An exploration of knowledge, attitudes and practices of primary health care providers providing contraceptive and family planning services in Cape Town, South Africa: A qualitative study

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FTRKUL001

Submitted in partial fulfilment of the requirements for the degree Master of Public Health at University of Cape Town

March 2020

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Abstract

Health care providers can play a significant role in empowering women to make informed decisions when selecting suitable contraceptive methods during contraceptive counselling. This study explores the experiences and perceptions of primary health care providers delivering contraceptives services in Cape Town to gain a deeper understanding of the delivery of contraceptive services. Ten in-depth interviews were conducted at five public primary health care facilities in urban areas in Cape Town, South Africa. Eligible participants included primary health care providers providing contraceptive services and willing to participate in the study. The qualitative software package NVivo was used to sort and manage data. Data was analysed using a thematic analysis approach. Overall, providers emphasized supporting women in contraceptive decision-making. Sexual and reproductive health training increased providers confidence to deliver appropriate contraceptive services. Furthermore, contraceptive prescribing practices were also influenced by medical eligibility criteria and women's preferred bleeding patterns. However, contraceptive prescribing practices were also influenced by providers' attitudes towards younger and older women. Challenges experienced by providers when providing contraceptive services included: contraceptive stockouts; time constraints of employed women accessing the service; and work pressure due to providing other health services. Health care providers play a critical role in facilitating women's right to accessing high quality contraceptive services. Providers in the study perceived themselves as negotiators during contraceptive counselling by considering both women's preferences and provider recommendations for contraception, whilst enabling women to make informed contraceptive decisions through provision of reproductive health information. Consequently, shifting contraceptive counselling to focus on shared decision-making may encourage autonomy during decision-making and help to limit the influence of provider attitudes on contraceptive prescribing and counselling.

Abbreviations

ART	Antiretroviral Therapy
COC	Combined Oral Contraception
DMPA	Depot Medroxyprogesterone Acetate
HIV	Human Immunodeficiency Virus
IUD	Intrauterine Device
NDoH	National Department of Health
OC	Oral Contraception
PACK	Practical Approach to Care Kit
PN	Professional Nurse
POC	Progestogen Oral Contraception
SA	South Africa
SADHS	South African Demographic and Health Survey
SDG	Sustainable Development Goals
SN	Staff Nurse
SRH	Sexual and Reproductive Health
WHO	World Health Organization

Acknowledgements

I would like to extend my appreciation to the study participants for their willingness to volunteer their time and their enthusiasm to share their experiences of delivering family planning services within the public health context.

I am also grateful for the financial support provided by Cape Higher Education Consortium, City Health and National Research Foundation towards funding my dissertation.

To my supervisors, Associate Professor Jane Harries and Dr.Virginia Zweigenthal, your constructive feedback and expertise was invaluable to me throughout this process. Thank you for your ongoing support and encouragement, which I am deeply grateful for.

Lastly, to my husband and family: words cannot express how much your unwavering support has helped to maintain my motivation throughout this experience.

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Part A: Protocol

An exploration of knowledge, attitudes and practices of primary health care providers providing contraceptive and family planning services in Cape Town, South Africa

Introduction

The sexual and reproductive health needs of women remain a priority in South Africa; despite more than 70% of contraceptive demands being met, many women continue to discontinue contraception or engage in inconsistent and incorrect use. Health professionals play a critical role in promoting continuation of contraception as they facilitate access to contraception and provide reproductive health information. Thus, the qualitative research study proposed aims to explore the knowledge, attitudes and practices of primary health care providers providing contraceptive and family planning services in Cape Town, South Africa.

Statement of the Problem

The South African government has pledged a commitment to improve accessibility to sexual and reproductive healthcare services (SRH) for all females by 2030 as outlined in the Sustainable Development Goals (SDG). This will be achieved by improving and expanding family planning services, developing national programmes and strategies which have an increased focus on reproductive health and ensuring that sexual and reproductive health information is available and accessible (United Nations, n.d). Additionally, in 2012, the government pledged its commitment to the Family Planning 2020 (FP2020) initiative. The FP2020 is aligned with the SDG goals focused on improving access to SRH services through collaborating with "governments, civil society, multilateral organizations, donors, the private sector, and the research and development community to enable 120 million more women and girls to use contraceptives by 2020" (FP2020, 2019). Consequently, the South African government aims to support this by promoting dual protection (preventing both unwanted pregnancy and sexually transmitted infections), aligning contraception and family planning policies with human rights and integrating reproductive health into

school-based health programmes (FP2020, 2019). In 2012, the National Contraception and Fertility Planning Policy and Service Delivery Guidelines (National Department of Health [NDoH], 2012) was released. This much-needed updated policy provided a renewed focus on family planning in addition to contraceptive provision. It also identified issues of accessibility for various key populations including "sex workers", "lesbian, gay, bisexual, transgender and intersex persons", "migrants", "adolescents" and those living with disabilities (NDoH, 2012: 8). Furthermore, it expanded the provision of various contraceptive methods such as long-acting contraceptive methods (including the implant) and female condoms in order to meet the demand for contraception.

According to the South African Demographic and Health Survey (SADHS) conducted in 2016, 79% and 76% of the demand for contraception amongst women in marriages/living with a partner (in-union) and sexually active women was being met, respectively (NDoH, Statistics South Africa, South African Medical Research Council and ICF, 2019). In addition, a high proportion of women were aware of most modern contraceptive methods. Despite this, multiple findings from population-based surveys in South Africa identified a concerning proportion of women reporting that their pregnancies were unwanted or mistimed; in one study this was reported to be 79% (Chersich et al., 2017; NDoH, 2019; Seutlwadi, Peltzer & Mchunu., 2012). More alarmingly, despite the high proportion of unwanted pregnancies, there continued to be a lack of motivation to use contraception; women who reported ever being pregnant were three times less likely to use contraception (Seutlwadi, Peltzer & Mchunu, 2012). In 2010, approximately 68 000 termination of pregnancies were performed in South Africa; this number has reduced since 2009 (NDoH, 2012). However, this excludes the number of women seeking illegal and/or informal termination of pregnancy services, which might lead to increased rates. In a small study conducted by Gerdts et al. (2017), more than 80% of participants reported seeking abortions outside of formal health care facilities. Furthermore, many women experienced unanticipated side-effects like heavy bleeding, abdominal pain, dizziness and nausea (Gerdts et al., 2017: 6). This highlights that despite termination of pregnancy being legal in South Africa, women experience barriers to accessing termination of pregnancy in the event of

unintended pregnancy. One significant barrier to abortion is related to women seeking abortions when they are beyond the legal gestational age limit (Harries et al., 2015). Findings reported by Harries et al. (2007) highlight that women sometimes fail to identify pregnancy symptoms due to irregularity of their menstrual cycle; this results in women becoming aware of pregnancy when they are beyond the legal gestational age for an abortion. Another concern are young girls accessing informal providers for abortion; the South African National Youth Risk Behaviour Survey found that 27% of females aged 13-19 years old accessed traditional healers for abortions and 13% accessed this from another place (Reddy et al., 2013). Thus, it is important to identify why women may not be using contraception. Conversely, it has been argued by Lince-Deroche et al. (2016:99) that women who are using no method are not the only concern; when the demand for contraception is being met, unintended pregnancy may continue to occur amongst contraceptive users due to "inconsistent and incorrect use". Therefore, attention needs to be given not only to non-users but also women who may discontinue use for a short time or switch contraceptive methods.

There has been some evidence to indicate that women discontinue use (for both short and long time periods) or switch methods (Ali & Cleland, 2010; Lince-Deroche et al., 2016; NDoH, 2019). The most often reported reason for discontinuation or switching of contraceptives are women's experiences or concerns related to side-effects (Sedgh, Ashford & Hussain, 2016). Furthermore, it has been found that women are often not informed about side-effects or do not have their concerns about side-effects addressed (NDoH, 2019; Marlow et al., 2014). Thus, health professionals play a significant role during contraceptive counselling to empower patients to make informed decisions about contraception (Lince-Deroche et al., 2016). However, health professionals may restrict access to contraception as a result of their own biases about women's eligibility for specific contraceptive methods (Sieverding et al., 2018). Additionally, Sieverding et al. (2018) also notes that providers may be biased due to insufficient knowledge and clinical skills which impacts on their confidence to provide particular contraceptive methods. In South Africa, there have been a few qualitative studies addressing the role of health providers in providing sexual and reproductive health services to youth (Jonas et al., 2019; Muller et al., 2016; Wood & Jewkes, 2006). To

gain a deeper understanding of how these factors influence delivery of contraceptive services, this study explores the knowledge, attitudes and practices of South African primary health care providers in Cape Town delivering contraceptive and family planning services.

Rationale

Health care providers play a powerful role in influencing women's contraceptive decisions. Thus, it is important to explore how health providers are negotiating access and restrictions to contraceptive methods and whether they draw on professional or personal knowledge to do this (Sieverding et al., 2018). Also, there is limited evidence exploring whether lack of confidence in clinical and technical skills may influence which contraceptive methods health professionals promote, particularly for reversible long-acting contraceptive methods. Within primary health care facilities, primary providers are mainly nurses involved in delivering primary health care services (including family planning); thus, nurses will be the focus for the purpose of this protocol. The aim of this study is to gain a deeper understanding of the current contraceptive knowledge of nurses providing family planning services and how this influences contraceptive counselling and prescribing. Additionally, this study aims to explore the attitudes and prescribing practices of nurses and how this influences provider-patient interactions during contraceptive counselling. Consequently, through this exploration, this study will add to the existing knowledge related to the how provider knowledge and attitudes may influence contraceptive prescribing and counselling practices. More significantly, findings from this study will be used to address the current family planning services being offered in Cape Town to improve women's accessibility to various contraceptive methods by promoting that nurses empower women to make informed contraceptive decisions which are suitable to their needs and demands.

Main Research Question: What is the knowledge, attitudes and practices of primary health care providers providing contraceptive and family planning services in Cape Town, South Africa?

Secondary Research Questions:

1. What existing knowledge and clinical skills do nurses have related to contraception and family planning services?
2. What factors influence how this knowledge is translated into prescribing practices?
3. How do personal attitudes and beliefs interact with professional knowledge in the context of contraceptive counselling and prescription?
4. How does patient-provider power dynamics impact on contraceptive decision-making?

