1
Poster	9.5
SMS	2.4
Coupon or Voucher	1.4
Other	3.2

Table 5 shows that more than half (56.9%) of respondents felt that information they had received from friends was influential in their decision to come to the clinic for VMMC. Another interpersonal communication source, clinic recruiters, were reported as second

most influential (30.1%), while radio programmes, a mass media source, was selected third most (27.7%).

An analysis of the three most selected sources of information amongst mobile phone users was conducted by messaging platforms used as a means to determine or map information sources that could potentially be used as influencers in future demand creation activities. This analysis is presented *Table 6.*

Table 6: Top Three Information Sources by Messaging Platform (Yes %)

Source *n= 1,092*	**Yes (%)**	**No Platform**	**SMS Only**	**IM & Internet**	**Combo with SMS**	***p value***
Friend	56.6	47.1	53.2	63.4	58.9	0.078
Clinic Recruiter	29.2	31.0	34.0	24.4	27.1	0.152
Radio Programme	28.1	20.7	29.3	29.3	28.5	0.449

None of the associations between information sources and messaging platform used was statistically significant. Study participants who reported friends as an influential information source seemed to use IMS and MI without SMS more than respondents who recorded clinic recruiters or radio programmes as having influenced their decision to access the VMMC clinics.

Figure 9 displays the outcomes of this analysis in a stacked column chart. The data show that interpersonal communication was the predominant source of influential information amongst mobile phone using clients when analysed by platforms used (48.8% - 63.2%), followed by the category of combined sources (31.0% - 46.2%). Mass media as the only source of information that influenced mobile phone users to access the VMMC clinic scored low by comparison (4.9% - 6.8%). Clients who owned a mobile phone, but did not use any messenger platforms selected interpersonal sources the most (63.2%). Respondents who used a combination of mobile internet and instant messenger platforms including using SMS, scored interpersonal only sources and combinations of interpersonal and mass media

similarly (48.8% and 46.2%), but still scored mass media alone, very low (5.0%). Overall, these associations were not significant (p= 0.117).

Figure 9: Information Source Categories by Messaging Platforms (%)

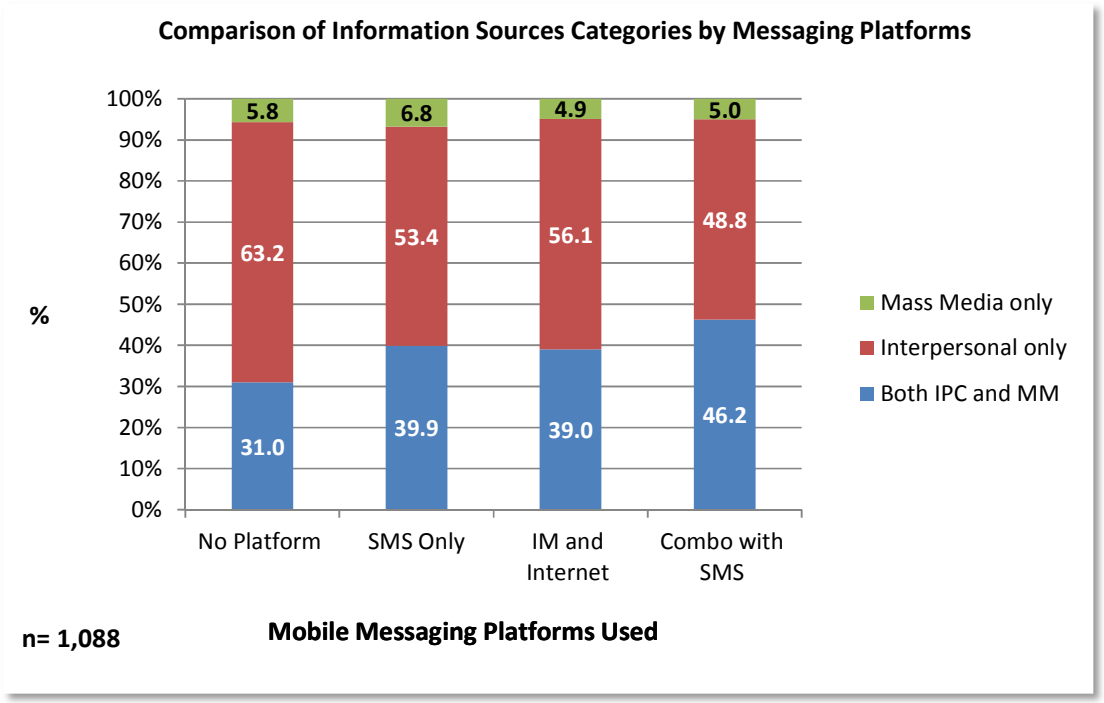


Table 7: Influential Factors by Messaging Platforms (%)

n= 1,199						
Factors	**Yes (%)**	**No Platform**	**SMS Only**	**IM & Internet**	**Combo with SMS**	***p***
Safe Circumcision	66.1	56.3	69.3	62.5	67.4	0.136
Free Circumcision	55.6	47.1	60.5	50.0	55.9	0.125
Good Reputation	43.2	35.6	42.2	40.0	45.4	0.311
Convenient Location	34.3	28.7	30.1	20.0	38.2	0.009
Only VMMC Clinic I Know	33.5	35.6	35.1	37.5	31.9	0.663
Convenient Hours	19.4	14.9	22.3	17.5	18.7	0.387
Other Services Here	14.9	9.2	17.9	10.0	14.1	0.143
Other	0.4	0.0	0.0	0.0	0.6	0.585

Data on additional factors that influenced clients to access the CHAPS VMMC clinics also were collected. These are detailed, in total and by platform used, in *Table 7*. Safety and cost were two factors that frequently influenced study participants selection of the VMMC clinic study sites. The safety of circumcision was selected as a key reason for attending the specific VMMC clinics by two thirds of the study participants (66.1%) and more than half of the study respondents indicated that they were influenced to select the clinics because the circumcisions were free (55.6%). The good reputation of the CHAPS was another influential factor (43.2%). These did not differ significantly by the mobile platforms used. The only factor that differed significantly by platform used was the convenience of the clinics location (p= 0.009), which was selected significantly more often by those using a combination of platforms and less by those using only IM and IMS platforms.

Figure 10 and *Table 8* display data on the reasons that influenced participants' decisions to access VMMC. This analysis was done as a means to test whether VMMC demand creation should consider ways to promote or refer to the selected reasons using different platforms for better segmentation of audiences. *Figure 11* is based on re-coded data whereby ranks provided were converted into simple counts so that options could be ordered according to the number of times they were selected. The green column indicates the only reason that was shown to be significant by messaging platform used using Pearson's chi square test of association.

