Frontiers of Nursing • 8(3) • 2021
DOI: 10.2478/fon-2021-0028

sciendo

Frontiers of **Nursing**

Developing a model for reducing maternal mortality in South Africa

Original article

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Received: 24 August 2020; Accepted: 12 October 2020; Published: 20 September 2021

Abstract: **Objective:** High maternal mortality ratios (MMRs) remain a concern in many parts of the world, especially in developing countries like South Africa. Different models have been developed, tried, and tested worldwide, in the hope that they will reduce maternal mortality, but without much success.

Methods: A qualitative approach was used to conveniently select a sample of 10 women attending an antenatal clinic in a rural area, in one of the districts of KwaZulu-Natal (KZN) Province. Data were collected by means of interviews with the women. Data were analyzed employing Burnard's content analysis approach.

Results: Four themes emerged: (1) age at first pregnancy; (2) birth intervals, risks in pregnancy and hospitalization; (3) the use of contraception; and (4) HIV status. All themes that emerged revealed inattention to reproductive health (RH) needs, resulting in poor RH outcomes as an area of concern.

Conclusions: Greater emphasis needs to be placed on meeting the sexual and reproductive health (SRH) needs of South African women, if maternal mortality rates are to be reduced. An alternative model for reducing maternal mortality in South Africa is proposed.

Keywords: *antenatal care • contraception • maternal mortality • model • sexual and reproductive health*

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1. Introduction

Improving maternal health and reducing maternal mortality continue to be a global priority.[1] According to WHO[2] estimation in 2017, 295,000 women died due to pregnancy- or childbirth-related complications, of which, 99% were in the developing world: sub-Sahara accounts for most of these, with a maternal mortality ratio (MMR) of 920/100,000, compared to only 20/100,000 in developed countries.[2,3]

South Africa has not escaped from the increasing MMR either.[4] By the end of 2015, its MMR had increased from 150/100,000 in 1990 to 154.1/100,000 in 2014; against the Millennium Development Goals (MDGs) target of 38/100,000.[4] The MMR for South Africa currently relates to current institutional maternal mortality rates documented in public health facilities, and excludes maternal deaths occurring in community and private facilities.[5–7] The implication is that this country's MMR could be higher than what is currently being reported.[5–7]

Building on the unfinished business of the MDGs, the current sustainable development goals (SDGs) call for countries to improve maternal health and reduce maternal mortality.[8] The SDG 3.1 calls for a reduction

How to cite this article: Mmusi-Phetoe RMM, Masaba BB. Developing a model for reducing maternal mortality in South Africa. *Front Nurs*. 2021;3:269–278.

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of the global MMR to <70/100,000, between 2016 and 2030.[1]

Several models were used in different countries including South Africa to reduce maternal mortality.[9–12] These models focus on finding solutions to complications that occur during pregnancy, childbirth, and postnatal care and do not address more fundamental questions of reducing the real root causes and risks associated with maternal mortality, such as the women's living conditions.[9] These issues are linked to women's overall health and their social position and not necessarily to improvements in their physical health only. Further, the models lack an integrated approach to the problem. The proposed model embraces a broader approach that focuses on improving overall women's health and specifically aims at meeting all the reproductive health (RH) needs of women, across their reproductive lifespan, for improved maternal health outcomes. The participation of all stakeholders (including women of reproductive ages) is encouraged. If adopted, the proposed model will not only comply with national priorities but also comply with international initiatives such as the SDG's agenda to reducing MMRs in member countries.

Improving maternal health and reducing maternal mortality is not only an issue of health but also of human rights.[13] The right to health considers biological and socioeconomic preconditions as well as the available government resources available.[9] Implied in this article is that preventable maternal mortality occurs where there is violation of a woman's right to sexual and reproductive health (SRH) care. It is against this background that this article argues for a multisectoral, integrated model that could significantly reduce maternal mortality in South Africa, in line with the United Nations' SDGs agenda, of which this country is signatory.