Literature Review

Universal access to family planning services is essential to ensure that reproductive age women's sexual and reproductive health needs are met. Access to such services assist women to make informed decisions about their sexual and reproductive health to avoid unintended pregnancy, HIV/STI infections and possible unsafe termination of pregnancy (Chersich et al., 2017; Paul et al., 2016). Consequently, this provides the overall benefit of reducing maternal and infant mortality and morbidity. Presently, in South Africa, multiple contraceptive methods are freely available in the public health sector including hormone injectables, oral contraception (including emergency contraception), male and female condoms, intrauterine devices (IUD), male and female sterilization and implants (National Department of Health [NDoH], 2019). According to the SADHS conducted in 2016, more than 90% of reproductive age women had knowledge of injectables, OC and condoms (NDoH, 2019). Moreover, despite the implant only being recently available since 2014, 84% of women were familiar with this method. In comparison, fewer women were familiar with female sterilization (64%), IUD (64%) and emergency oral pills (63%). However, the SADHS did not further investigate levels of contraceptive knowledge according to age; Chersich et al. (2017) found that women aged 15-19 years old were less aware of all methods of modern contraception than older women. Nonetheless, amongst both younger and older women, contraceptive knowledge has not translated into use.

Despite the high proportion of women who reported to be aware of different methods in the SADHS, only 23% of women were using injectables, 5% were using OC and 12% were using condoms (NDoH, 2019). Notably, the data reported is based on self-reporting by participants and thus may be prone to bias; participants may respond in a socially desirable way (such as reporting being aware of contraceptive methods when they are not). Similar rates of use of these methods are reported elsewhere; however, in some studies, the rates for use of male condoms were higher than the OC and vice versa (Chersich et al., 2017; Kaida et al., 2010; Osuafor, Maputle & Factors, 2018; Seutlwadi et al., 2012). Furthermore, the South African National Youth Risk Behaviour Survey (Reddy et al., 2013) reported that amongst young women aged 13-19 years old, male condoms were used the most (44%) in all age categories; however, use of injectables increased with age (0% use at 13 years old vs. 21.5% at 18 years old). Notably, despite male condoms being the most common form of contraception being used, only 35% of females aged 13-19 years old were using condoms consistently every time they engaged in sexual activity; this rate increased with age but overall remained below 40% (Reddy et al., 2013). Concerningly, many young sexually active women are not using any contraceptive methods (modern or traditional); this trend is highest at age 13 (22%) and gradually decreases by age 17 (12%) but then begins to increase again at age 18 (17%) (Reddy et al., 2013). Similarly, the SADHS reported that 40% of 15-19-year-old women were not currently using contraception (NDoH, 2019). However, amongst all age categories, rates for non-use of contraception were higher amongst in-union women in comparison to sexually active women. Thus, it is important to investigate women's non-use of contraception, including their decisions to discontinue contraception.

In 2016, 15% of women in-union and 19% of sexually active women desired to limit or space their pregnancies but were not using contraception. This is known as the *unmet need* for contraception, which includes both women who have never used contraception and women who have discontinued use (NDoH, 2019). According to the SADHS, most women discontinued use due to side-effects (9%), desire to become pregnant (5%) or wanted a more effective method (3%). Additionally, more women who discontinued injectables switched to another method (8%), compared to women switching from male condoms (6%) and

OC (4%); however, it is uncertain whether they switched to another modern method or a traditional method. Lastly, 12.4% of women reported discontinuing injectables because it was inconvenient to use in comparison to OC (8%) and male condoms (6%) (NDoH, 2019). A study conducted by Smit and Beksinska (2013) found there were high rates of discontinuation and switching contraceptive methods amongst injectable users in South Africa. They also found that many women discontinued use for a short period of time before returning to use; however, further investigation is needed to determine the cause of this (Smit & Beksinska, 2013). According to Sedgh, Ashford and Hussain (2016), the main reasons reported by women in developing countries for not using contraception were side effects or other health related concerns, none or limited sexual activity and personal resistance or resistance by partners family members. A positive finding was that few women cited poor accessibility due to cost or lack of availability of contraception as reasons for not using contraception, which was similarly reported in the SADHS (NDoH, 2019; Sedgh, Ashford & Hussain, 2016). However, investigating contraception discontinuation is often complex. For example, Alvergne, Stevens and Gurmu (2017) argue that demographic and health surveys often simplify the complexity of women's decisions to discontinue use. These distinctions are important as they require different interventions to prevent discontinuation. Furthermore, they fail to acknowledge *why* women report these reasons; for example, Tabane & Peu (2015:4) found that adolescents reported not using contraceptives due to information relayed by others, such as "contraceptives leaves dirty blood in your body" or results in excessive eating and weight gain. Thus, such perceptions may continue to perpetuate into adulthood; a study in Ethiopia found that many women discontinued contraception due to misinformation (Alvergne, Stevens & Gurmu, 2017). Thus, health professionals play a significant role in providing accurate information to ensure that women can make informed decisions and choices about contraception.

The SADHS did not investigate whether lack of knowledge influenced women's decision-making related to contraceptive use. However, they asked women whether their decision to use contraception was an informed decision (NDoH, 2019). An informed decision requires women to be provided with

information about possible side effects and what to do in the event they experience this and whether they were informed of other methods that could be used. Notably, the highest proportion of women who were provided this information were women who used the IUD; 79% of women using the IUD were provided with all the relevant information. It is unclear why women using the IUD were more likely to be provided with this information in comparison to other contraceptive users. However, most women using other forms of modern contraceptives were informed about other methods of contraception. Concerningly, only 50% of women using injectables and 60% of women using OC were informed about the side effects; a lesser proportion of women were informed about what to do when they experienced side-effects (NDoH, 2019). Considering that side-effects are one of the highest reported reasons for discontinuation, these findings require investigation as to why women are not being provided with this information. When this is further categorized by source of the method of contraception, it appears women being provided contraception by the public sector were less likely to be provided with this information (41.7%) in comparison to private facilities (63.8%). This is concerning as majority of women are accessing contraceptives in the public sector (80%) in comparison to only 11% of women accessing this at private facilities. A qualitative study conducted by Marlow et al. (2014) at a public family planning clinic in SA found that most women were not given information about the side-effects of the contraceptive method they were provided. Furthermore, some women were also unsure about the name of the contraceptive they were using or whether they were being provided a 3-month or 2-month injection (Marlow et al., 2014). It is important that women are informed about side effects and how to manage this before choosing contraception to promote continuation of contraception (NDoH, 2012). However, Minnis et al. (2014) suggests that health professionals should not limit this discussion to providing medical knowledge of side-effects; rather, they should also aim to understand what side effects patients are aware of. This highlights the role of the health professional in the promotion of consistent contraceptive use through effective family planning services. For example, health professionals can help patients to choose a contraceptive method that is more appropriate to prevent non-use of contraception. However, health professionals may also influence women to use particular contraceptives based on their knowledge, attitudes and prescribing practices.

According to Minnis et al. (2014), effective contraceptive counselling includes assessing current contraceptive use, accessibility, current awareness about contraceptive methods, current awareness of peers' use of contraception, and sexual behaviour. However, health professionals tend to influence the choices of women by prescribing what they think is best; women's choices are often restricted by health professionals' beliefs about contraception provision (de Irala et al., 2011; Lince-Deroche et al., 2016; NDoH, 2012). According to a multi-country study conducted by de Irala et al. (2011) comparing five European countries, women are most likely to choose a contraceptive method on recommendation of the health professional as opposed to their own choice. This was highest for injectables (71% provider recommendation versus 27% own choice) and OC's (70% provider recommendation versus 31% own choice). Furthermore, a qualitative study conducted by Marlow et al. (2014) provided deeper insight into what biases may influence nurses' contraceptive prescribing practices. The study reported that nurses were more biased towards providing certain types of contraception based on the woman's age and parity due to perceived delay of their fertility returning. Thus, younger women who were never pregnant before were provided with injectables that resulted in faster return of fertility; however, it is uncertain if women were asked about their fertility preferences (Marlow et al., 2014). This has been found in multiple studies in other African countries where nurses restricted access to particular contraceptives due to their concerns that younger unmarried women without children will become infertile due to injectables; however, in those contexts, nurses were more likely to promote condom use and avoid prescribing injectables (Godia et al., 2013; Schwandt, Speizer & Corroon, 2017; Sieverding et al., 2018; Stanback & Twum-Baah, 2001; Tumlinson, Okigbo & Speizer, 2015). Furthermore, Sieverding et al. (2018) found that more unmarried women were asked about their age and why they wanted contraception in comparison to married women. Furthermore, unmarried women were more likely to be provided with information about side-effects to deter them from using contraception in comparison to married women. Only 30% of unmarried women were asked what contraceptive method they wanted in comparison to over 70% of married women (Sieverding et al., 2018). Notably, provider bias is also evident elsewhere in the world; a study conducted in Sweden found that younger women who have never had children and were not in a monogamous sexual

relationship were less likely to have the IUD recommended for them (Ekelund, Melander & Gemzell-Danielsson, 2014). This occurred despite the World Health Organizations (WHO) guidelines which stated that IUD's were suitable for younger women and women who have never been pregnant (Ekelund, Melander & Gemzell-Danielsson, 2014). This highlights how limitations in professional knowledge may result in restricted access to suitable contraceptive methods. Consequently, this emphasizes how certain beliefs and attitudes may conflict with professional knowledge and influence the contraceptive prescribing practices of health professionals. Thus, Sieverding et al. (2018) also argues that a growing body of literature recognizes that providers may also restrict access to contraception due to a lack of knowledge and clinical skills and confidence in their ability to provide family planning services. For example, a study conducted by Baumgartner et al. (2007) found that 37% of women presenting for reinjection at Eastern Cape clinics were not provided with injectables despite them arriving within the two week "grace period", which means they were still eligible for reinjection. Furthermore, majority of the women were not provided with any other form of contraception despite their increased risk for unintended pregnancy and were given little information about the risks associated with being late for reinjection and what to do in the event they might be late for their reinjection date (Baumgartner et al., 2007). Comparatively, majority of women attending clinics in the Western Cape received reinjection within the grace period. This once again emphasizes the need for deeper exploration of the existing knowledge, attitudes and practices of primary health care providers providing family planning services as they have significant influence on women's ability to access a range of contraceptive methods. Furthermore, restrictions placed on women's access to various contraceptive methods may have dire unintended consequences for women's sexual and reproductive health.

Methodology

Study Design

This study will employ a qualitative approach; this approach is relevant when the researcher aims to describe complex phenomena or social problems in a holistic manner. Thus, qualitative research is mainly

concerned with "the meaning people attach to everyday life" (de Vos et al., 2011:65). This may be achieved through exploring the "inner world" of the research participants via interactions which evoke their perceptions, knowledge, attitudes, experiences and beliefs about the phenomena under study (de Vos et al., 2011). Consequently, this approach is most appropriate when the problem or phenomena under study may not be well understood or there has been limited exploration in a particular context. This design has been chosen as the research question involves exploring the lived realities of nurses providing family planning services. Thus, the study aims to gain a deeper understanding of the existing knowledge that nurses possess about contraceptives and family planning and how this might influence their contraceptive prescribing practices. Furthermore, the study aims to gain a deeper understanding of their beliefs and attitudes and how this might interact with their professional knowledge and practices related to contraceptive prescribing and family planning. Consequently, the researcher aims to describe this complex interaction between knowledge, attitudes and practices in the daily work of nurses providing family planning services to an array of patients.