Figure 10: Reasons to get Circumcised

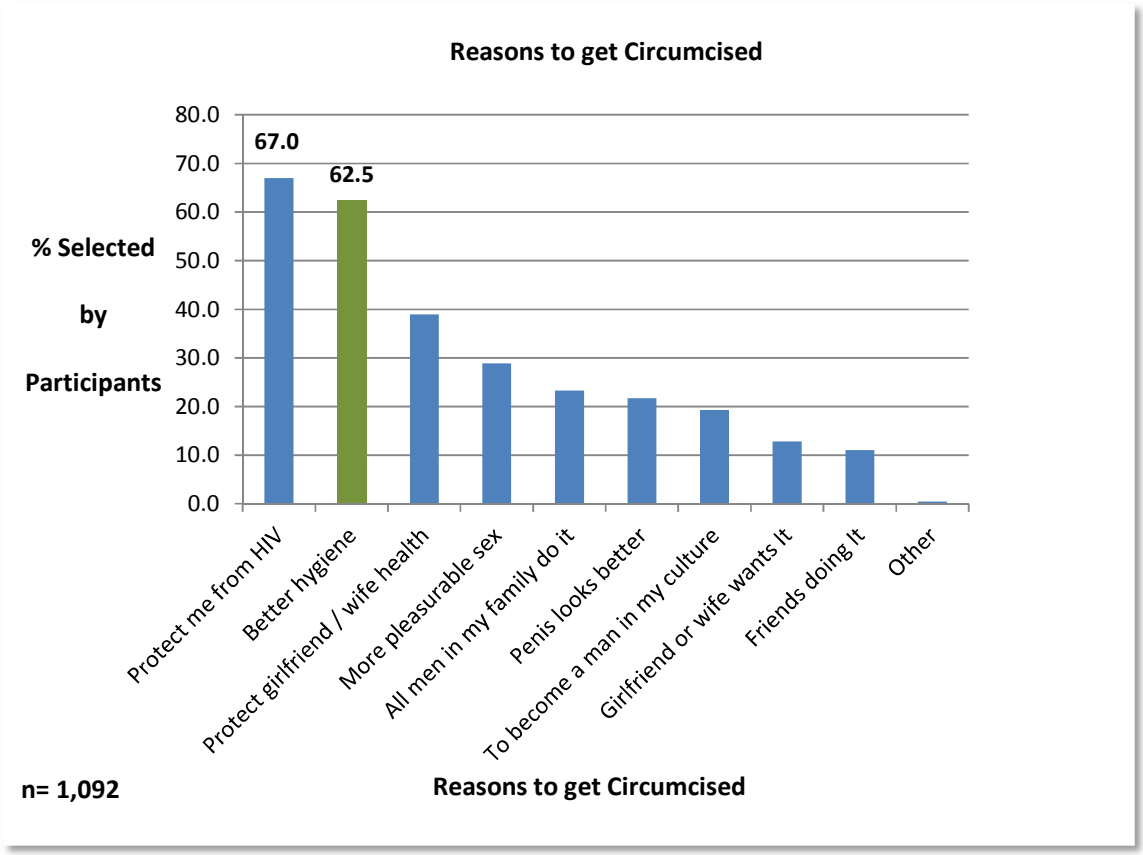


Table 8: Top Three Reasons to get Circumcised by Messaging Platform (%)

n= 1,088 Reasons	Yes (%)	No Platform	SMS Only	IM and Internet	Combo with SMS	*p value*
Protect Me From HIV	66.3	35.6	42.2	40.0	45.4	0.311
Better hygiene	62.2	44.2	60.4	68.3	65.4	0.001
Protect Girlfriend / Wife Health	37.9	34.9	36.6	41.5	40.3	0.584

Personal protection from HIV transmission was selected by the most participants (67.0%) as a reason to get circumcised. The data in *Table 8* shows the most used messaging platform amongst the group who selected this reason was SMS (42.2%). Better hygiene was selected second most often (62.2%). This reason, when analysed by messaging platforms used was

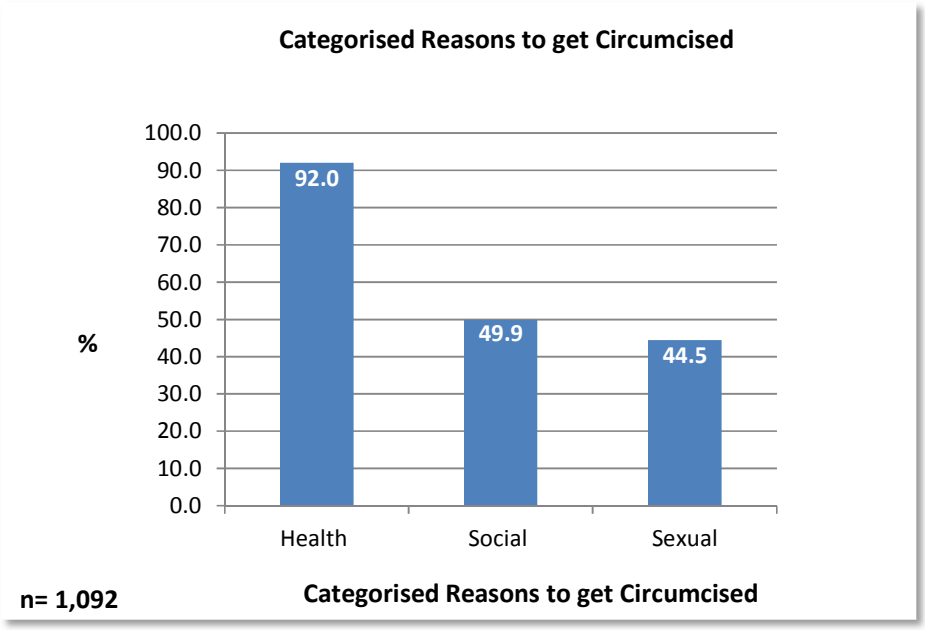
shown to be highly significant (p= 0.001) with respondents who selected this option more likely to use IMS and MI (68.3%) for messaging than any other combination. Respondents who selected protection from HIV and who did not use any messaging platform (61.6%) were more represented than for any other reason.

The analysis by platforms demonstrates that clients who selected better hygiene as a reason for getting circumcised are more likely to use mobile phone messaging than any other reason.

The protection that circumcision offers men was also selected among the top three reasons men ranked for getting circumcised. This did not differ significantly by messaging platform used (p=0.219), nor did more pleasurable sex differ significantly by messaging platform (p=0.362). Among the top three first ranked reasons was that all the men in respondents' families do it. An analysis by platforms used revealed that respondents who ranked this as their main reason for getting circumcised were significantly less likely to use mobile messaging platforms (p=0.017). This reason did not appear in the second or third ranked top three lists. The top selected third ranked reasons participants listed for getting circumcised was to protect their girlfriend or wife from HIV. This differed significantly (p=0.034) by platform use, with a higher proportion of those who use the SMS platform only (19.1%).

The reasons to get circumcised were categorised into three broad categories, namely Health, Social and Sexual. *Figure 11* displays the percentage of respondents that selected each category therefore the data presents a proportion of count of each type of reason selected by members of the study group. Health reasons were selected by nearly all participants (92%); this was more than double the proportion of participants who indicated sexual reasons for getting circumcised (44.5%).

Figure 11: Categorised Reasons to get Circumcised



These categories were then analysed by messaging platforms used, as detailed in *Table 9*. No significant differences were noted.

Table 9: Reasons to get Circumcised by Messaging Platform

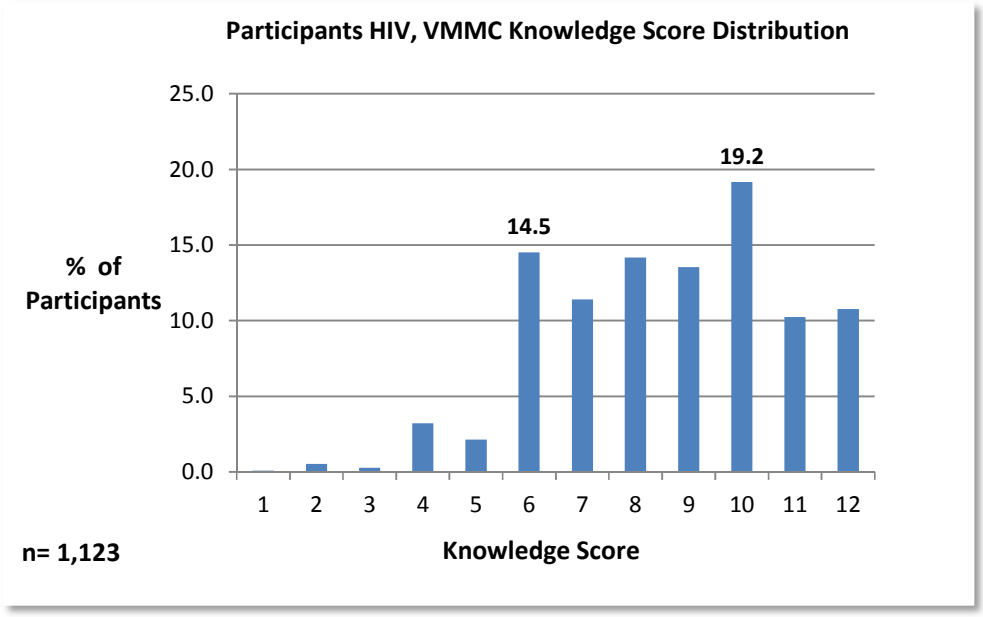
n= 1,092	**Yes %**	**No Platform**	**SMS Only**	**IM & Internet**	**Combo with SMS**	***P value***
Reasons for Circumcision (%)						
Health	92.0	88.4	94.0	95.1	92.2	0.319
Social	49.9	61.6	48.0	46.3	49.0	0.136
Sexual	44.5	44.2	46.0	36.6	44.7	0.730

3.4 KNOWLEDGE AND BELIEFS REGARDING HIV AND VMMC

Participants' knowledge of HIV, VMMC and healing were tested by way of a Knowledge Scale which listed six statements that they were required to agree or disagree with, for a

knowledge score of between 0 and 12. The distribution of continuous Knowledge Scale scores is presented in *Figure 12* (n= 1,123).