2. Methods

The article is part of a larger study carried out to develop a model that integrates social interventions into primary healthcare to reduce maternal mortality in South Africa. The study was carried out in 4 phases, using a qualitative approach, and the findings were triangulated with numerous data sources. The current article reports on the final phase of the findings in developing the abovementioned model, namely the interviews with the women "at risk" phase. The other 3 phases included the interviews that were conducted with an adult, next of kin of the deceased who had recently passed (within the last 2 years); representatives from local non-governmental organizations (NGOs) working in the area of RH in the iLembe district, KwaZulu-Natal (KZN) Province and experts working in the area of RH at the national level, in Gauteng Province.

2.1. Setting

The study was performed at primary health care (PHC) centers in rural iLembe district at KZN province. This district was chosen because the South African National Department of Health (SANDoH) identified it as 1 of 18 priority districts requiring the acceleration of evidence-based, low-cost high-impact maternal, neonatal, children's and women's health and nutrition interventions.[12]

2.2. Population and sampling

Convenience sampling was used to select 10 women from a rural clinic in the iLembe district. The criteria for inclusion are as follows: participants had to be 15–49 years old, attend antenatal care at the clinic under study, be able to speak isiZulu, and willing to participate in the study.

2.3. Ethical considerations

Ethical clearance was obtained from the relevant Research Ethics Committee of University of South Africa before conducting the study. The participants were given an opportunity to accept or refuse to participate in the research, followed by signing the prepared consent and assent forms.

Written consent was voluntary, and a participant's signature was obtained only after the researcher had disclosed the relevant information to her, before conducting the interview.

Of the selected participants, 2 were teenagers younger than 18 years old. Written consent and assent were obtained from the teenagers and their mothers who had accompanied, once the aim of the study had been explained to both parties.

The participants were free to withdraw from the study at any time, and that was emphasized throughout the study. Confidentiality was maintained by using pseudonyms rather than their names. Ethical principles, as approved by the relevant Unisa ethics committee, were adhered to.

2.4. Data collection

Data were collected by means of individual interviews using a self-developed interview guide. Every interview, which was audio-recorded with the participants' permission, lasted 45–60 minutes. All interviews started with one broad statement: "Tell me about your reproductive journey, from conception until now." This was followed by probing questions, depending on the answers given, such as: "Was your pregnancy planned?", "Have you always attended antenatal clinic?", and "At what age

did you have your first child?" The interviews took place in an office that was assigned to the researcher by the clinic management.

2.5. Data analysis

Content analysis was done following Burnard's[14] approach. Tapes from the interviews were listened to and transcribed; subsequently, the transcripts were reread several times to allow the researcher to immerse herself in the data. Detailed notes were taken, and data were categorized according to themes. A colleague who is conversant with handling qualitative data also studied the transcripts and the researcher found significant similarities between the categorization of the themes.

3. Results

The findings presented below reflect the demographic details of the study participants as well as the themes emerging from the study.

3.1. Demographic details

3.1.1. Place of residence

Five of the interviewees resided in the rural area of iLembe. Four of them lived in informal settlements and one lived on a farm. None of them had ever lived in an urban settlement. This has a particular impact on their possible access to health facilities, since health care is concentrated in urban areas.

3.1.2. Level of education

Nine women had some level of education, while only one woman had received no education at all. Among those who had received education, 1 woman had completed Grade 4; 3 had completed Grades 5–8; and 5 had completed Grades 9–12.

3.1.3. Employment status

About 7 of the 10 interviewees were unemployed and had no independent income, but were dependent on the limited family resources. Among the 3 who were employed, 2 worked as domestic servants, while 1 was employed in a small trading business.

3.1.4. Marital status

Only 1 of the 10 women was married at the time of the interviews. The 9 unmarried women were not cohabiting with the male partners who had impregnated them. Some received visits from these men on regular basis. In this regard, 1 interviewee commented as follows:

> "I am very happy with my current partner. He looks after me and my other child who is not his own. We do not live together but he comes to see us often" (Busi).