Study population and Setting

The study population are nurses who provide family planning at City Health facilities in City of Cape Town. The City of Cape Town offers personal primary healthcare (which includes family planning) in collaboration with the Provincial Health Department's Metro District Health Services. They provide personal primary healthcare services at 80 primary health care facilities, 12 satellite facilities, 7 community day centres and 6 mobile facilities; 86 of these facilities provide family planning services (City of Cape Town [CoCT], 2019). These services are provided predominantly by nursing staff, which include professional nurses and clinical nurse practitioners (Western Cape Department of Health [WCDoH], 2018a). The study sample will include approximately ten nursing staff who provide family planning services, including contraceptive counselling, prescribing and insertion and removals of the implant and IUD City Health facilities. The sample excludes other health professionals providing services at the clinic including doctors, pharmacists, dentists, occupational therapists, physiotherapists, speech therapists and audiologists as they are not directly involved in family planning and contraceptive counselling and services.

Sampling and Recruitment

Participants will be recruited with the assistance of City Health; the City Health Management Team will disseminate information about the study during their monthly meeting. This will be done in liaison with the student researcher who will also contact health facility managers. Due to this research being commissioned by City Health, they will assist in selecting the suitable sites to recruit eligible nurses as participants; City Health facilities provide services in eight sub-districts across the Cape Metro, a map is attached (see Appendix A) (WCDoH, 2018b). Thus, participants will be recruited from across these sub-districts to determine if any variability exists between facilities. Additionally, City Health will give guidance on sites where interviews can be conducted to prevent the disruption of services. Purposive sampling will be used to recruit approximately ten participants for in-depth individual interviews; this sampling strategy is most appropriate when the researcher wants to select participants who may have particular characteristics that "serve the purpose of the study best" (de Vos et al., 2011: 392). Furthermore, purposive sampling allows the researcher to gather data that "will provide rich detail to maximize the range of specific information that can be obtained from and about that context" (de Vos et al., 2011: 392). Therefore, as the knowledge, attitudes and practices of nursing staff are of interest to the researcher, they have been purposively selected. Due to nursing staff being employees of City Health, there is a possibility staff may feel obligated to participate in the study as a result of City Health recruiting participants. Thus, it will be emphasized that participation is voluntary, with no consequence for non-participation. Study participants will be eligible to participate if they are 18 years or older, able to speak English and are involved in the dispensing and counselling of family planning and contraceptive services.

Data Collection Methods

This study will utilize semi-structured individual in-depth interviews to collect data. The semi-structured interview is appropriate when researchers are gathering data on a specific topic (de Vos et al., 2011). However, it also provides the researcher the flexibility to address emerging data which may be interesting or unexpected. This is a useful method to gather data on topics which may be multi-faceted or personal. In

this case, the knowledge, attitudes and practices of nurses in the context of family planning services may be influenced by multiple factors, some of which may be personal. The researcher develops an interview guide with pre-identified questions which serves as a guide during the interview; the semi-structured interview for this research study is attached (please see Appendix B). Furthermore, vignettes are useful tools to prompt underlying knowledge, beliefs and attitudes that participants have which may not be easily voiced (Green & Thorogood, 2014). Vignettes also provide "real-world" examples and are often useful when attempting to understand how health professionals make clinical judgements or may have particular biases towards certain groups of patients (Sieverding et al., 2018). Two vignettes will be developed based on existing literature in Africa exploring provider bias related to contraceptive counselling and prescribing. Each interview will not exceed more than two hours; breaks will be provided at 30-minute intervals or when the participant requires them. The interview will begin by the researcher introducing themselves and building initial rapport with the participant to ensure comfortability and familiarity. Following this, the informed consent form will be provided and will be explained to confirm that the participant fully understands their purpose in the research. The participant will also be asked to consent to the use of a tape-recorder; it will be explained that identifying data will be not be linked to them. Once the research participant agrees to partake in the research, the interview will begin. At the end of the interview, the researcher will address any questions or concerns; they will also reaffirm the privacy and confidentiality of the participant.

Data Analysis

Data will be analysed using a thematic content analysis approach; this form of analysis consolidates significant data that emerges from interactions with participants (Green & Thorogood, 2014). Thus, "themes" are identifiable patterns in the data; they are "recurrent concepts which can be used to summarize and organize the range of topics, views, experiences or beliefs voiced by participants" (Green & Thorogood, 2014: 210). The researcher will use qualitative software package NVivo12 to organize and manage the data. This will assist the researcher to create an audit trail throughout the data analysis process, which includes

identifying any changes made during the research process and justifications for changes (Bazeley, 2013). The data analysis process is an iterative process; the researcher begins the analysis during data collection through observations and memo-taking. The researcher might identify important information that may require follow-up during the data collection process or might help the researcher to refine their interview schedule. Thus, an audit trail is helpful to keep track of the data collection and analysis process. Thematic content analysis requires various steps; firstly, the researcher will familiarize themselves with the data; for this research, this will take the form of transcripts which has been transcribed by an external transcriber. However, no identifying information will be recorded, and the transcriber will only have access to audio recordings. Following this, the researcher will then identify codes and themes – codes are labels which describe what the researcher understands about a particular segment of data (Bazeley, 2013). Initial coding will be done using NVivo; from this, a codebook will be generated which will name and describe each code. This will be an inductive process initially; when the researcher refines the codes, they will use the codebook to re-analyse the transcripts to ensure data were coded correctly. The codebook will be re-updated; any decisions to re-code data will be noted and justified where necessary. Lastly, when codes are refined, they will then be used to identify broad themes, which will be further analysed.

Ethical Considerations

The student researcher will apply for ethical approval of the study from the Human Research Ethics Committee at the University of Cape Town. Furthermore, permission will also be sought from the City of Cape Town (in consultation with City Health) to recruit nursing staff from City Health facilities and to utilize the chosen sites where data collection will take place. Please note that ethics approval has already been obtained to conduct this study (HREC REF 349/2018); however there is now a change of study staff in this case, an MPH student. An FHS 007 amendment of study staff has been submitted and approved on 22/6/2019. In addition, an FHS 016 annual progress report has been submitted and approved until 30/06/2020.

Potential Risks and Benefits

The potential for harm, discomfort or inconvenience of participants in this study are minimal. The participants risk for physical, psychological, social, economic and legal harm is low as the content matter being explored in the study is not of a sensitive nature. The student researcher will ensure that data provided by participants will be anonymized to prevent nursing staff experiencing any victimization as employees of City Health as a result of their participation. Furthermore, the participants will also be frequently reminded that they may choose to disclose information only when they feel comfortable to do so and can refuse to or request to omit answer any question. They will also be reminded that they may withdraw from the study at any point before, during or after data collection. In this way, the participant will be protected from any unforeseeable and unintended consequences which may be of potential harm.

The potential benefits of participation in the study is the opportunity to provide insights into the daily experiences of nursing staff providing contraceptive counselling and prescribing. This might assist City Health to have a deeper understanding of areas for improvement in rendering family planning services for future patients in the City of Cape Town and where support may be needed for nursing staff. Furthermore, it may also provide an opportunity to reflect on professional practice and identify areas of one's professional practice which can be strengthened. Lastly, the study will contribute to existing knowledge about current contraceptive counselling and prescribing practices.

Informed Consent

Informed consent will be sought from participants by the student researcher prior to the start of conducting the in-depth individual interviews via adult informed consent forms (please see Appendix C). The informed consent form will be in English; it will be explained by the student researcher to address any issues of confusion or uncertainty. If participants would like the form in a different language to ensure comprehension of the information, then this will be provided. The form will include the aim of the study, the method of data collection and the duration of the participation. Furthermore, it will emphasize the

potential risks and benefits of partaking the study, voluntary participation and anonymization of data, confidentiality, refusal to participate in the study and that there will be no compensation for participation. Lastly, the student researcher will explain and request the use of a tape recorder to record the interview for ease of analysis; participants will also be informed of how data will be stored and protected in this regard. Following this, participants may choose to withdraw from the study if they do not feel comfortable with being recorded. During this process, the student researcher will address any concerns if the arise; participants will be asked to sign the form if they agree to participate. The participants will be provided with an additional form which will include the student researcher, research supervisor and ethics committee contact details in the event they are unhappy or would like to withdraw from the study after participating. As previously stated, it will be emphasized to participants that there will be no consequences related to their employment if they choose to not participate or withdraw from the study.

Privacy and confidentiality

Privacy and confidentiality will be maintained through the anonymization of participants' responses; the student researcher will avoid linking personal details to the responses of participants during the analysis and reporting process. All recorded data (written and audio) will be securely stored on the student's personal laptop which is password-protected and known only to the student researcher. Furthermore, recorded data will be destroyed (deleted from the student researcher's laptop) when the data has been transcribed and checked for quality purposes. Only individuals on the research team will have permission to access to the primary research data including the student researcher, research supervisors and transcriber (the transcriber will only have access to the audio recordings). Furthermore, the transcripts will be backed up electronically on hard drives, which will be stored on in a locked cabinet. Lastly, signed informed consent forms will also be stored in a locked cabinet.

Participation Reimbursement

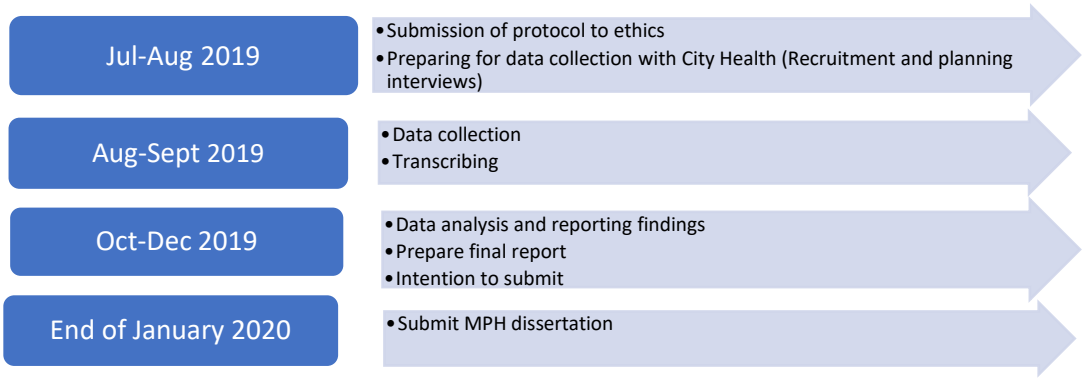
Participation will not be compensated or reimbursed by the student researcher. However, in liaison with City Health, the student researcher will ensure minimal disruption to the clinic by ensuring that nursing

staff are available and that this will not be detrimental to the services they provide. Refreshments will be provided.