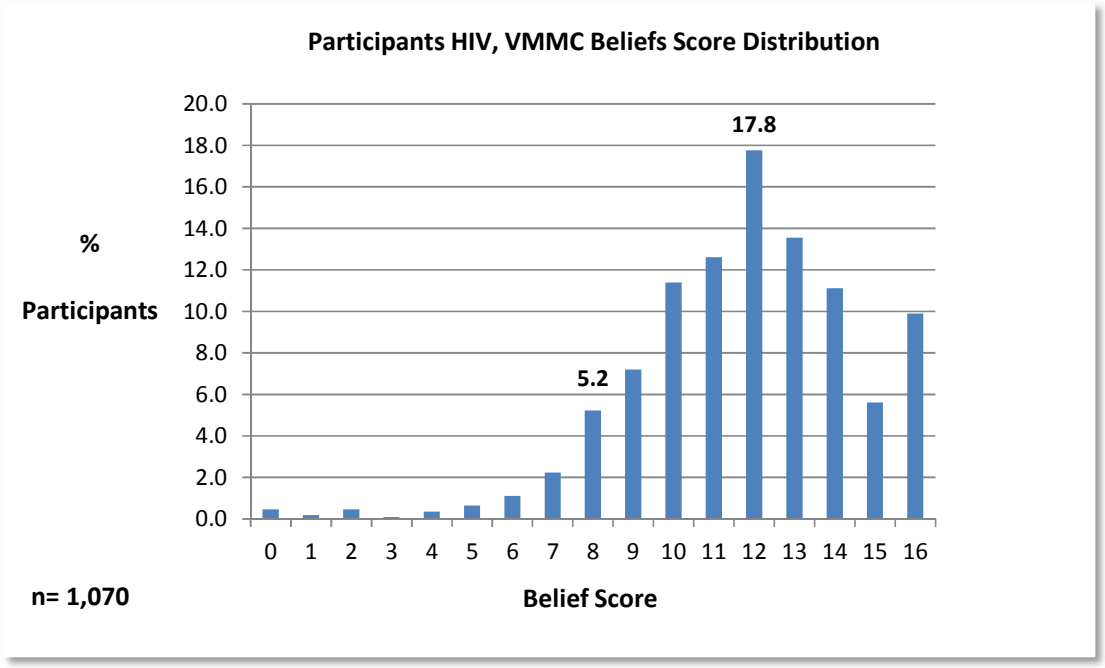
Figure 12: Participants HIV and VMMC Knowledge Scores Distribution



The data show a negatively skewed distribution with most participants (93.8%) scoring six or more, with a higher score indicating better knowledge. The mode for the knowledge data was a score of 10.0 (19.2%) and the highest score attained was a full 12.0 out of 12.0 possible (10.8%). The mean score for the knowledge data was 8.6 (95% CI: 8.5 – 8.7) with a standard deviation of 2.2 and a median of 6.5 and an IQR of 4.0-9.0.

Figure 13 displays the distribution of the continuous Belief Scale scores for the study respondents (n= 1,070), with higher scores indicating more positive beliefs about VMMC.

Figure 13: Participants HIV and VMMC Beliefs Score Distribution



These data show a negatively skewed distribution with most participants (89.2%) indicating positive beliefs (a score of more than 8.0). The mode for the belief data was a score of 12.0 (17.8%) and the most positive belief score attained was a full 16.0 (9.9%). The mean for the belief scale was 11.8 (95% CI: 11.6 – 11.9) with a standard deviation of 2.8, with a median of 8.5 and the IQR 4.0-12.0.

Table 10: Knowledge and Belief Scores Analysis by Messaging Platform

	Yes %	No Platform	SMS Only	IMS & Internet	Combo with SMS
Knowledge	**n= 1,123**	**by Platform (%) n=1,123**			
Low Knowledge (0-49%)	6.2	11.0	6.7	11.1	4.2
Average Knowledge (50%)	14.5	25.6	15.0	8.3	11.4
Good Knowledge (51-91%)	68.5	61.0	68.5	75.0	71.8
High Knowledge (92-100%)	10.8	2.4	9.7	5.6	12.5
P<0.001 (Chi Squared)					
Belief	**n= 1,070**	**by Platform (%) n= 972**			
Poor Belief Score (0-7)	5.6	2.8	3.8	3.1	6.3
Average Belief Score (8)	5.2	5.6	5.3	3.1	5.1
Positive Belief Score (9-15)	79.3	77.5	82.8	87.5	79.7
Strong Positive Belief (16)	9.9	14.1	8.0	6.3	8.9
p= 0.023*					

Following the categorisation of the Knowledge and Belief Scale data, analysis was conducted by the type of messaging platform used. These data are displayed in *Table 10*. Most respondents (68.5%) demonstrated good knowledge of VMMC, with. significant differences in knowledge by platforms used (p<0.001). When analysed by messaging platform, most respondents (75.0%) who indicated that they used a mix of IMS and IM were found to have a good knowledge. The group of study participants that reported using a combination of messaging platforms with SMS were found to have the highest proportion of high knowledge observations (12.5%), followed by the SMS only category (9.7%). Those clients who did not use any messaging platform scored the worst in knowledge about HIV and VMMC; 36.6% of the No Platform category had a poor knowledge score compared with only

* Fisher's exact test used

21.0% of the next worst performing group. The inverse was true for the group that used a combination of messaging platforms that included SMS, with 88.3% having above average knowledge scores.

The majority of study participants (79.3%) had positive beliefs about VMMC, with nearly one tenth possessing strong or highly positive beliefs (9.9%). The No Platform group's belief data was heavily skewed towards positive (77.5%), and this group also had a higher proportion of Strong Positive (14.1%) beliefs than any other group. Clients who reported using IMS and MI without SMS had the highest combined proportion of above average belief scores (93.8%), whereas clients who reported using a combination of messaging platforms including SMS had the smallest combined proportion of observations with belief scores above average (88.6%). These association were shown to be significant (p= 0.023).

3.5 RESULTS SUMMARY

Although the study design and protocol aimed to sample at least 1,920 clients of the CHAPS circumcision clinics, a number of factors lead to a final number of 1,207 clients being surveyed. The Orange Farm clinic provided the greatest proportion of respondents (41.5%), while the Chiawelo clinic provided the least (19.9%). IsiZulu was the predominant language of the sample (49.1%), followed by SeSotho (28.1%). The highest proportion of participants in the study was between the ages of 21 to 25 years old (31.3%), with over half of the study sample below the age of 26 years.

Almost half of all participants lived with at least three others (44.6%) and the person that the most participants reported living with was their mother (45.1%), in stark contrast to the proportion living with their father (23.7%). Participants also reported living with sex partners (23.2%). Roughly two thirds of all respondents reported being in a committed relationship (63.9%) and the relationship reported the most was a committed relationship where the study participant did not live with their partner (40.6%). Single participants (34.9%) made up more than one third of the study population.

Mobile phone ownership was high amongst study participants (92.7%) with the likelihood of mobile phone ownership increasing with age as shown in *Table 3* Participants aged 31 to 35

years old were the most likely to own a phone (96.7%) while those 15 to 20 years were least likely to own a mobile (84.9%), although mobile ownership was still high. The sharing of mobile phones was reported by slightly more than one fifth of the mobile phone owning participants (20.6%).