Although all of the interviewees were pregnant, most were unmarried and were the heads of their households. Through probing, the researcher discovered that, although all of the interviewees claimed they were still in relationships with their partners, they struggled financially and had to fend for themselves. One of the single mothers stated:

> "I have been pregnant nine times. I had a partner who was the father of my other children. He was abusing me until I left him with my other children. Now I have this partner who is aware that I am pregnant but he does not buy food. I am struggling... I went to the clinic for my first antenatal care today, although I am already nine months pregnant. I didn't have money to go for my booking" (Zanele).

3.2. Themes generated from the study

The 4 major themes that emerged from the transcribed interviews are:

- Age at first pregnancy
- Birth intervals, risks in pregnancy and hospitalization
- Use of contraception, and
- HIV status

Theme 1: Age at first pregnancy

Data revealed that 8 women had had their first pregnancy at a young age (under 21), while only 2 had had their first pregnancies between the ages of 21 and 25. Table 1 shows that the common age for first pregnancy was between the ages 15 and 20.

The study further revealed that all the births from first pregnancies resulted from premarital conception. The younger age at first pregnancy was pronounced in this rural area.

Theme 2: Birth intervals, risks in pregnancy and hospitalization

Eight of the women had two or more children, with the mean number of live births (with all previous pregnancies included, but the current pregnancy excluded) of three.

Of the 8 women who had two or more live births, 2 were pregnant within 18 months of a previous birth; 1

Pseudonym and at-risk status	Age group at first pregnancy	
	15–20 years	21–25 years
Ntombi (teenager)	√	
Zodwa (teenager)	√	
Thandeka (>35 years)		√
Busi (>35 years)		√
Thuli (closely spaced births)	√	
Boni (closely spaced births)	√	
Masesi (high parity)	√	
Zanele (high parity)	√	
Lolo (HIV+)	√	

Table 1. Women at risk by age at first pregnancy ($N = 10$).

had a birth interval of 18–23 months between the current pregnancy and the youngest child; 4 women had a birth interval of 24–35 months between the current pregnancy and the youngest child; and 1 had a birth interval of 36 months or more between the current pregnancy and the youngest child.

Of the 10 women, 4 had been hospitalized during pregnancies and/or confinements. Immediate threats included anemia, high blood pressure, obstetrical hemorrhage and a previous cesarean section. Conde-Agudelo et al.[15] identified a positive association between short intervals between pregnancies and maternal nutrition depletion, folate depletion, cervical insufficiency, vertical transmissions of infections, incomplete healing of uterine scar from a previous cesarean delivery, and abnormal remodeling of the endometrial blood vessels. Four of the women (Thuli, Busi, Masesi, and S'mangele) were hospitalized during their pregnancies and/or confinements/deliveries.

Thuli, had been hospitalized with the previous 2 pregnancies, shared her experiences with regard to hospitalization while pregnant:

> "With the previous pregnancies of my other two children, I was hospitalised for shortage of blood and received blood. However, for this current pregnancy I was hospitalised for stomach cramps and high blood pressure. I actually slept at the hospital before delivery of my two other children, as I always deliver through Caesarean sections" (Thuli).

In terms of immediate health threats at the time of the interviews, Thuli appeared to be most at risk of reproductive ill health and mortality, should her condition not be managed properly. She reported having suffered from high blood pressure, swollen feet, and anemia with previous pregnancies. She had already been admitted to hospital with her current pregnancy, again suffering from high blood pressure, anemia, obstetrical hemorrhage, and abdominal pain.