What happens at the end of the study?

The research is commissioned by City Health; consequently, the findings and recommendations will be disseminated to City Health to inform future planning around family planning services.

Study period and timeframe



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Part B: Journal Article

An exploration of primary health care providers' perceptions and experiences of providing contraceptive services in Cape Town, South Africa: A qualitative study

Target Journal: *PLoS ONE*

Kulthum Fataar

Abstract

Background:

Health care providers can play a significant role in empowering women to make informed decisions when selecting suitable contraceptive methods during contraceptive counselling. This study explored the experiences and perceptions of primary health care providers delivering contraceptives services in Cape Town to gain a deeper understanding of the delivery of contraceptive services.

Methods:

Ten in-depth interviews were conducted at five public primary health care facilities in urban areas in Cape Town, South Africa. Eligible participants included primary health care providers providing contraceptive services and willing to participate in the study. The qualitative software package NVivo was used to sort and manage data. Data was analysed using a thematic analysis approach.

Results:

Overall, providers emphasized supporting women in contraceptive decision-making. Sexual and reproductive health training increased providers confidence to deliver appropriate contraceptive services. Furthermore, contraceptive prescribing practices were also influenced by medical eligibility criteria and

women's preferred bleeding patterns. However, contraceptive prescribing practices were also influenced by providers' attitudes towards younger and older women. Challenges experienced by providers when providing contraceptive services included: contraceptive stockouts; time constraints of employed women accessing the service; and work pressure due to providing other health services.

Conclusions:

Health care providers play a critical role in facilitating women's right to accessing high quality contraceptive services. Providers in the study perceived themselves as negotiators during contraceptive counselling by considering both women's preferences and provider recommendations for contraception, whilst enabling women to make informed contraceptive decisions through provision of reproductive health information. Consequently, shifting contraceptive counselling to focus on shared decision-making may encourage autonomy during decision-making and help to limit the influence of provider attitudes on contraceptive prescribing and counselling.

Key words: Family planning, Unintended Pregnancy, Contraception, South Africa, Healthcare Providers, Qualitative research

Introduction

Universal access to family planning services is critical to ensure the sexual and reproductive health needs and desires of reproductive age women are met. Furthermore, increasing contraceptive uptake could prevent millions of unintended pregnancies [1]. Globally, the uptake of contraception has significantly increased, however, there remains a proportion of women who want to avoid unintended pregnancy but are not using a contraceptive method [2]. Overall, avoiding unintended pregnancy minimizes the risk of maternal and infant mortality and prevents social and economic barriers that may result from unintended pregnancy [3,4]. Furthermore, it may also prevent adverse health outcomes as a result of accessing unsafe abortion services in contexts where abortion services are unavailable or difficult to access [5].

In South Africa, a household survey conducted in 2016 reported the contraceptive prevalence rate was 47.9% amongst all reproductive age women (ages 15-49) using modern contraception in comparison to 50.1% in 2003, indicating a decline of 2.2% [6,7]. Modern contraceptive methods are available for free in the public health sector in South Africa and include male and female condoms, injectable progestogen contraceptives, intrauterine devices (IUD), sub-dermal contraceptive implant, oral contraception and sterilization [8]. Notably, not all the listed contraceptive methods are offered at public health facilities and methods may not always be available due to stockouts [7]. The depot medroxyprogesterone acetate (DMPA) injectable remains the most used modern contraceptive method [6]. In recent years, there has been significant debate about DMPA's role in increasing the risk of HIV acquisition amongst women using this injectable method [9-11]. In 2019, the World Health Organization (WHO) released a statement advising there is no increased risk of HIV acquisition amongst DMPA users [12]. Increasing access to accurate and comprehensive reproductive health information is important to empower women to make informed decisions about contraceptive method choices.

According to recent findings in South Africa, 12% of reproductive age women desired to limit or space their pregnancies but were not using contraception [6]. Consequently, many women continue to experience unintended pregnancies [6,13,14]. In 2012, the National Department of Health (NDoH) updated the National Contraception and Fertility Planning Policy and Service Delivery Guidelines [8]. The updated policy aimed to expand the availability of contraceptive methods (including longer-acting methods) in the public health sector; for example, the sub-dermal contraceptive implant became available in public health facilities in 2014 [15]. Increased risk of unintended pregnancy is not limited to non-users of contraception; inconsistent and incorrect contraceptive use may also result in unintended pregnancy [7]. This is often due to lack of reproductive health information provided to women during contraceptive counselling. Many women report receiving insufficient information about their chosen method when accessing family planning services [7,16,17]. Furthermore, women also discontinue contraceptive use due to unwanted side effects [6, 7, 16]. Many women desire more information from health care providers about side effects and management

thereof [16]. However, research in South Africa indicates that amongst women attending government health clinics, only 56.4% and 47.9% of women are being provided with information about side effects and how to manage side effects, respectively [6]. Health care providers delivering contraceptive services within clinics play a significant role in facilitating the process of contraceptive decision-making by providing information about the various contraceptive methods available, the possible side effects associated with each method and its suitability for women.

Health care providers may influence or restrict women's contraceptive choices during contraceptive counselling based on their own biases, which may not be evidence-based, about the suitability of specific contraceptive methods for specific groups of women [18]. Examples of this include differences in promoting methods such as injectables to younger women in different contexts; in South Africa, injectables are considered more suitable for younger women [17] whereas in other African countries, younger women are restricted access to this method and are more likely to receive information on oral contraception [19,20]. Furthermore, a study conducted in Nigeria found that providers may also restrict access to contraception due to a lack of knowledge, clinical skills and confidence in their ability to provide family planning services [18]. This highlights how limitations in professional knowledge or bias may result in restricted access to suitable contraceptive methods.

The majority of reproductive age women in South Africa are accessing family planning services within the public health sector, and thus are required to engage with health care providers about their family planning decisions. The recommendations of health care providers are powerful; many women are more likely to choose a contraceptive method recommended by health care providers as opposed to their preferences [21]. However, health care providers may have biases when prescribing contraceptive methods, which may be influenced by differing levels of knowledge and clinical skills, their attitudes and perceptions towards contraception. To gain a deeper understanding of how these factors influences delivery of contraceptive services, this study explores primary health care providers' experiences of delivering

contraceptive services in Cape Town and how their perceptions towards contraception influences their contraceptive prescribing practices.

Methods

Study design, research setting and study population

This study used a qualitative approach which involved conducting in-depth interviews between October and November 2019 with primary health care providers (providers) at five public sector health care facilities, providing free contraceptive services, spread throughout metropolitan Cape Town, South Africa. Prior to the recruitment process, a meeting was scheduled with health managers who provided a list of health care facilities providing contraceptive services and key personnel to contact to assist with study recruitment. Approval was obtained from area managers to contact facility managers within selected areas. Most facility managers preferred to inform eligible providers about the research study themselves and negotiated an appropriate day and time for an interview if providers indicated their interest. Eligibility criteria included providers delivering contraceptive services and willingness to participate in the study. Each sampled clinic had two providers delivering contraceptive services; thus, only two providers were recruited from the five selected facilities. All ten providers recruited agreed to participate in the study.

Facilities were purposively sampled based on their geographical location and the diversity of patient populations accessing contraceptive services including youth, migrants, and women who utilize the clinic due to its proximity to their workplace. Sites were selected to determine how the diversity of patient characteristics and their contraceptive needs influenced the perceptions and experiences of providers. Three facilities provided all the contraceptive methods available in public-sector facilities including progestogen-only injectables, oral contraception (OC) including combined oral contraceptive pills (COC) and progestogen oral contraception (POC), male condoms, intrauterine contraceptive devices (IUD) and sub-dermal implants (implant). Two facilities provided all the contraceptive methods excluding the IUD; one facility provided injectables and OC only. Additionally, four of the selected facilities offered services,

including contraception services, that were tailored for younger women under 18 years old, which occurred on specific days during the afternoon. All five selected facilities also offered maternal and antenatal care and other primary health care services.

Data collection

A semi-structured interview guide was developed by the researcher and piloted with two providers who were included in the study sample; the guide was re-ordered for flow and clarity. Prior to the interviews, providers were asked to share their sociodemographic information including their professional background and years of experience. During the interviews, they were asked about the training they had received, how they conducted contraceptive counselling sessions and what factors they considered when making contraceptive prescribing decisions.

Additionally, two vignettes were developed based on existing literature related to health care providers who are involved in family planning services in an African context [18]**.** Vignettes present fictional characters as cases to explore the underlying knowledge, beliefs and attitudes of participants which might be challenging to identify when reporting on their personal experiences [23]. Vignettes are useful when attempting to understand how health professionals make clinical judgements or to identify biases towards patients or treatments [18]. Vignettes have been used to explore provider bias in contraceptive provision elsewhere [18]. In this study, the vignettes provided further exploration into providers' prescribing practices; providers were asked to explain why the agreed or disagreed to prescribe the contraceptive requested by the client in the vignette and what factors they considered when making this decision.

A total of ten individual in-depth interviews were conducted by the researcher, a female, English-speaking, Master of Public Health student trained in qualitative research methods. Due to English being a common language used in healthcare settings in South Africa, all providers agreed to the interview being conducted in English. Interviews were conducted in a private room at the facility and varied in duration

between an hour and one hour and thirty minutes. Providers working at the same facility were interviewed on two separate days to avoid disrupting services.

Ethical considerations

Ethical approval was obtained from the Human Research Ethics Committee at the University of Cape Town (HREC REF 536/2019). Permission was also obtained from the health authority in order to access facilities. Written informed consent was provided by all study participants including permission for audio recording. Providers were also assured that to maintain anonymity and confidentiality, identifying information would not be reported in any dissemination related to the research, including their names, the facilities at which they work or any other identifying information. Signed informed consent forms were stored in locked cabinets and monitored by the researcher. Digital data, including recordings and transcriptions, were stored in password protected files on a private, password-secured computer. Access to digital data was limited to the research team and a professional transcriber. After transcribing was completed and verified, all audio recordings were deleted.