The cellular telephony network service provider utilised by the more than half of the participants was MTN (50.9%). The vast majority of participants indicated that they used SMS for messaging (89.1%), while more than half of the respondents reported using IM and IMS (56.5% and 55.6%). Nearly two thirds of the mobile phone owners in the study indicated that they used a combination of messaging platforms that included SMS (61.0%). Participants in the 21 to 25 year old age group were the most likely to use a combination of platforms that included SMS (35.1%), while the participants in the youngest age group were more likely to use IMS and MI without SMS (31.7%). Participants who were 36 years or older were the most likely to not use any messaging platform (33.3%).

More than half (52.1%) of the respondents indicated that it was information received from interpersonal communication channels that lead to their decision to access free VMMC. Combined sources that included mass media as well as interpersonal channels were reported as being influential by 42.8% of respondents. The most influential information source recorded was friends (56.9%). Additional factors that influenced participants were the perception that VMMC was a safe procedure (66.1%), and the knowledge that it was free (55.6%). When additional factors were analysed by messaging platforms used, the convenience of the clinics location was shown to be significant ($p= 0.009$) in that it was selected significantly more often by participants who used a combination of platforms included SMS, and less by those using only IM and IMS platforms.

The majority of participants (76.3%) had an above average knowledge of HIV and VMMC. Participants with the highest knowledge scores were most likely to use a combination of messaging platforms that included SMS (12.5%). Similarly, the vast majority of participants held positive and strong positive beliefs regarding HIV and VMMC (89.2%).

The study also aimed to determine whether health, social and or sexual reasons were viewed as reasons for accessing the VMMC services. Almost all respondents (92.0%)

selected a reason related to health for getting circumcised whereas close to half (49.9%) of participants reported a social reason. Marginally fewer participants (44.5%) indicated a reason relating to sex or sexuality. Protection from HIV was (66.3%) followed by 'Better hygiene' (62.2%) were the top reasons for getting circumcised. When the reasons for getting circumcised were analysed by messaging platform used, 'Better hygiene' was shown to be significant ($p<0.001$).Those who selected improved hygiene used IMS and MI platforms without SMS the most (68.3%), and participants who reported becoming a man as a reason were most likely not to use any messaging platform (25.6%).

CHAPTER 4 DISCUSSION AND LIMITATIONS

Uptake of VMMC across Southern Africa, including South Africa, remains relatively low, but recent research shows there may be an upswing in support for and access of VMMC with around 65% of uncircumcised men indicating their willingness to undergo VMMC, and 70% of women indicating that they favour circumcised partners [19, 66].

The overall aim of the study was to explore if mobile phone based messaging platforms, such SMS, IMS services and MI, can be utilised by SBCC programmers to generate additional demand for the VMMC services such as those provided by CHAPS clinics in Gauteng, South Africa. The study design sought to describe the socio-demographic profiles of CHAPS VMMC clients that own mobile phones and what mobile phone messaging platforms they use. It also explored what influencing factors lead the clients to access the free VMMC services and their HIV and VMMC pertinent knowledge and beliefs according to the mobile platforms they use. This section discusses the findings presented in Chapter 3.

The theoretical implications of the study results must also be taken into consideration. In the literature review, the Integrated Model of Behaviour Change was highlighted as a possible framework to explain or predict VMMC uptake in the context of the CHAPS primary study. For the purposes of the study, it is assumed that the surveyed VMMC clients had a strong perception of control over the behaviour of seeking VMMC as they had already elected to undergo VMMC. Therefore, from a theoretical perspective, this discussion will focus mostly on describing the data related to client's attitudes and subjective norms about VMMC, along with describing the socio-demographics of the surveyed sample, which may speak to the social ecology in which they make their sexual, reproductive health and rights (SRHR) decisions.

4.1 FACTORS ASSOCIATED WITH ACCESSING VMMC SERVICES

The socio-demographic characteristics of the study participants provide insight into the profile of males who are accessing the VMMC clinics in Gauteng. This type of information is useful for audience segmentation. With this audience insight, social and behaviour change communication (SBCC) practitioners can better target their health promotion activities such

as VMMC demand creation programmes, within the target communities, borrowing knowledge from commercial marketing's consumer orientation principles [67].

Almost three quarters (72.4%) of participants in this study fell between the ages of 15 and 30 years old. According to a 2002 national survey, Connolly et al (2008) found that men aged 15 to 24 years (32.8%) had the lowest circumcision prevalence in South Africa [68]. As such, it is not surprising that males in this age group were seeking VMMC in this study. This finding was also in line with the age ranges of individuals seeking and receiving VMMC in other studies in similar South African settings. In Orange Farm, South Africa, Auvert et al (2013) found that men aged 15 to 29 years old had the greatest levels of VMMC uptake (53.0% - 59.7%) when compared with other age groups in the study. Lissouba et al (2010) found that roughly three quarters of surveyed participants were willing to receive VMMC and that more than half (52.2%) of those respondents were aged 21 years or younger [12, 68]. These studies' findings, alongside the results from this study, imply that there remains great demand and opportunity for VMMC amongst uncircumcised community members aged 15 to 30 years due to lower circumcision rates within this age group combined with seemingly high levels of acceptability of VMMC [12, 68, 69].

Behaviour change theory shows that programming targeted at individuals is not as effective as programming that considers multiple levels of influence. In line with the socio-ecological model, the primary study collected household composition data, including who and how many people the participants lived with. This information is useful for determining who the study population is likely to interact with on a daily basis [51, 70]. Nearly half (44.9%) of all respondents indicated that they lived in households with at least three other people. This corresponds with census data from Soweto, which indicates the average household size in 2013 was five people as compared with 3.7 people in 2001, reflecting a somewhat rapid densification of the households in the study sites [71].

Literature has shown that parents, mothers in particular, are critical in determining health and health seeking behaviours among youth [72, 73]. Previous studies indicate that up to 80% of surveyed mothers were willing to have their sons circumcised, including mothers from traditionally non-circumcising communities and cultures in South Africa [19, 66]. In this study, 45.1% of the respondents reported living with their mothers and as such, mothers of

uncircumcised boys and men in Soweto should be considered in VMMC demand creation strategies and approaches.

Respondents in the primary study were more likely to learn about VMMC from a male family member (24.1%) than from a female family member (11.0%). Since less than one quarter (23.7%) of participants lived in households with their fathers, compared to nearly half (42.1%) living with brothers, the data suggests that demand creation programmes would enjoy greater results if potential clients' brothers were integrated into the approaches.

The data on types of relationship is somewhat interesting as a large proportion (37.9%) of respondents listed one of the reasons they were getting circumcised was to protect the health of their wives or girlfriends. More than half (53.7%) of the respondents were in a committed relationship and single respondents were the second largest group by type of relationship (35.0%).This is a positive finding and must be considered when demand creation approaches and content are being developed, especially as modelling studies have shown that HIV transmissions averted through VMMC in 2025 will likely be equally averted between men and women [9, 18]. It must be noted that while nearly 40% of respondents indicated they considered their sex partners' health when deciding to access VMMC, only about one fifth (17.9%) of respondents indicated that they had discussed circumcision with their sex partner. As Khumalo-Sakutukwa et al (2013) reported that roughly 70% of women were in favour of circumcision for their male sex partners [74]. Incorporating messaging that encourages VMMC dialogue with sex partners should be seriously considered in demand creation programmes [75].

South Africa has 11 official languages, and considering that Gauteng is the economic hub of the country, the primary study survey considered that CHAPS VMMC communication approaches would need to be aware of the range of languages prevalent in their target communities. Such knowledge about their audiences aides in more accurate segmentation thus allowing better targeting of their demand creation strategies and activities at a local population level. Target audience specific language, culture and colloquial communication style in mass media can make the communication more meaningful to the target audience

than the use of a standard language, not specific to sub-segments of the language speaking population [76].