Masesi, who had a history of high blood pressure, obstetrical hemorrhage, and a previous cesarean section, also presented as a high-risk case. Her re-telling of the treatment of these problems reflects the same lack of clear information about her pregnancy-related and obstetric health problems:

> "I had high blood pressure with all my previous pregnancies. I would always be given tablets and attend my check-ups at Stanger Hospital. I've been requested to be managed at the hospital and not the nearby clinics like other women. I went for my first booking at the clinic but was then referred to the hospital. I do not like the hospital. It's like I being sent to die there." (Masesi).

She continued:

> "I delivered child number 4 through caesarean section at Stanger Hospital, because I was bleeding vaginally. I really [did] not know why I was bleeding; hence I [was] so scared about what [would] happen with me or my baby during the time of delivery. Especially since the nurses shout[ed] at us as if we are not human beings." (Masesi)

The lack of quality of care in the inadequately equipped public health maternity services contributes significantly to maternal morbidity and mortality.

Theme 3: Use of contraception

All the women interviewed alleged that their pregnancies were unintended and mistimed. This points to an unmet need (for family planning). An analysis of the findings revealed that 5 women had previously used contraception, while 5 had never done so. One interviewee replied as follows, when asked why she did not use contraceptives:

> "I did not plan to be pregnant. I did not use contraception because the family planning clinic is far. This pregnancy is a mistake. I have since accepted that I will have the child. My mom shouted at me for being pregnant again when my first child is still very small" (Thuli).

Theme 4: HIV status

Among the 10 interviewees, 3 had a known HIV-positive diagnosis. All 3 indicated that they only discovered their status during the antenatal care visits for their current pregnancies. It should be noted that all 10 women had had unprotected sex, which resulted in unplanned pregnancies in all of them, as well as HIV infection in 3 of them.

S'mangele was 21 years old, just married, and expecting her second child. She declared:

> "Irrespective of my status, I will still have other children. My partner and I will decide how we will deal with the issue later because the nurses have advised that we should use condoms" (S'mangele).

S'mangele revealed that her husband had confessed that he was the one who had transmitted the virus to her.

3.3. Subthemes generated from the study

The 2 subthemes that emerged from the transcribed interviews are as follows:

- Nutritional inadequacies
- Neglect by male partners

Subtheme 1: Nutritional inadequacies

Half of the interviewees spontaneously listed malnutrition as a major cause of maternal mortality in South Africa. Problems related to inadequate nutrition were also mentioned by the interviewees when asked what the government can do to assist women to survive. However, a focus on inadequate nutrition as a cause of death obscures the full character of social problems suffered by black, poor, rural women. Although malnutrition is a cause of death and thus a health issue, it is also a symptom of deprivation at the household and community level, and is thus related to poverty and norms regarding food distribution in the family or community. The researcher found that at the household level, all 10 women reported a lack of food and nutritious foodstuffs. For example, although starchy foodstuffs were available (albeit in inadequate quantities), protein-rich foodstuffs were reported as being scarce and unaffordable. Thus, the study found that malnutrition stood out as a social root cause of morbidity and increased mortality of women in the iLembe district.

Subtheme 2: Neglect by male partners

Three of the "at-risk" interviewees reported the absence of a male partner and lack of support by male partners during pregnancy or post-delivery as a cause of maternal and new-born deaths. Abandonment or neglect by male partners was narrated as a deeply degrading and humiliating experience for women, causing serious ill health. Thuli, for example, said:

> "To tell the honest truth, men do not love us. All they want is to sleep with us; when we fall pregnant, then they run away. One becomes a laughing stock in the community and one feels so dirty. This too causes such an embarrassment to our parents. One neighbor commented sarcastically that some girls are just objects that men relieve themselves with sexually when they have lust … I have come to realize that we – the young ones – fall in love with older men who are already married. They manipulate us so that we can have sex with them and when we fall pregnant they run away. Men also do not want to carry the responsibility of looking after their offspring. What I mean is that they do not want to maintain their offspring."