Data analysis

The audio recordings of the individual interviews were transcribed by an independent transcriber. The researcher listened to all audio recordings and reviewed all transcripts for accuracy and quality. All sorting, management and coding of data was conducted by the researcher using Nvivo (QSR International) qualitative software. A codebook was developed based on *a priori* codes derived from questions in the interview guide. The codebook was further refined after inductive codes were derived from the data. A thematic analysis approach was used to identify and examine key themes and sub-themes emerging from the data. Illustrative quotes are provided for each theme. Informants are identified by their rank and years of experience, with PN for professional nurse and SN for staff nurse. PN's have four years training and work autonomously in specific areas including contraceptive prescription. SN's have two years training and work under the supervision of a PN.

Results

Participant characteristics

Ten providers were interviewed, two from each facility. Eligible providers were all female and included one registered staff nurse (SN) and nine registered professional nurses (PN's) who provided contraceptive services. The median nursing work experience amongst providers was 8 years.

The key themes identified during data analysis included the influence of contraceptive knowledge on providers' practices, attitudes towards providing contraceptive services and factors which influence prescribing practices. Additionally, sub-themes were identified and are explored within each key theme.

The influence of contraceptive knowledge

Contraceptive knowledge was strongly emphasized by providers in preparing them to confidently deliver comprehensive contraceptive services. The factors which contributed to providers contraceptive knowledge included prior sexual and reproductive health (SRH) training and the Practical Approach to Care Kit (PACK) clinical guidelines.

Sexual and reproductive health training

All providers had prior knowledge of contraception acquired through their studies, work experience and/or training. Providers reported that they previously felt confident about providing an effective service by relying on their prior knowledge. During their employment, providers who delivered contraceptive services were expected to complete an additional six-month SRH training course. After attending the SRH training, many providers re-evaluated their prior training and reported that they were not sufficiently trained to provide contraceptive services that prioritized women's contraceptive needs:

> *… except for you know how to inject … you don't really have that background knowledge of choosing what is best for the client. Whereas when you get this course you have a better understanding of how to treat* (PN, 3 years' experience)

Furthermore, many providers reported the training challenged misconceptions shared amongst providers about the suitability of certain contraceptive methods for women. Thus, the training prompted providers to reflect on their prescribing practices and to critically reassess if this aligned with women's contraceptive needs and desires. For example, one PN who attended the training reported that clinic staff deterred providers from prescribing implants for younger first-time contraceptive users which differed from the training information received:

> *… [Clinic staff] would say 'never put in an [implant] for a 16 year old that's never had family planning'. And when I did sexual reproductive training [SRH trainers] said like why not? …. So, there's some myths that … was clarified … I sat in that training, I was like – now why do people say that, like why? Why are [nursing staff] so resistant to do certain things and we can* (PN, 4 years)

Additionally, one PN with three years' experience, who recently enrolled in the training emphasized that providers delivering contraceptive services needed additional SRH training*"…because [clinic staff] are mis-prescribing, we are giving wrong information, we're not giving enough information with regards to reproductive health*", despite their previous knowledge gained from their professional qualification and training. Thus, most providers who attended SRH training reported having increased confidence to prescribe suitable contraceptive methods for women, including providers who received training on implant and IUD insertion and removal.

Majority of providers were trained to insert and remove implants and reported feeling confident to provide this method. Furthermore, those who attended training to insert the IUD also reported having increased confidence to both prescribe and insert the IUD. Five providers were trained to insert IUDs at the

time of the study. Providers who received IUD training often promoted the IUD to both first time contraceptive users and those considering switching to a non-hormonal contraceptive method due to side effects. In comparison, providers who had not received training reported feeling less confident to promote the IUD to women despite having theoretical knowledge of the IUD. Thus, they would only provide information and not prescribe the IUD when requested by women:

> *… but personally me, I won't [prescribe the IUD]. The IUD, I'm not supposed to do that, but I don't really advertise as much you know, but at the end of the day it's still, if they ask for the information I will give them. But I won't … I don't like to do things that I'm not able to stand my ground* (PN, 11 years)

Clinical guidelines

In addition to their knowledge acquired through training, providers also used clinical guidelines to assist with clinical decision-making related to prescribing appropriate contraceptive methods. Overall, providers reported using the Practical Approach to Care Kit (PACK) adult guide in their practice. The PACK guide is a management algorithm which was developed in the Western Cape, South Africa (now used nationally) to assist health workers' clinical decision-making to appropriately assess, diagnose and treat patients for one or more symptoms and/or conditions [24]. Some providers reported the guidelines assisted them when they experienced uncertainty about prescribing a suitable contraceptive method. However, other providers reported that in some cases the guidelines were not tailor-made for all women and only suitable for the "*normal*/*ideal patient"*. Furthermore, the use of clinical guidelines was associated with being *"computerized"* to follow the decision-tree based on the assessment as opposed to exploring women's specific contraceptive needs:

> *… Each patient is different and … the PACK isn't always like about the patient … you can follow the PACK but there's some cases where it's not like as in the algorithm … like I think that [providers] have been computerized … I think that we've driven away*

> *from what the patient needs and each patient is different. And we try and generalize and that's the biggest mistake* (PN, 4 years)

Thus, at times, some providers overlooked clinical guidelines in favour of prioritizing women's personal contraceptive needs. For example, one PN with 33 years' experience, questioned why women older than 40 years should switch from injectables to POC because it is *"…stated in a book somewhere"* and reported that she would prioritize their preferences *"if [the patient] wanted to stay on it because [they] feel safe, that's fine with me, I will give it"*. In comparison, other providers reported that women older than 40 years needed to be counselled on switching from injectables to POC and based this recommendation on their knowledge that injectables might result in reduced bone density.

These contrasting opinions of providers highlights the balancing act between one's clinical knowledge and judgment and women's contraceptive needs and desires. One PN reported that she would not provide COC to women who have hypertension as her perceived role was to use her clinical judgment to prescribe methods to avoid women experiencing adverse health outcomes, regardless of their satisfaction with the prescribed method:

> *But if [patients] choose oral contraceptive while there are things that are hindering me to prescribe this oral contraceptive, I won't provide it. because at the end of the day, let's say they have a raised blood pressure – raising a blood pressure, that is part of the side effects of the oral contraceptive. So for me to … put your life at risk as a patient, I wouldn't be able to sleep at night knowing that I killed a patient* (PN, 7 years)

Thus, despite many providers emphasizing that women have the right to choose their desired contraceptive method, they also used their clinical knowledge and judgment to counsel women to use a more appropriate method, particularly when contraindications were present.

Attitudes towards providing contraceptive services

Most providers reported enjoying engaging with women about their sexual and reproductive health, providing health education and supporting women in their reproductive health choices. They reported it was essential for women, including younger women, to have accessibility to this service to allow them to space having children and avoid the socioeconomic impact unintended pregnancy may have on both mother and child:

> *I think it's an absolute necessity … it doesn't matter what age you are, people need to be able to have the right to decide when they want a child … or if they want children at all. I think it is part of, one of the building blocks in our communities. Because if we are not going to allow any lady to not be able to decide when she wants, she's going to end up with children that she's not going to be able to care for. She's not going to be able to care for herself* (PN, 33 years)

Thus, many providers were supportive of family planning decisions being centred on women's reproductive needs and desires by exploring their contraceptive preferences. Providers perceived themselves as negotiators who assisted women to make contraceptive decisions by delivering accurate reproductive health education that accounts for both women's preferences and the provider's recommendations for contraception:

> *You negotiate yes, but it must come from them, you need to know what does she want. I can't say this is good for you because of this benefit – but it's not what [the patient] came for, [they] wanted the 2 months [injectable] but you're advising for 3 months [injectable] … so let them talk, let's just share* (PN, 7 years)

Thus, many providers disagreed with "*forcing*" women to use a contraceptive method they had not requested as they believed this would result in non-compliance. Consequently, providers felt that they should prescribe contraceptive methods tailored to women's choices thus improving compliance:

> *… But what I have seen is you cannot force a woman, if she does not want to use it, she does not want to use it. Because if you give her the tablets and she doesn't want to take it, she's not going to take it. Because she said to you she is not going to take. So, don't force yourself, give the patient's what they want so they can be compliant on it* (PN, 5 years)

Contraception provision to younger and older women

Despite providers reporting the importance of negotiating with women about their desired contraceptive method, they displayed varying attitudes towards the suitability of contraceptive methods for specific age groups. The responses generated from the vignette of a younger woman requesting to use COC highlighted providers' attitudes towards prescribing COC to younger women, which was mostly positive but also highlighted their perceptions of younger women's ability to be "*responsible*". Many providers believed COC should be prescribed for "*mature*", *"responsible"* and *"organized"* women who "*have a routine"* whereas younger women were described as *"forgetful"* and were perceived to lack a structured, daily routine. Thus, they were more likely to probe younger women about their adherence to other medication regimens to assess their ability to use COC consistently compared to older women as there was a general perception that they might not use it correctly. Most providers reported that they would counsel younger women to use injectables instead; some providers also suggested longer acting methods such as the implant and IUD. However, many also stated they would prescribe COC if younger women refused any other method as their main concern was the risk of an unintended pregnancy. Generally, providers strongly motivated and encouraged younger women's access to contraceptive services by establishing and promoting an effective youth-centred family planning service to avoid teenage pregnancy in communities. However, providers preconceived notions of younger women may influence their contraceptive counselling approach and prescribing practices, which might not be in their best interest.

Similarly, providers attitudes towards older women also influenced their contraceptive counselling approach and prescribing practices. Many providers reported older women preferred injectables and refused

to switch to POC, which was perceived to be a safer contraceptive method for older women. Thus, providers became frustrated with older women who were reluctant to switch to POC, despite provides educating them about the perceived possible health risks (such as reduced bone density) associated with the injectable. This resulted in providers questioning their approach to contraceptive counselling as they felt they failed to persuade older women to switch to a perceived safer method:

> *... Most [older women] have already came in with the mind set of I am not changing and I think that is the, the problem that we have. Like we have so many older women like in their 40's, 50's, not wanting to change from [injectable progestogen] to [progestogen only OC] which is a safer method for their age ... they say no, no sister I will maybe consider it at the next time but today, give me my family planning. So, they're very adamant like I don't know, if our approach is wrong or I really don't know* (PN, 4 years)

"Every woman is different": Factors influencing prescribing practices

Providers identified various factors they considered when prescribing suitable contraceptive methods for women. One of the main factors considered was medical eligibility criteria. Another factor emphasized by providers was prescribing methods that minimized unwanted side effects. Providers also considered women's preferred bleeding patterns.