Data from the 2011 census shows isiZulu and seSotho as the two most prevalently spoken languages (40.9% and 18.3%) with four times more isiZulu speakers than isiXhosa speakers (10.3%). The most spoken language among the study participants was isiZulu (49.1%) and the second largest language group were seSotho speakers. This is interesting since Zulu's are a non-circumcising ethic group and as the literature suggests Zulu and Sotho males are least likely to be circumcised [8, 66, 68, 69, 74]. This study data supports recent literature that indicates there has been some shift towards cultural acceptance of VMMC amongst these two non-traditionally circumcising groups, particularly amongst younger members [9, 12, 74]. This could be as a direct result of young people from non-traditionally circumcising cultural groups perpetuating cultural stigmas about traditionally circumcising cultures, and as a consequence perceiving medically administered male circumcision to be more favourable [74]. Of course, there remains the possibility that since these are traditionally non-circumcising cultures, that there would be a greater proportion of uncircumcised males in the study population and thus it would be expected to see this reflected in the sample.

The low representation of Xhosa speakers (4.6%) within the sample deserves a mention since this is a traditionally circumcising ethnic group within South Africa who practice circumcision [77]. Such circumcisions within the Xhosa tradition generally take place around or after the age of 17 years as a rite of passage into manhood and are performed in rural settings in what are commonly known as initiation schools where partial or incorrectly administered procedures leave much of the foreskin remaining, effectively nullifying the HIV prevention benefit seen in VMMC [77, 78].

Language may also serve as a proxy for cultural backgrounds with different circumcision practices and the associated cultures, norms and practices. These are added reasons, beyond health literacy, that language should be considered in demand creation design, especially for the development of content. Studies have shown that circumcision messaging in communities with some knowledge about VMMC should focus more on promoting services, including addressing cultural barriers [74].

4.2 MOBILE PHONE USAGE

A 2012 World Bank study conducted through the infoDEV global partnership programme reported that mobile networks in South Africa cover roughly 90% of the landmass and more than 75% of the population [35]. According to the same World Bank study, nearly all mobile phone users in South Africa operate their mobile phones on a prepaid SIM card (98.5%) and more than 75% of the poorest segment of South Africa's population who use mobile phones are aged 15 years or older [35]. An analysis of this study's data by size of the household revealed that those living with one other person were most likely to share their phone (25.2%) and this association was statistically significant using the Pearson's chi squared (p= 0.028).

According to South Africa's All Media and Products Survey (AMPS) data, which covers the entire country, the proportion of 15 to 24 years old that own, share or rent a mobile phone (85.0%) [79] is very similar to the proportion of the study respondents aged 15 to 25 years reporting mobile phone ownership (88.8%). The trend amongst this study's participants, as shown in *Table 3* shows an increased likelihood of mobile phone ownership as age increases with a slight decrease once participants reached 36 years and older. This same trend was observed in the AMPS dataset, with a noticeable decline in mobile phone ownership, rental or sharing dropping when comparing the 25 – 34 year age group (93.0%) to those aged 35 years and older (<89.0%) [79].

'Feature Phones' are capable of SMS and relatively low-technology instant messaging services based on previous-generation network technology (2G or GPRS). Some feature phones provide for very limited mobile internet connectivity for email and browsing and low processor-demand third party applications such as games and basic instant messenger platforms such as South Africa's own Mxit™ [80, 81]. 'Feature' phones are the most prevalent types of mobile telephony devices in South Africa presently, with an estimated 32 million feature phones in use in the South African mobile telephony market in 2013 [82].

Smart phones are currently the costliest mobile phone handsets available and are capable of high speed internet browsing and have multi-core high speed processors that enable the device to download third party software, instant messenger services and applications. These

services include social media platforms that can be accessed through mobile internet browsers or via specific third party applications, popular examples include Facebook™, Twitter™, WhatsApp™, BlackBerry Messenger ™ [83]. Smart phones associated cost and expenses mean that these devices don't enjoy as large a market share as 'feature' phones do, with roughly 15 million smart phones in operation in South Africa in 2013 [84].

While the questionnaire did not ask participants to identify which type of device they used, the type of messenger services they reporting using could be used as a proxy of the technology capability of their mobile phones. The study findings reinforce how prevalent SMS use is (89.1%) over other mobile phone based messaging platforms; yet only 27.5% of respondents used SMS exclusively to message. As most handsets used in the South African mobile telephony market are 'feature' phones and are thus capable of a combination of platforms using older SMS technology as well as 2G/GPRS internet connectivity, SMS' dominance was notable. It was also surprising, as it is more costly to send a SMS than other instant messenger and mobile internet based social media platforms [35]. Also, SMS is generally limited to communicating one-on-one whereas IMS platforms and MI allow instant group conversations.

A trend to adopt these new technologies was reflected in the nearly two thirds of respondents (61%) who reported using at least one other platform alongside SMS. That said, only a very small percentage of the surveyed clients used IMS or MI without using SMS (3.7%), which was still less than the percentage of respondents who reported using no message platform at all (8.0%). Although no similar data outside of this study was found, the growing trend amongst general population mobile phone users is towards social media platforms that have messaging and correspondence capability such as Facebook ™, Twitter ™ and Youtube™ and this is largely associated with the rapid uptake of mobile-data based internet since 2007 [84].

Mobile telephony researchers have predicted that the price of a low-cost smart phone device will soon drop from US$ 80.00 to below US$ 50.00 and this will lead to a large shift away from 'feature' phones. The researchers even went so far as to predict the end of 'feature' phones altogether [84]. At the time of writing this report, the MTN network announced the launch of their own new network branded smart phone, using the Android

(Google Inc, Mountain View, California, USA) operating system priced at ZAR 499.00 [85, 86].

As nearly two thirds of respondents used a combination of messaging platforms that included SMS, messaging platform usage was compared by socio-demographic characteristics in the study. The data displayed in *Figure 8* intimates that the youngest respondents were likely better able to utilise mobile technology, more so than older age groups as they make use of the more modern messaging platforms the most, and are least likely to not use any messaging platforms. It is not surprising is that the youngest age group in this study were least likely to use SMS ($p< 0.001$), given it is the most costly and least socially inclusive messaging platform available to them. It must be noted that those aged 15 to 20 years old were most likely to not own a mobile phone compared to other age groups. This is likely due to limited finances as 71.5% of black South Africans aged 15 to 19 years are unemployed and often in school [87].

While SMS was the most used messaging platform, the use of IMS and MI without SMS was rare (3.7%). Respondents who lived alone were most likely to use SMS only while those living with one other person only were least likely to use any platform at all ($p= 0.020$). The data also showed those who did not use any messaging platform were most likely to be older than 36 years, living with one other person only and did not live with their partner. It may be that these individuals are less socially connected than younger participants in sample.

Another major obstacle for the majority of participants, and indeed the general mobile phone using population is undoubtedly poor internet and technology literacy, and the related lack of awareness of mobile apps. For example, the World Bank study cites a nationwide Research ICT Africa report (2011) on access and usage that states that even when South Africans in the lower economic segment have access to the Internet, they lack understanding of it [35]. Among people who did not use the Internet, 86% said they do not know what it is.

The messaging platform usage by relation status shows that participants who were either single or did not live with their committed partner were more likely to use a combination of

messaging platforms that included SMS but participants who lived with their committed partners were more likely to not use any messaging platform at all ($p< 0.001$). Only married participants were shown to be more likely to use SMS only as a messaging platform.

By knowing which networks are utilised by clients accessing the free VMMC services, demand creation strategies can incorporate mobile network operators into the channel mix and distribution plans. The data collected in this study showed that MTN (50.9%) was the most used network by the participants, across all age categories. This is most likely due to some location influence or MTN promotion as the study data is inconsistent with AMPS data that names Vodacom as the most used network generally (45.7%), with MTN as the most prevalent (43.9%) only in the 25 to 34 year old age group [79]. This association in the study data was shown to be significant ($p= 0.001$).

SMS was the most utilised platform and IMS and MI was used the least amongst MTN users whereas IMS and MI were used the most by Vodacom users ($p< 0.001$). In terms of demand creation programming for CHAPS, this implies that MTN is attracting the same target audience that makes use of the CHAPS VMMC services. CHAPS would do well to consider exploring the marketing approaches MTN is using in these communities.