People engage in unprotected heterosexual sexual intercourse for different reasons, one possible result of which could be a risk to the woman's health in the form of a sexually transmitted infection (STI) or pregnancy. Thuli hid her pregnancy from her mother and neighbors because she felt judged by the remarks they made about her. RH rights imply that men and women can engage in sexual intercourse and plan the number and spacing of children freely without discrimination, violence or coercion. Yet Thuli, who felt embarrassed about her latest unplanned pregnancy, clearly could not exercise these rights. Not only did the short intervals between her pregnancies pose a threat to her health but also her fears about making her current pregnancy known posed emotional and physical health threats to her.

Thuli continued:

> "The father of my second child deserted me when I was 9 months pregnant. He has never seen his child and the child is already 2 years old. Throughout pregnancy he beat me, forcing me to sleep at his place so that he can have sex with me, when he knew that he didn't love me. He was just using me."

4. Discussion

A major finding of the study relates to the high number of women who were below 20 years of age when they had their first child. This suggests that the peak age, at first birth, for most of the women was shortly after puberty. This finding is supported by the South African Census of 2011[16] which indicated that most black, colored and Asian mothers were pregnant with their first child at around 20–24, compared to white mothers who had their first child aged 25–29. In the African tradition, marriage indicates the start of exposure to sexual relations and childbearing through the onset of cohabitation with a male partner or spouse.[17] However, most of the women in the study were not married or living with a male partner, despite being pregnant.

Hayford et al.'s study[18] pointed to an existing relationship between a first pregnancy at a young age,

unplanned pregnancies and poor health outcomes for mothers and babies, relative to giving birth at a later age. Accordingly, this study has showed an association between unplanned pregnancies, early pregnancies, closely spaced births, and failure to use contraception for all 10 interviewees, which could potentially lead to poor RH outcomes such as a maternal death.

What was striking from the findings is that the 2 teenage interviewees were 15 and 16 years old respectively, revealing the likelihood that girls in the rural iLembe District engage in early sex, do not use protection against pregnancy, and therefore, face the possibility of early childbearing and, potentially, a difficult labor and challenges of motherhood. Unprotected sex also exposes girls to contracting STIs, including HIV. These factors subject women to the risk of reproductive ill-health and mortality.

Early childbearing might have serious consequences for young girls, such as dropping out of school, restricting their skills, and limiting their chances of gainful employment, reducing their capacity to support own children and a poor quality of life generally. A study by Karra and Lee[19] found that children of teenage mothers, who have had lower education levels, tend to also have lower levels of school achievement, thereby creating a vicious cycle of poverty.

The analysis also showed that the level of education of the women, their geographical location and poverty played a role in influencing early childbearing and demographic behavior. For example, 5 of the sampled women had below Grade 8 or no education, while none of the participants had a tertiary education. All the women in the study lived in the rural iLembe area, and were generally poor.

The second major finding of this study was that some women had closely spaced births. Some studies have shown that children born too close to previous births are at an increased risk of dying, especially if the interval between births is <24 months.[20,21] A study conducted in Nairobi by Fotso et al.[22] revealed that a child born within 18 months of an older sibling is more than twice as likely to die compared to a child born after an interval of 36 months or more. Similarly, the risk for maternal ill-health and the associated mortality increases if pregnancies occur in quick succession.[22]

The third major finding in the study pertained to the low use of contraception, mainly due to inaccessible contraception or family planning programs which were located at a venue some distance from their homes. Inaccessible contraception leads to early and unplanned pregnancies and resultant maternal deaths. This view subscribes to the declaration that “any factor which decreases fertility should decrease maternal morbidity and mortality”; however, a decrease in fertility should occur through the choice of a woman, not through coercive population policies.[23,24] In addition, Chola et al.[23] suggested that maternal mortality can be prevented if women with high parities, and very young or very old childbearing ages avoided pregnancy by using contraception. Suggested improvements in family planning programs include expanding contraception to all sectors of the community, by strengthening community-based family planning clinics; better management of STDs and HIV/AIDS programs; and networking with other sectors of the community, such as NGOs to make contraceptive services accessible.[25]