Medical Eligibility

Medical eligibility criteria were emphasized as the most important factor considered when prescribing contraception. This included asking women about their chronic illness history, current medication use and HIV status. Most providers reported avoiding prescribing COC to women who were using medication to manage hypertension and/or diabetes; they were more likely to prescribe POC due to fewer contraindications. Furthermore, one PN with 23 years' experience avoided prescribing OC to women using multiple chronic medications because *"adding another pill"* was perceived to be adding to women's oral

medication burden. A few providers also reported avoiding prescribing the implant for HIV-positive women due to contraindications with antiretroviral therapy (ART) (specifically efavirenz) which they reported reduced the effectiveness of the implant. Thus, they were more likely to prescribe injectables to HIV-positive women. Providers also reported removing implants from women who were HIV-positive after receiving communication about its reduced effectiveness as a contraceptive method. One provider reported they received communication that HIV-positive women can continue to use the implant if they used condoms; however, providers at their facility often promoted removing implants because HIV-positive women attending their facility were not compliant with condoms. Another provider described experiencing confusion when prescribing the implant due to new information that contradicted the initial communication they received regarding the implant's suitability for HIV-positive women. Furthermore, she reported that two women had unintended pregnancies despite having the implant inserted; both women were HIV-positive and receiving ART at the time:

> *Because there was this one point where they said no [implants]. And now when I phone, [the HIV clinic staff] said they're not on [efavirenz]... There's a double standard, also because the message that we got was like different to what, what's happening. Like two of my patients … both of them fell pregnant on the implant on [antiretroviral therapy]*
> (PN, 7 years)

Providers also reported situations when women's preferred contraceptive methods were not suitable for them based on medical eligibility criteria; however, women would insist on continuing to use their preferred method. In these situations, providers attempted to educate women about contraindications during the counselling session or provided them with booklets they could read at home. However, if they refused alternative methods, providers would document this in their file and prescribe their preferred method as they reported *"at the end of the day, it's the patient's choice".*

Many providers highlighted that women often requested specific contraceptive methods based on recommendations by female friends and family members. However, they also noted that women struggled

to understand the differing physical effects experienced by women using the same method. Thus, providers often emphasized that "*every woman is different*" and that it was challenging to predict the physical effects of a prescribed hormonal contraceptive method:

> *But for family planning, there's hormones involved and not everybody's hormone levels are the same and not everybody's mood swings are the same – you may have moods, I don't have moods; you may have heavy bleeding – I don't have heavy bleeding. Even though we are both on contraception...* (PN, 23 years)

Consequently, many strongly emphasized the need to provide health education, particularly focusing on varying side effects experienced by women using different contraceptive methods. Providers reported that educating women on side effects was important as they considered this was perceived as the primary reason women discontinued contraception:

> *Because if you are not given the proper information when you start … we have a lot of people here who start on the injection and then they just don't come again and then you find out they started bleeding … some people get a period, others don't. Some people gain weight, others stay the same. Some people have, most people have irregular periods for the first 4 to 6 months, but we can treat that until your body is accustomed to it"* (PN, 33 years)

Bleeding pattern preferences

Across all interviews, irregular and unwanted bleeding was considered the main side effect that resulted in discontinuation of a contraceptive method. Thus, providers often asked women about their preferred bleeding patterns because many women requested specific contraceptive methods based on these preferences. These preferences included no bleeding or bleeding patterns that were "*regular*" which was associated with a regular menstrual period cycle. For example, one PN thought the primary motivation for many women requested injectables was to avoid bleeding, and family planning was secondary to this:

> *And patients who don't want a period … That's why most of them are on it, not because they are sexually active – because of her period … they are the ones [that say] 'Sister, I don't want a period" because that's what they tell me. But it's a family planning method. 'Yeah sister, and that as well, but I don't want a period'* (PN, 5 years)

One provider also reported gender identity influenced preferred bleeding patterns. For example, women who identified as lesbian and transgender requested injectables to suppress bleeding. Furthermore, another important factor reported was access to sanitary products. Sanitary products were usually purchased by the parents of younger women. Younger women were often concerned that reduced or excessive bleeding may cause their parents to become suspicious that they were using contraception if they used sanitary products less or more frequently. Furthermore, one provider reported that one woman who preferred no bleeding considered the injectable to be more economical because it was "*free*" and sanitary pads were not affordable.

Health system challenges influence on contraceptive delivery practices

Many providers reported experiencing health systems related challenges which affected their ability to provide comprehensive contraceptive services. This included contraceptive stock outs and limited counselling time.

Contraceptive stock-outs

Despite providers desiring to provide women with information on all the contraceptive methods available, their side effects as well as exploring their preferences and needs, providers felt this was mostly not possible. Consequently, providers felt issues such as contraceptive stockouts impacted on their service provision and might compromise women's contraceptive compliance. Contraceptive stockouts were repeatedly reported as a significant challenge as it limited the women's ability to choose their preferred method. Many providers reported stockouts forced women to use a method they did not desire which

resulted in resistance about alternative methods. Occasionally, stockouts resulted in some women not returning for their follow-up appointment:

> *Yes and there was a time that ... the 2 month injection was out of stock for maybe 2 to 3 months, then the client must be forced to take something else and some of them stayed away. There was also a time that the [oral contraception] was out of stock now for 3 months. So it was also not nice because now the lady must go onto the injectable and some of them decided, no they rather go [and] buy it or they [planned] to come back whenever"* (PN, 11 years)

Limited Counselling Time

Another challenge many providers reported was having insufficient time to provide women with comprehensive contraceptive counselling. For example, facilities that provided contraceptive services to a significant proportion of employed women reported that they usually attended the clinic during their lunch break or before attending work. Consequently, despite many facilities using a new appointment-based system, providers felt they still had very little time to provide comprehensive counselling:

> *Like they get here, "sister I did not come for this. I literally have to be back at in, like 15 minutes" ... They come in their lunch time. So when you want to sit with them and they like already made up their mind – so you just give them what they came for and then they leave ... give them condoms, try and give the message ... it is difficult* (PN, 4 years)

Furthermore, at other facilities, providers experienced pressure to work more quickly due to staff being "*one-stop shops*" and required to provide a broad range of health services. Providers also questioned the feasibility of being expected to provide services to a certain number of patients in an hour. Managing these pressures resulted in providers being unable to provide comprehensive contraceptive counselling:

> *You are under [a lot of] pressure because they want us to reach a target. We're supposed to see 4 to 5 or 6 clients in an hour and it doesn't happen like that, it doesn't*

work like that. Even if you're busy with a client here inside they will say "Sister I've got an emergency, my child had a fit" ... what are you going to do? This client [receiving contraceptive counselling] is also important to you but you have to see to the emergency (PN, 23 years)

Discussion

This study provides key insights into primary health care providers' perceptions towards contraception and their experiences when delivering contraceptive services in Cape Town. Our data suggests the knowledge and attitudes of providers influences the delivery of contraceptive counselling and prescribing practices. Furthermore, despite providers across the five facilities displaying positive attitudes towards providing contraceptive services that prioritized women's contraceptive needs and desires, this study suggests there may be underlying factors influencing how providers are delivering this service.

Overall, SRH training was perceived to be important, ensuring providers felt confident to provide effective contraceptive services. Lack of knowledge and training was perceived to be a significant barrier to providing effective contraceptive services because it affected providers' confidence when prescribing contraceptives [25-29]. This study, as found elsewhere, [30,31] shows that providers were more likely to promote the IUD as a contraceptive method after receiving clinical training. Thus, despite the NDoH's updated policy focusing on improving the availability and accessibility of the IUD [8], this might not be achievable if providers are not adequately trained and feel confident to promote and insert the IUD.

In addition to training, providers also used clinical guidelines to assist with their clinical judgement when prescribing contraceptives. For example, providers assessed if women were medically suitable for their preferred contraceptive method by considering multiple factors outlined in clinical guidelines. However, as found in this study, providers may perceive guidelines as a one-size-fits-all approach to delivering contraceptive counselling that limits their autonomy and overlooks the individual needs of women [32-34]. Thus, providers who have negative attitudes towards clinical guidelines may favour their

personal judgment. This might result in women having restricted access to a suitable contraceptive method, which has commonly been found in studies related to the IUD [30].

This study also highlighted the importance of accurate guidelines being clearly communicated to providers, particularly where contraindications are present [35]. A few providers in the study were aware that the implant had reduced efficacy amongst HIV-positive women due to contraindications with efavirenz; similar findings were found elsewhere in South Africa [36]. However, it was also noted that lack of clearly communicated guidelines created confusion amongst staff about the suitability of the implant for HIV-positive women. The NDoH recommended that women using the implant may continue to use it but require education about using condoms due to increased risk of pregnancy [37]. However, this study indicates that providers were not comfortable with promoting continued implant use as women were not compliant with condoms; thus, providers were more likely to promote implant removal and recommended an alternative contraceptive method.

Many providers believed they were enablers of women's reproductive health decision-making processes by providing accurate information to guide their decisions. Furthermore, most providers emphasized the importance of providing information about side effects. Other study findings in South Africa report women often receive little to no information on side effects [16,17]. However, providers in this study highlighted that they were often unable to provide in-depth contraceptive counselling due to time constraints, imposed by both women and their own workloads. Irrespective, providing accurate information is essential to increase women's involvement in contraceptive decision-making and to promote the correct and consistent use of their preferred contraceptive method [38]. In the United States, emerging research has focused on shared decision-making [39-41]; this involves the provider facilitating the process of both providers and women agreeing on an appropriate contraceptive method, through providing accurate information, addressing misconceptions and helping women identify the suitability of the methods available with their contraceptive preferences [39]. In our study, providers engaged with women about their bleeding preferences when selecting a contraceptive method. Findings from multi-country studies in Europe, North

America and Latin America suggest that bleeding preferences may influence women's contraception choices, where bleeding is perceived to negatively impact on their daily activities [42,43]. For example, some women prefer a predictable bleeding whereas other women prefer to reduce or eliminate bleeding and use hormonal contraception to achieve this [42,43]. Thus, providers showed evidence of facilitating women's contraceptive decision-making that aligned with their bleeding preferences, which was generally influenced by the women's lived realities.

Providers displayed attitudes that may have influenced contraceptive prescribing to younger and older women. A recent review of studies exploring provider bias in low-middle income countries found that many providers would avoid prescribing COC, injectables and IUDs to younger women [44]. Conversely, this study found that providers promoted injectables and IUDs to younger women; however, this was mostly due to concern that younger women may not use COC correctly and consistently. Many studies have explored the attitudes of providers towards providing contraceptive services to adolescent and young women in South Africa [45-48]. Findings presented in this study highlight that when providers prescribe contraception to younger women, they continue to use value-based judgements, such as younger women being irresponsible, as found elsewhere [45,48,49]. Additionally, this study also identified providers had a negative attitude towards prescribing injectables to older women who request to use this method. Providers perceived that injectable use might result in reduced bone density in older women and thus recommended women switch to a perceived safer method. However, this contradicts guidelines by the WHO and NDoH stating women over 40 can safely use injectables [50, 51]. Furthermore, there is no reported associated risk for reduced bone density amongst older women using DMPA [52]. This finding highlights that lack of accurate knowledge may bias providers against providing women their preferred contraceptive method.