4.3 SOURCES OF INFLUENCE

SBCC theory and models such as the Socio-Ecological Model and the Integrated Model for Behaviour Change recognise that an individual's health decisions and behaviour are influenced by others through subjective norms, or beliefs about what others think the individual should do, with individuals making health decisions depending on the value or authority they perceive the source of information has [46, 47, 49, 50].

In the marketing and communication fields, and indeed in social marketing for health promotion, demand creation and health promotion strategies should be 'consumer orientated' for greater programme efficacy [38]. In order to achieve meaningful alignment or orientation with the health promotion information consumer, in this case uncircumcised males, SBCC programmes should engage in a marketing activity known as audience segmentation. This process subdivides somewhat heterogeneous markets are into smaller,

even more heterogeneous market segments, based on demographics, behaviours and beliefs [38, 88-90].

As has been observed in a number of other studies, participants indicated improved health and protection from disease were important reasons to get circumcised (92.0%) [70, 72, 74, 91]. Respondents who selected Protection from HIV (66.3%) which was consistent with multiple other studies that reported uncircumcised men and their sex partners reporting protection from HIV as a critical reason to access VMMC. However, this did not significantly differ by messaging platform ($p= 0.331$), suggesting that such segmentation would not be necessary. Like other studies, better hygiene (62.2%), which was another important reason for VMMC [69, 74]. However, unlike HIV prevention, this differed significantly by messaging platforms ($p< 0.001$), cited most by participants who used IMS and MI without SMS (68.3%).

Communities that have been exposed to VMMC, and that have even a basic knowledge about VMMC, have been shown to demonstrate greater acceptability of circumcision than communities with no exposure or knowledge. In considering the spheres of influence from the SEM, it becomes clear that the participants' VMMC seeking behaviour is mostly influenced by information or perspectives located within and between the familial and Societal spheres. The interplay of influencers across these two dimensions of the SEM is also known as the Meso-system sphere of influence. The high proportion of respondents who named friends as a source of VMMC information supports other literature that describes peers as being highly influential on sexuality beliefs, particularly amongst younger population groups [45, 66, 70, 72, 74]. It should be noted that such friends may or may not be conveying accurate information about VMMC.

Slightly less than a quarter (24.5%) of respondents indicated that they learned about VMMC and HIV from a male family member and a little more than ten percent of respondents indicated they received information from a female family member. This is not surprising as other studies have shown that South African parents are reluctant to talk about sex and sexuality with their children, relying more on the school system to address such matters [92]. This does not, however, indicate that parents should be excluded from health promotion strategies. As discussed earlier, parents and particularly mothers are influential influencers of their children's health behaviours and should be included in VMMC demand

creation [72, 73]. A demand creation programme for uncircumcised men living with their mothers should consider that the data from this study shows participants who lived with their mother were most likely to use a combination of messaging platforms including SMS (47.2%) on their mobile phones.

The primary objective of this study was to determine the feasibility of reaching uncircumcised men using mobile phone messaging platforms to promote VMMC. Although the primary study included one question that asked the respondents to indicate whether they had learned about VMMC via SMS, very few (2.4%) respondents selected this option. This finding conflicts with initial evidence from the only programme in South Africa, Brothers for Life, that uses SMS to help clients identify their nearest VMMC clinic, which has reportedly lead to an increase in demand for VMMC in areas where it is applied [93, 94]. At the very least, it suggests that the roll-out of the Brothers for Life programme has considerable scope to improve its reach with potential clients, but could this reports data could also indicate that participants knew about VMMC before the Brothers for Life SMS campaign begun.

Research has shown that young people prefer to get their HIV and AIDS information from interpersonal sources, particularly from friends, health care workers, siblings and cousins, over MM sources [72]. This is consistent with this study's data. Interestingly, radio programmes were reported by more than a quarter of respondents as an information source that influenced the study participants to access VMMC. This mass media channel has been shown in numerous interventions to increase the prevention knowledge, and in some cases influence audience members behaviour to practice safer sex [55, 95, 96]. When the data for sources of influence were analysed by messaging platforms used, no significant associations were identified, suggesting that a further segmentation by key information sources may not be necessary. The implication of this study's data on sources of influence to get circumcised, although it tested not significant by messaging platform, is that respondents' value information received from interpersonal sources more so than from mass media mediums, even though a clinic recruiter would be located in the same sphere as a mass media channel.

HIV and VMMC knowledge was generally above average amongst the participants (79.3%) and this was supported by a mostly positive and strong positive set of beliefs around HIV and VMMC (89.2%). This is not surprising given the study sample. In addition, urban populations in South Africa have been exposed to sustained HIV and AIDS campaigns for a number of years, which have resulted in increased knowledge of HIV as well as enhanced prevention behaviours among similar populations as this study's sample [97, 98]. One fundamental difference between the knowledge data and belief data became apparent when the categorical belief scores were analysed by messaging platforms, specifically for the group that reported using no messaging platform. This group's belief data were heavily skewed towards positive and strong positive scores (77.5% and 14.1%) and therefore such clients should be considered in demand creation outreach activities, especially considering the proportion of respondents who indicated they felt someone who had already been circumcised at a CHAPS facility was highly influential.

The groups of participants who used IMS or MI in combination together or with SMS possessed higher levels of knowledge than groups who used no message platform or who only used SMS. An analysis of the participants' knowledge by messaging platform showed that those with a below average knowledge on HIV and VMMC were most likely to not use any messaging platform, but those with above average and full knowledge scores used IMS and MI or a combination that included SMS more than any other platform ($p< 0.001$). This provides evidence to support a multi-channel approach to demand creation for the CHAPS clinics.

The age category 31 to 35 years had the greatest proportion of above average knowledge (86.1%) and positive belief scores (94.7%). This could be due to participants in this age category being targeted by HIV and AIDS information and prevention communication programming longer than participants in any other age category. They would have been within the primary target audience age range of multiple national campaigns that incorporated both IPC and MM, for more than a decade at the time of the data collection. These programmes have been run by multiple organisations such as Soul City and LoveLife, and government departments. The programmes have likely been targeting these participants from when they were early teenagers [99-101]. They would have been exposed

to television and radio campaigns, school and community based peer education, billboards and posters and even today in campaigns such Brothers for Life, which targets men older than 30 years of age [89, 100-105].

The study sought to identify factors that influenced the participants' selection of the CHAPS facility where they were accessing VMMC. This information is invaluable to health care programming as it enables demand creation practitioners to identify what factors are likely to motivate uncircumcised males to attend a VMMC clinic. Previous studies suggest such data is also useful in providing insight into factors that can be useful in addressing barriers to accessing health facilities [106-108]. This study supports other studies' findings on factors that lead patients to select public health facilities, including safety, quality of service, cost, and convenience. These were not significant when further assessed by platforms used (*Table 7*). Only the convenient location (34.3%) of the CHAPS clinics was shown to be significant (p= 0.009), and these participants were most likely to use a combination of platforms that included SMS. Further research on this association should be considered.

4.4 LIMITATIONS

As this is a secondary data analysis study, many of the discussed limitations stem from limitations and bias introduced at the primary study level.

The primary study did not reach the intended number of completed questionnaires that were planned in the study protocol. It was discovered that the participation was low due to the clinic based staff deciding to not administer the study tool due to a high demand for services that created a heavy workload. The clinic staff identified the study tool was adding to the workload and was thus determined to be creating work backlogs. The high demand was due to schools having broken up for vacation and many school going uncircumcised men accessing the clinics while on school break. An unintended consequence of this is that the data appears to show a low response rate which is not the case, but rather a much smaller number of VMMC clients were invited to participate that what was planned.

The application of the study survey tool introduced some limitations, particularly in the data management phase of the study. The questionnaire was intended to be a facilitator-guided self-completion tool. This automatically excluded some clients who had no literacy proficiency, or very low literacy levels. While the facilitators were trained on how to explain terms in local language and the tool was piloted in the study sites as part of the quality controls of the primary study, there were still response errors, particularly in questions that required ranking. This was addressed at multiple stages of the data management phase through data cleaning and rechecking, running pilot data analysis on sampled observations and recoding so that ranked data could be converted to count data.