The last finding pertained to HIV/AIDS, which was viewed as a leading cause and determinant of maternal deaths. If HIV was ruled out, South Africa would manage to reverse the rise in maternal mortality. The National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD)[6] illustrates this trend, highlighting the fact that between 1998 and 2002/04, the proportion of maternal deaths due to indirect causes such as HIV/AIDS rose from 33.4% to 43.4%.[26] Adding to the discussion, Pillay-van Wyk et al.[27] warned that there is growing evidence that the HIV/AIDS epidemic has become a leading indirect cause of death, reversing the gains in maternal mortality reduction in southern African countries.

The study found that some women were infected by their husbands and were aware of the HIV-positive statuses of their partners, but could not do anything about it due to skewed power relations. Women are powerless and must fight subordination in multiple roles and identities as members of households.[28] Power relations determine women’s ability to control their lives and their decision-making capability.[28] The empowerment process within the gender and development context seeks to address the powerlessness of women and has the greatest potential of reducing maternal mortality.[29]

In light of the aforementioned findings, it is evident that high levels of maternal mortality in South Africa arise mostly from the powerlessness position of women, lack of participation of women on matters that affect their health and poor coordination and cooperation with other departments by the South African Department of Health (SADoH). A model to reduce high levels of maternal mortality is hence proposed as illustrated in Figure 1.[30]

The model has 3 pillars. The first pillar is the empowerment of women: Any model, policy or strategy to reduce maternal mortality must seek to empower women through education, strengthening the socioeconomic base, ideology, and control over oneself.

The second pillar is ensuring participation of women in the development of programs or policies to address RH care issues. Women must participate in