Limitations

This study has limitations. Firstly, the research was confined to public primary health care facilities situated in urban areas in Cape Town, South Africa and therefore the findings reported may not be generalizable to rural areas or other dissimilar settings. However, facilities selected serve a diverse population in terms of

age, socio economic status and county of origin. Thus, the findings reported may be relevant for primary care facilities in the public health sector elsewhere in South Africa. There is a possibility that providers may have provided socially desirable responses. However, the study aimed to overcome this by using vignettes and follow-up questions to explore how providers use their clinical judgment to motivate a specific contraceptive method and the degree of agreement with women's requests for a contraceptive method.

Conclusions

The World Health Organization emphasizes health care providers critical role in ensuring women's right to accessing high quality contraceptive services [53]. To achieve this, providers need to be appropriately trained to prescribe and administer various contraceptive methods and deliver evidence-based information to ensure women make informed decisions about contraception [53]. Providers should also facilitate the process of women selecting a method that is most suitable for them without imposing personal judgment on women's decisions and support women's approval or refusal of contraceptive methods suggested by them [53]. This study demonstrates that providers are committed to promoting contraceptive services that upholds women's preferences although providers' knowledge and attitudes may influence their prescribing practices and delivery of contraceptive counselling. Consequently, ensuring that providers receive timeous, standardized evidence-based SRH training can support the provision of high-quality services, as providers in this study differed in prescribing practices based on the level of SRH training they received. This might limit providers' attitudes influencing their prescribing practices, as outdated or lack of evidence-based knowledge influenced providers' attitudes towards younger and older women. Additionally, shifting contraceptive counselling to focus on shared-decision making may be valuable to manage provider's influencing women's contraceptive decisions and promoting their autonomy during decision-making [41]. However, this is an emergent area of research in family planning in other contexts such as the United States and requires further exploration within the South African context.

Acknowledgements

I am grateful to the nursing staff for agreeing to participate in this study and their enthusiasm to share their experiences of providing family planning services. I am also thankful to the area managers and facility managers for their willingness to assist during the recruitment process.

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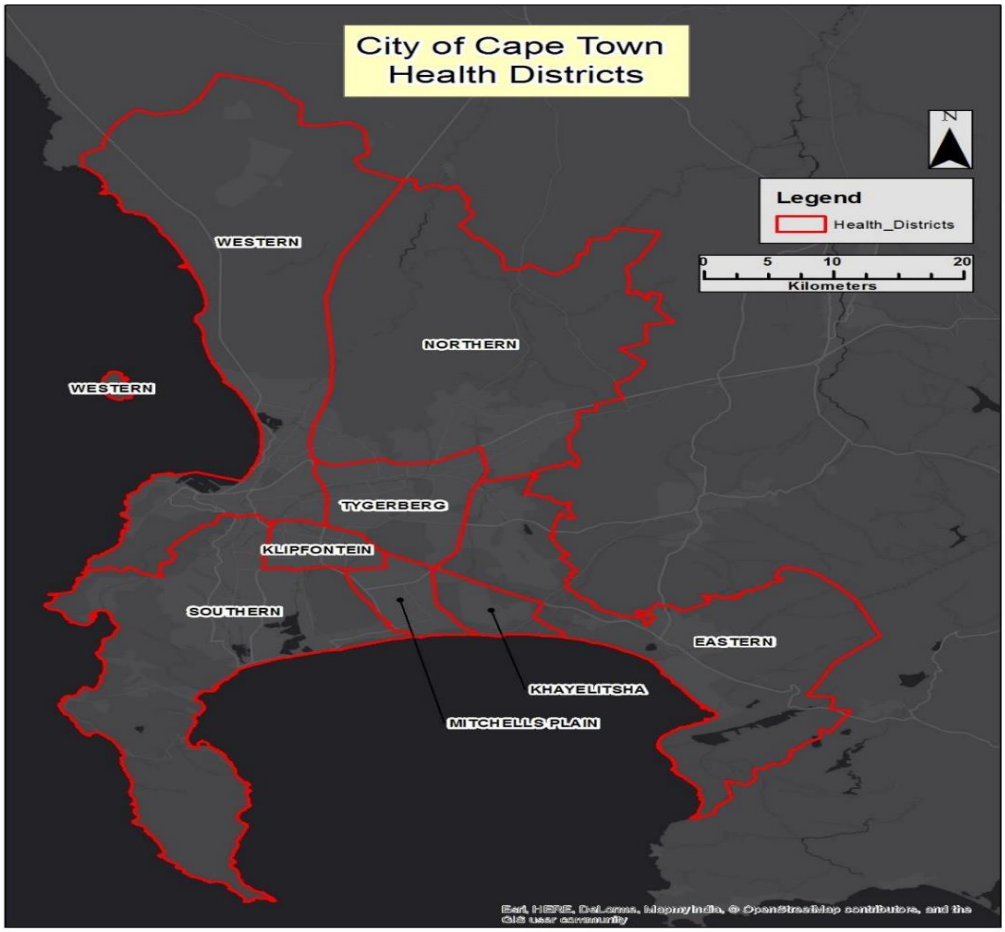
Appendices

Appendix A: City of Cape Town Health Districts



(Western Cape Department of Health, 2018b: 6)

Appendix B – Interview Schedule

General:

Introductory comments about the researcher and the study. Following this, the informed consent form will be explained. Remind participant that we can have a 10 minute break after 45 minutes (or sooner if needed)

Introductions: what qualifications do you have, how long have you been a nurse, how long have you been providing family planning services and where? How do you feel about contraceptive counselling and prescribing? What are the contraceptives prescribed here?

- Knowledge:
    - What policies and clinical guidelines inform your practice?
    - Do you receive training on contraceptives, prescribing and counselling? When/how often? How do you keep yourself up to date?
    - Does the knowledge and training you have received feel adequate for various counselling/prescribing situations (do you feel more)? Does it allow you to feel more confident in your practice and making clinical decisions at the clinic? If not, why?
    - What do you think are the most popular contraceptive methods prescribed? Why?
    - What do you think are the most popular contraceptive methods requested by patients? Why?
    - Tell me about the things (factors) you think about (knowledge and skills you have) when thinking about what is best to prescribe/not prescribe a contraceptive method to a patient? When would you not prescribe certain contraceptives?
    - Why do you think a patient might discontinue contraception use?
    - What do you think is important for patients to know (information you provide) about contraception?
- Present vignettes and discuss:
    - How would you counsel this person? Why would you choose one method for this case over another?
    - How would you feel about providing contraception to this person?
- Practices:
    - Tell me about a typical session providing family planning services? What happens/doesn't happen? What is your role? What is the patient's role? What informs your decisions?

- What professional challenges do you experience when providing contraceptive counselling? When prescribing? (link here to knowledge – are they always able to provide service according to training and knowledge received? What situations are they unable to)
- What happens when a patient requests a particular contraceptive method? How often do patients change their mind after counselling?

- Attitudes:
  - Who do you think is best suited for 1) the pill, 2) IUD 3) the injection 4) implant 5) IUD. Why?
  - Do you ever disagree with patients request for a particular contraceptive method? What influences you to disagree? How do you go about dealing with this?
  - How confident do you feel providing different contraceptive methods? What makes you feel confident about this? Do you feel more confident prescribing some than others? How confident do you feel about prescribing newer contraceptives?
  - Would you provide a contraceptive method you felt uncertain about? How would you go about addressing this?
  - Tell me about any experiences where your personal beliefs impacted on what you chose to prescribe or to counsel on?
  - How do you feel about your role as someone prescribing and counselling contraceptives? Do you feel you have significant influence on patient decision making? How do you feel about shared decision-making? (Do you see yourself and patient as equal in decision making)
  - How do you feel about patients who show low adherence or frequently discontinue contraceptives? How do you manage such situations?

Recommendations: What recommendations do you have to improve family planning services?

Vignette 1:

A 17 year old patient attends the clinic, asking to use the oral contraceptive pill. She lives quite far from the clinic, so travelling is not easy for her. She lives with her single mother and 3 younger siblings in a 2 bedroom home. Her mother is not aware she is seeking contraceptives. She is currently not in a steady relationship, however she has been sexually active for a few months.

Vignette 2:

A 25 year old patient attends the clinic; she has a 5 year old child from a previous relationship and does not want to fall pregnant any time soon as she intends to study a 3 year degree which she will start next year. She previously used the

injection, but hated the weight gain and side-effects so she failed to attend her follow up sessions. She is currently working part-time and living with her parents. She has read about the IUD and is wondering if that might be a good option.

Appendix C: Informed Consent Form

Informed consent form (ICF): Individual Interviews

Please take time to read this form and ask questions.

If you decide to take part you will be asked to sign this document.

Once you have signed the consent form, you will be given a copy to keep.

Your participation is your choice and you can stop the interview at any point. You can also discuss your participation with others before making a decision.

Who is conducting this study?

The research is being conducted by the City of Cape Town and the University of Cape Town.

What is the purpose of this study?

We would like to better understand how nurses are counseling clients to make choices about which contraceptive methods are best for them. We also want to know what is contributing to the current mix of contraceptive methods and how services could be improved for both nurses and clients.

What will taking part in the study involve?

If you agree to participate in this study, we will ask you to take part in an individual (one-on-one) interview where you will share your experiences and opinions about contraceptive counseling and prescribing. The discussion will be between one to two hours with a break every 30 minutes or at a time of your choosing.

Will the Interview be audio recorded?

The interview must be recorded so that everything that was discussed can be written down, translated into English if necessary, and read. The interviewer will also take notes during the interview to help record what you say as accurately as possible. *All recordings will be permanently deleted once the interview has been transcribed*.

Will my involvement be anonymous?

We will not use your name when writing reports or presentations about the research. Your name will never be used and your identity is protected. Your information will be handled carefully and will be kept safe and secure.

Will I be reimbursed?

This is a non-paid study. However, your opinion and personal experience are greatly valued, and will help increase understanding about how nurses experience providing family planning and contraceptive services. We will also make every effort to share with you the results of this research if you would like me to do this.

Are there any risks or benefits to taking part in the study?

There will be no direct benefits for taking part but the information will help us to improve the services for both nurses and clients. Your participation or decision not to participate will not affect your job now or in the future. We will make up a number for you that will go with your interview. We will make sure that no information about your identity is kept with these documents.