Another limitation is that the study sample comprised of uncircumcised men that had already opted for VMMC and it was likely that they differed from those who had opted not to access the CHAPS services. This limitation has been addressed by integrating the findings from other research studies into this research report.

As a secondary analysis, this study was constrained to the question content and formats prescribed by the primary study tool. As mentioned previously in this limitations section, instructions for the ranking of certain variables proved problematic for a number of respondents, and the primary sturdy database was set up so that each option for lists was captured as a stand-alone variable, leading to complex syntax development and time

consuming analysis of data. This was not impossible to overcome though and offered good opportunity for learning new statistical analysis software.

The study design or objectives did not require any multivariate analysis to be conducted. Designing such tests could have resulted in somewhat difference associations but these would not have added value to the objectives or findings.

Much of the information generated in this study is able to fit into multiple constructs of various behaviour change theories and models [39, 44, 46-50, 109]. Even though mobile phone ownership, usage and network coverage has become part and parcel of everyday life in South Africa, it remains the responsibility of demand creation programmers to ensure that confidential communication and personal information of recipients of communication are respected and protected [22, 23, 110]. Between one fifth and one quarter of respondents in this study indicated that they shared their mobile phone.

The primary study tool also did not seek to collect data on the study participants' socio-economic status, such as education or employment type.

Ever changing mobile phone services and messaging platform products introduced technology based limitations. At the conception stage of the study, smart phones were highly complex and very costly devices being used by only the most well resourced individuals and SMS and basic feature phone platforms were prevalent. Towards the data collection phase of the study, highly developed feature phones and lower cost smart phones become more prevalent in the market place and therefore the study objectives and tool had to be updated to incorporate IMS and MI as message platforms

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

Mobile phone ownership was shown to have significant associations with a number of socio-demographic characteristics of uncircumcised men in the CHAPS clinics' catchment areas, including age, household size, people who they share their home with and their relationship status. According to the data, the typical CHAPS client who owns a mobile phone was shown to be isiZulu speaking, aged 21 to 25 years old in a committed relationship, living with at least three other people including their mother and probably a brother but not the partner they reported being in a committed relationship with.

Most VMMC clients owned mobiles and the most used messaging platform was SMS, with IMS and MI being used by slightly more than half of the studied clients. The most preferred means of messaging communication was shown to be a mix of platforms that contained SMS, but more than a quarter of the study participants still used SMS exclusively. The mobile network service provider most utilised by the sampled VMMC clients was MTN, as opposed to Vodacom, which is the most used in the general population. Amongst the sampled clients who used MTN, SMS was the preferred platform for messaging, while IMS and MI were most used among Vodacom customers sampled in this study. The typical sampled client used a combination of messaging platforms including SMS.

Information about VMMC that led to the study participants accessing the CHAPS clinic was mostly received through interpersonal communication sources, with friends and clinic recruiters being identified as the two top sources. The only mass media source that was selected amongst the top three sources was radio programmes. However, overall, mass media as the only type of information sources was only indicated by a very small proportion of respondents. The study's found that respondents who indicated receiving information about the VMMC clinic from a combination of sources were most likely to have an above average knowledge of HIV and VMMC, as well as positive beliefs about HIV and VMMC. Participants who used a combination of platforms, including SMS, were most likely to score above average in HIV and VMMC knowledge, whereas participants who only used IMS and

MI as messaging platforms were most likely to have positive and strong positive beliefs about HIV and VMMC.

The most selected reason for getting circumcised was personal protection from HIV, but slightly more than a third of participants indicated they considered their female sex partners health as a reason for getting circumcised. The most significant reason by messaging platform was better hygiene and health reasons were selected by more than 90% of participants.

This study found that the use of mobile phones is feasible and, based on various messaging platforms being used, provides for a mix of demand creation opportunities. However, using platforms as a way to meaningfully segment content for target audience may not be required, especially as 'Smart' phones become more prevalent in the mobile phone market and utilisation of costlier messaging platforms such as SMS diminishes.

5.2 DEMAND CREATION RECOMMENDATIONS

The study collected a highly valuable body of data that can be used for decision-making by CHAPS in developing a VMMC demand creation programme that uses mobile phone based messaging platforms. The use of mobile phones as a demand creation channel, based on the age of the target audience, would be a meaningful method of communication. This is especially true in targeting youth going forward, for as they age so the likelihood that the target group members will use a broader spectrum of mobile phone messaging platforms will increase, particularly combinations that do not include SMS.

If a programme only uses SMS as a demand creation platform, this study indicates that uncircumcised men aged between 21 and 30 years of age should be targeted more than any other age group. SMS also should be the preferred platform for targeting people older than 36 years of age particularly if CHAPS wants to increase the number of married clients.

Uncircumcised men from the catchment area that use the MTN service provider network could be targeted directly and content should integrate the following insights where possible:

- Improved hygiene is highly important and significant to the target audience
- Protection from HIV is highly important, and
- The perception that VMMC is something all men in the family do is highly important and significant
- Protection of the sex partner's health is important and significant
- VMMC services are easily accessible in convenient locations and for no cost
- Other content that addresses perceived barriers. These should be explored through further research

Although language was not shown to be significant by mobile ownership analysis, if CHAPS consider mobile phone based platforms for demand creation, they would do well to consider using isiZulu and seSotho languages to continue attracting uncircumcised men from these cultural backgrounds to access their clinics. Such messages must take into account that these are not traditionally circumcising cultures and as such, further analysis of the data from this study is recommended. Indeed, an additional study in the target community is required to determine more in depth what factors are motivating these uncircumcised men to step outside of their traditional norms and get circumcised and to contextualise any demand creation content in line with such motivating factors. The study implies that demand creation programming should apply additional resources and capacity to target the non-circumcised isiXhosa speaking community in the CHAPS catchment areas. This sub-section of the community was poorly represented in the sample as less than five percent of participants were isiXhosa compared to roughly 10% of the general Soweto community being of Xhosa ethnicity [71].

The study data suggests that for mobile message platform based demand creation, that the recipient would likely find the content more acceptable if the content is framed such that it appeals to the target audience's male family members, especially brothers. Literature has shown that mothers are also highly influential in health seeking behaviours and as such, CHAPS should also consider utilising outreach messages that reference mothers. Mothers of uncircumcised boys in Soweto should be included in VMMC demand creation approaches, either by targeting mothers as recipients of SBCC materials and content promoting VMMC for their sons. CHAPS could also use a 'mother' figure in mobile phone messaging content

targeting uncircumcised men in the CHAPS catchment areas. This could be in the form of language a mother might use or to reference the fact that 80% of mothers support circumcision for their sons [19, 66].

Analysis of the study data shows that CHAPS would do well to target socially connected young people aged 25 years and younger through a combination of IMS and MI platforms, as well as considering recruiting clinic recruiters from this same age group who could reach out to their peers in the community, through these platforms. SMS, it seems, remains a viable option, but will likely enjoy greater success from targeting older or less socially connected individuals. In terms of mHealth programming, the difference in network utilisation implies that there are more clients from the study site catchment areas, on the MTN network database as compared to other networks. As the second most utilised network nationally but the most used network in the study sites, implies that they have been more successful than their competitors in securing the greatest Soweto based market share amongst the same target group of CHAPS clinics. It is therefore a recommendation of this study that CHAPS approach the MTN service provider to investigate avenues and opportunities for collaborations to target uncircumcised men in CHAPS catchment areas using the various messaging platforms. CHAPS would do well to consider exploring the marketing approaches MTN has used. This is especially relevant in programming situations where demand creation budget limitations are a reality.

As analysis of the study data showed, the most used network nationally, Vodacom, was not the most represented within the sample. Therefore, demand creation programmers should consider targeting users of the Vodacom services more directly as a means to potentially reach a wider audience alongside the already highly represented MTN audience. This would be an especially pertinent consideration if the demand creation programme using mobile phone messaging platforms were to be expanded beyond the Soweto catchment area.