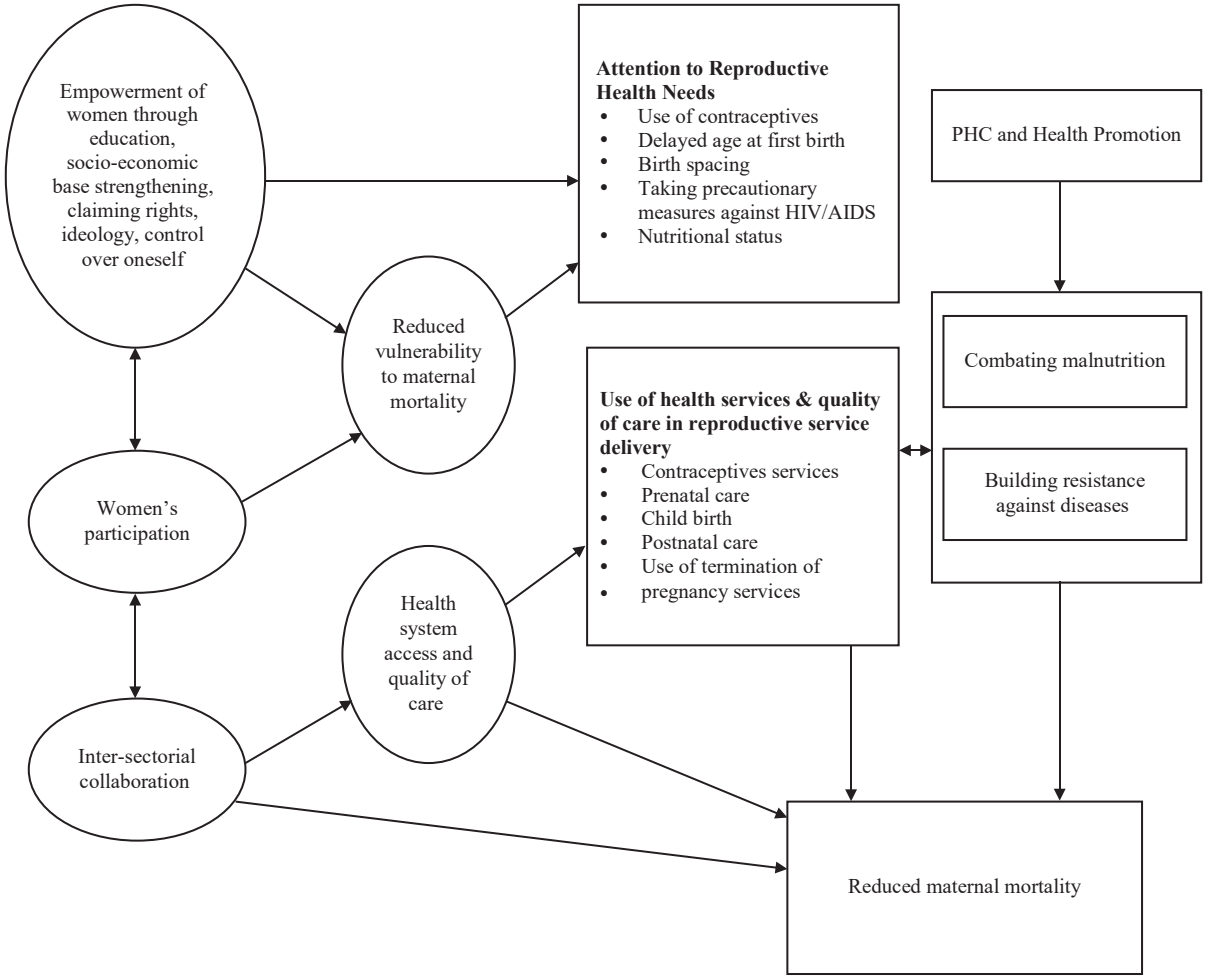


Figure 1. Model to reduce maternal mortality in South Africa 2018. Adapted from Mmusi-Phetoe.[31]

the planning their services to overcome their RH problems throughout RH span. The third pillar, inter-sectoral collaboration with the other stakeholders is crucial for addressing the RH needs of women to reduce maternal mortality.

5. Conclusions

The study aimed to develop a model to reduce maternal and child mortality in South Africa. The study revealed that persistently high rates of maternal mortality were associated with adverse SRH conditions, such as early pregnancy, closely spaced births, unintended pregnancies and HIV/AIDS infection. All of these health and demographic factors point to a lack of empowerment, which contributes to high rates of maternal mortality.

On examining South African approaches to addressing high maternal mortality rates, the study found that interventions to reduce maternal mortality are dispersed across different departments, they adopt a top-down medical approach, and women have not been engaged in developing interventions which involve them. The interventions mainly focus on the health of women during pregnancy, childbirth and postnatal care, and, therefore, not all the RH needs of women receive attention.

An alternative model, that would ensure that women are empowered and that their RH needs are met throughout life phases, would contribute toward reducing maternal mortality.

Limitations

The model was developed based on the views of women who attended the identified antenatal care clinics during the data collection period for the study. The study might have missed the views of women who did not attend the clinic during this period, due to their social and/or economic circumstances.

What is already known about this topic?

- MMR remains high in most developing countries, especially in sub-Saharan Africa.
- Contraception contributes to improved reproductive outcomes including reducing maternal mortality.
- Teenage pregnancy contributes to maternal mortality.

What this study adds

- Reappraisal of knowledge and information regarding the socioeconomic determinants of maternal ill health and consequent high maternal mortality.
- Meeting RH needs throughout the life phases of women, to reduce maternal ill-health and maternal mortality.
- Advocacy for reduction of MMR through integrated multisectoral approach.

Acknowledgements

We thank the University of South Africa and South African Department of Health for permissions to conduct the study.

Ethical approval

This study was approved by the UNISA Health Studies Research and Ethics Committee (HSREC) (IRB approval number: 0622 061-4_CREC_CHS_ 2010).

Conflicts of interest

All contributing authors declare no conflicts of interest.

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