What will be done with the information collected during the study?

Interviews will be read and listened to. Reports will be used to share the information with other people. Your name and face will never appear anywhere in these documents and your feedback will not be linked to you.

Who has given ethical approval for the study?

This study has been approved by the University of Cape Town's Health Sciences Human Research Ethics Committee (HREC).

If you have any questions or want more information about the study you can contact:

1. A/Prof Jane Harries, Research Supervisor, University of Cape Town : Jane.Harries@uct.ac.za
2. Kulthum Fataar, Student Researcher, University of Cape Town : ftrkul001@myuct.ac.za
3. University of Cape Town Human Science Research Ethics Committee: 021 406 6338

Written consent:

By signing below I show that:

- **I have read the study information form, or it has been read to me.**
- **I have had the chance to ask questions, and to have any questions that I have asked answered.**
- **I know that taking part in the study is my choice and I can stop taking part at any time for any reason.**
- **I know that the interviews will be recorded and I agree to being recorded.**
- **I am aware that my job will not be affected in any way should I decide to withdraw from the study.**
- **I agree to take part in the study.**

Name of study participant	
Signature of study participant	
Date	

Consent to Interviews being recorded

Yes ☐

Appendix D – UCT Human Research and Ethics Committee Form

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room E53-46 Old Main Building
Groote Schuur Hospital
Observatory 7925
Telephone [021] 406 6626
Email: ahuretta.thomas@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

08 August 2019

HREC REF NO: 536/2019

A/Prof Jane Harries
Women's Health Research Unit
Public Health and Family Medicine
Falmouth Building, Entrance 5, level 3

Dear A/Prof Harries

PROJECT TITLE: ***KNOWLEDGE, ATTITUDE AND PRACTICES SURROUNDING CONTRACEPTIVE COUNSELLING AND PRESCRIPTION OF NURSES PROVIDING FAMILY PLANNING SERVICES IN CAPE TOWN (SUB-STUDY 349/2019) (MASTERS DEGREE – MISS KULTHUM FATAAR)***

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

Approval is granted for one year until the 30 August 2020.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

Please quote the HREC REF in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

The HREC acknowledge that the student, Kulthum Fataar will also be involved in this study.

Yours sincerely

Signature Removed

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE
Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938

Appendix E – City Health Approval

CIVIC CENTRE IZIKI LOLUNTU BURGERSENTRUM
HERTZOG BOULEVARD CAPE TOWN 8001 PO BOX 2815 CAPE TOWN 8000
www.capetown.gov.za
CITY HEALTH
Dr Natacha Berkowitz
Epidemiologist: City Health
T: 021 400 6864 F: 021 421 4894
E: Natacha.Berkowitz@capetown.gov.za
31 August 2019

RE: Knowledge, Attitudes and Practices surrounding contraceptive counselling and prescription of nurses providing family planning services in Cape Town. (8004)

Dear Kulthum Fataar

Your research approval has been amended as per your amended protocol to conduct 10 individual interviews rather than group discussions. The facility selection has not changed.

Please note the following:

1. All individual participant information obtained must be kept confidential.
2. Access to the clinics and clients must be arranged with the relevant Managers such that normal activities are not disrupted.
3. A copy of the final report must be uploaded to http://web1.capetown.gov.za/web1/mars/ProjectClosure/UploadReport/0/8004, within 6 months of its completion and feedback must also be given to the clinics involved.
4. Your project has been given an ID Number (8004). Please use this in any future correspondence with us.
5. No monetary incentives to be paid to clients on the City Health premises
6. If this research gives rise to a publication, please submit a draft before publication for City Health comment and include a disclaimer in the publication that "the research findings and recommendations do not represent an official view of the City of Cape Town "

Thank you for your co-operation and please contact me if you require any further information or assistance.

Kind Regards

Dr Natacha Berkowitz Epidemiologist: City Health

Appendix F – PLoS ONE Manuscript Guidelines

Style and Format

Length	Manuscripts can be any length. There are no restrictions on word count, number of figures, or amount of supporting information. We encourage you to present and discuss your findings concisely.
Font	Use a standard font size and any standard font, except for the font named "Symbol". To add symbols to the manuscript, use the Insert → Symbol function in your word processor or paste in the appropriate Unicode character.
Headings	Limit manuscript sections and sub-sections to 3 heading levels. Make sure heading levels are clearly indicated in the manuscript text.
Layout and spacing	Manuscript text should be double-spaced. Do not format text in multiple columns.
Page and line numbers	Include page numbers and line numbers in the manuscript file. Use continuous line numbers (do not restart the numbering on each page).
Footnotes	Footnotes are not permitted. If your manuscript contains footnotes, move the information into the main text or the reference list, depending on the content.
Language	Manuscripts must be submitted in English. You may submit translations of the manuscript or abstract as supporting information. Read the supporting information guidelines.
Abbreviations	Define abbreviations upon first appearance in the text. Do not use non-standard abbreviations unless they appear at least three times in the text. Keep abbreviations to a minimum.
Reference style	PLOS uses "Vancouver" style, as outlined in the ICMJE sample references. See reference formatting examples and additional instructions below.

Manuscript Organization

Title

Include a full title and a short title for the manuscript.

Title	Length	Guidelines	Examples
Full title	250 characters	Specific, descriptive, concise, and comprehensible to readers outside the field	Impact of cigarette smoke exposure on innate immunity: A *Caenorhabditis elegans* model Solar drinking water disinfection (SODIS) to reduce childhood diarrhoea in rural Bolivia: A cluster-randomized, controlled trial
Short title	100 characters	State the topic of the study	Cigarette smoke exposure and innate immunity SODIS and childhood diarrhoea

Titles should be written in sentence case (only the first word of the text, proper nouns, and genus names are capitalized). Avoid specialist abbreviations if possible. For clinical trials, systematic reviews, or meta-analyses, the subtitle should include the study design.

Author list

Author names and affiliations

Enter author names on the title page of the manuscript and in the online submission system.

On the title page, write author names in the following order:

- First name (or initials, if used)
- Middle name (or initials, if used)
- Last name (surname, family name)

Each author on the list must have an affiliation. The affiliation includes department, university, or organizational affiliation and its location, including city, state/province (if applicable), and country. Authors have the option to include a current address in addition to the address of their affiliation at the time of the study. The current address should be listed in the byline and clearly labeled “current address.” At a minimum, the address must include the author’s current institution, city, and country.

If an author has multiple affiliations, enter all affiliations on the title page only. In the submission system, enter only the preferred or primary affiliation. Author affiliations will be listed in the typeset PDF article in the same order that authors are listed in the submission.

Author contributions

Provide at minimum one contribution for each author in the submission system. Use the CRediT taxonomy to describe each contribution. Read the policy and the full list of roles.

Contributions will be published with the final article, and they should accurately reflect contributions to the work. The submitting author is responsible for completing this information at submission, and we expect that all authors will have reviewed, discussed, and agreed to their individual contributions ahead of this time.

PLOS ONE will contact all authors by email at submission to ensure that they are aware of the submission.

Cover letter

Upload a cover letter as a separate file in the online system. The length limit is 1 page.

The cover letter should include the following information:

Summarize the study's contribution to the scientific literature

Relate the study to previously published work

Specify the type of article (for example, research article, systematic review, meta-analysis, clinical trial)

Describe any prior interactions with PLOS regarding the submitted manuscript

Suggest appropriate Academic Editors to handle your manuscript (see the full list of Academic Editors)

List any opposed reviewers

Title page

The title, authors, and affiliations should all be included on a title page as the first page of the manuscript file.

Abstract

The Abstract comes after the title page in the manuscript file. The abstract text is also entered in a separate field in the submission system.

The Abstract should:

- Describe the main objective(s) of the study
- Explain how the study was done, including any model organisms used, without methodological detail
- Summarize the most important results and their significance
- Not exceed 300 words

Abstracts should not include:

- Citations
- Abbreviations, if possible

Introduction

The introduction should:

- Provide background that puts the manuscript into context and allows readers outside the field to understand the purpose and significance of the study
- Define the problem addressed and why it is important
- Include a brief review of the key literature
- Note any relevant controversies or disagreements in the field
- Conclude with a brief statement of the overall aim of the work and a comment about whether that aim was achieved

Materials and Methods

The Materials and Methods section should provide enough detail to allow suitably skilled investigators to fully replicate your study. Specific information and/or protocols for new methods should be included in detail. If materials, methods, and protocols are well established, authors may cite articles where those protocols are described in detail, but the submission should include sufficient information to be understood independent of these references.

Results, Discussion, Conclusions

These sections may all be separate, or may be combined to create a mixed Results/Discussion section (commonly labeled "Results and Discussion") or a mixed Discussion/Conclusions section (commonly labeled "Discussion"). These sections may be further divided into subsections, each with a concise subheading, as appropriate. These sections have no word limit, but the language should be clear and concise.

Together, these sections should describe the results of the experiments, the interpretation of these results, and the conclusions that can be drawn.

Authors should explain how the results relate to the hypothesis presented as the basis of the study and provide a succinct explanation of the implications of the findings, particularly in relation to previous related studies and potential future directions for research.

PLOS ONE editorial decisions do not rely on perceived significance or impact, so authors should avoid overstating their conclusions. See the *PLOS ONE* Criteria for Publication for more information.

Acknowledgments

Those who contributed to the work but do not meet our authorship criteria should be listed in the Acknowledgments with a description of the contribution.

Authors are responsible for ensuring that anyone named in the Acknowledgments agrees to be named.

Do not include funding sources in the Acknowledgments or anywhere else in the manuscript file. Funding information should only be entered in the financial disclosure section of the submission system.

References

Any and all available works can be cited in the reference list. Acceptable sources include:

- Published or accepted manuscripts
- Manuscripts on preprint servers, providing the manuscript has a citable DOI or arXiv URL.

Do not cite the following sources in the reference list:

- Unavailable and unpublished work, including manuscripts that have been submitted but not yet accepted (e.g., "unpublished work," "data not shown"). Instead, include those data as supplementary material or deposit the data in a publicly available database.
- Personal communications (these should be supported by a letter from the relevant authors but not included in the reference list)
- References are listed at the end of the manuscript and numbered in the order that they appear in the text. In the text, cite the reference number in square brackets (e.g., "We used the techniques developed by our colleagues [19] to analyze the data"). PLOS uses the numbered citation (citation-sequence) method and first six authors, et al.

Do not include citations in abstracts.

Make sure the parts of the manuscript are in the correct order *before* ordering the citations.

PLOS uses the reference style outlined by the International Committee of Medical Journal Editors (ICMJE), also referred to as the "Vancouver" style. Example formats are listed below. Additional examples are in the ICMJE sample references.