Analysis of the data suggests that the uncircumcised participants value the opinion of someone who has already been medically circumcised at a CHAPS clinic and therefore it is recommended that the organisation investigate ways to interlink past VMMC clients with mobile message based demand creation efforts. This could be through messaging the past clients directly and encouraging them to message uncircumcised friends and family to

promote CHAPS VMMC services and facilities. CHAPS might also consider, resources provided, to implement some sort of incentive scheme for referees of new clients, such as free airtime for a pre-determined number of referrals.

Additional Mass Media platforms exist on mobile phones that could be used by CHAPS for demand creation purposes, such as FM radio, news content applications and mobile television and video streaming. Each of these applications and platforms are often made available for advertisements by private sector enterprises. Traditional radio campaigns could include call-in shows; radio drama's or short advertisements on local radio stations that are listened-to on mobile phones. Other mass media examples include video sharing websites and applications that can be accessed on even lower cost smart phones such as YouTube where the first few seconds of a video show a short advertisement for a local company, or online banner advertising on sites or smart-device apps popular amongst youth or even setting up a YouTube channel that broadcasts weekly video clips pertaining to HIV prevention and VMMC. There are multiple formats that CHAPS could consider using for each of these platforms, which will require more in-depth research by the organisation.

While the aim of this study does not seek to describe whether radio programming would be an appropriate channel to promote VMMC, the data does indicate that using mobile phone message platforms could be used in conjunction with radio programming.

The primary study produced a vast data set that has not yet been fully explored. It is the opinion of the author that the dataset should be considered for further analysis and reporting for studies aimed at determining associations between VMMC clients HIV / VMMC knowledge, reasons for accessing VMMC, socio-demographic variables and even clinic selection and catchment areas.

The primary study design and tool did not seek to collect qualitative data on any of the associations described herein, and although a CHAPS qualitative study has recently been completed, triangulation of the data and results needs to be considered.

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APPENDICES

APPENDIX A PRIMARY STUDY SURVEY TOOL

PRE-SURGERY QUESTIONNAIRE (ENGLISH)

DATE | | | / | | | / | 2 | 0 | 1 | 2 | **CODE:** __ __ - __ __ __ __

Background Information

1. **Age:** __ __ *years old*

2. **Residential Area** *(Write in):* _____

   _____

3. **Who do you live with?**

Other members in home	#
Mother	
Father	
Brothers	
Sisters	
Sexual partner	
Other *(write in)*:	
Total	

4. **Marital status** *(Mark only one)*

Single – not in a committed relationship	
Committed relationship – living apart	
Committed relationship – living together	
Married – living apart	
Married – living together	
Divorced	
Widowed	
Prefer not to answer	
Other *(write in)*:	

5. **First language** *(Write in):* _____

Recruitment Information

6. **How did you learn about** *this clinic*?
   (Mark as many options as relevant)

Sources of information		X
Speaking to	.a clinic recruiter	
	.family member(s)	
	.friend(s)	
	.sexual partner	
Listening to	.a radio programme	
	.a school talk	
Reading	.a pamphlet	
	.a billboard(s)	
	.a poster(s)	
Receiving	.a coupon or voucher	
	.a SMS	
Other	*Please describe:*	

7. **Did you speak to anyone who was circumcised at** *this clinic* **before coming today?** *(Circle one)*

   YES **NO**

8. **What was the main source(s) of information that influenced your decision to come to** *this clinic?*
   (Rank up to 3, with 1 being the most influential)

Sources of information		1, 2, 3
Speaking to	.a clinic recruiter	
	.male family member	
	.female family member	
	.friend(s)	
	.sex partner	
	.someone who's circumcised	
Listening to	.a radio programme	
	.a school talk	
Reading	.a pamphlet	
	.a billboard(s)	
	.a poster(s)	
Receiving	.a coupon or voucher	
	.a SMS	
Other	*Please describe:*	

9. **What additional factors influenced you to come to** *this clinic*? *(Mark as many options as relevant)*

Additional factors	X
It is the only circumcision clinic I know	
Convenient location	
Convenient operating hours	
Free circumcision	
Safe circumcision	
Good reputation	
I can get other services at the same location	
Other (Please describe):	

10. **In general, which day or two days are BEST for you to visit this clinic?** *(Circle 1 or 2 days)*

Mon	Tues	Wed	Thu	Fri	Sat	Sun

PLEASE TURN THE PAGE OVER

PLEASE START AGAIN HERE

11. In general, what time of the day is BEST for you to visit *this clinic*? *(Circle one)*

9am-12pm	1-5pm	5-9pm	Anytime	Other:

12. What was your main reason or reasons for deciding to get circumcised? *(Rank up to 3 reasons, with 1 being the most influential)*

Main reason(s)	1,2, 3
All of the men in my family do it	
To become a man, according to my culture	
For better hygiene (to be cleaner)	
My penis will look better	
To make sex more pleasurable	
To protect myself against HIV	
My friends are doing it	
My girlfriend/wife wants me to	
For protect my girlfriend/wife's health	
Other (*Please describe*):	

13. Do you agree (A), disagree (D) or are you unsure (U) about the following statements? *(Mark only one in each row)*

Statement	A	D	U
a. Circumcision protects fully against HIV			
b. Most women prefer circumcised men			
c. Circumcision increases sexual pleasure			
d. Circumcised men do **not** need to use condoms to protect them from HIV			
e. Circumcised men can become infected with HIV			
f. It is easier to get sexual partners when circumcised			
g. My family supports circumcision			
h. Circumcision is safe when carried out by a doctor			
i. The circumcision procedure is painless			
j. It is easier for circumcised men to use a condom			
k. Circumcision can protect women from getting cervical cancer			
l. After being circumcised, it is important to wait six weeks before having sex			
m. It is safe to have sex as soon as the stitches fall out after being circumcised			
n. My sexual partner supports circumcision *(skip if you do not have a sexual partner)*			

14. Excluding today, in the past 12 months, have you visited *any* clinic or hospital for any other health services? *(Circle one)*

YES **NO**

14a. If yes, what were the reasons for seeking out this service or services? (If more than one, please list all reasons)

_____

_____

_____

_____

15. Do you own a mobile phone? *(Circle one)*

YES **NO**

YOU ARE DONE NOW. THANK YOU!

16. Which mobile network(s) do you use?

_____

17. Do you use SMS? *(Circle one)*

YES **NO**

18. Do you use the internet on your phone? *(Circle one)*

YES **NO**

19. Do you use instant messenger services on your phone? *(Circle one)*

YES **NO**

20. Do you share your phone with anyone else in your family? *(Circle one)*

YES **NO**

YOU ARE DONE NOW. THANK YOU FOR PARTICIPATING!

PLEASE GIVE THIS COMPLETED FORM BACK TO THE GROUP EDUCATOR.

APPENDIX B ETHICS CLEARANCE CERTIFICATE – PRIMARY STUDY

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Dr Dirk Taljaard

CLEARANCE CERTIFICATE **M120369**

PROJECT A Rapid Assessment of Voluntary Medical Male Circumcision (VMCC) Demand Creation in Gauteng, South Africa

INVESTIGATORS Dr Dirk Taljaard.

DEPARTMENT Centre for HIV and AIDS Prevention (CHAPS)

DATE CONSIDERED 30/03/2012

DECISION OF THE COMMITTEE* Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 13/08/2012 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor :

DECLARATION OF INVESTIGATOR(S)
To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

APPENDIX C ETHICS CLEARANCE CERTIFICATE – SECONDARY DATA ANALYSIS

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Mr Gareth Coats

CLEARANCE CERTIFICATE	**M120940**
PROJECT	Exploring the Feasibility of Using Different Cellular Telephone Based Messaging Platforms as Demand Creation Channels for Voluntary Medical Male Circumcision in South Africa
INVESTIGATORS	Mr Gareth Coats.
DEPARTMENT	School of Public Health
DATE CONSIDERED	28/09/2012
DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 28/09/2012 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Dr Sara Niewoudt

DECLARATION OF INVESTIGATOR(S)
To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

12/10/2012.