MAGNITUDE OF MATERNAL MORTALITY IN SOUTH AFRICA: VIEWS FROM SOUTH AFRICAN EXPERTS

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ABSTRACT

High maternal mortality ratios (MMRs) remain a major challenge to health systems worldwide. Developing countries account for more than 99% of the estimated maternal deaths worldwide. The South African MMR is of particular concern because of the perceived underestimation of maternal deaths. The absence of comprehensive information about maternal deaths means misguided decision-making on health provision to improve outcomes. It is within this premise that the author seeks to unravel the perspectives from South African experts on the magnitude of the South African MMR. Data was collected as part of a larger study where qualitative face-to-face interviews were held with six (6) experts in the field of reproductive health. The data was analysed using the WHO's Commission on Social Determinants of Health (CSDH) framework. The findings confirmed that underreporting of community maternal deaths was an underlying factor in the underestimation of the South African MMR. Robust strategies to collect comprehensive, reliable and consistent estimates are needed to develop focused interventions for handling maternal deaths.

Keywords: health policy, maternal mortality, maternal mortality ratio

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INTRODUCTION AND BACKGROUND

According to the World Health Organization (WHO), high maternal mortality ratios (MMRs) remain a major challenge to the health systems worldwide in spite of the 2000 Millennium Declaration, which aimed to reduce the MMR by three-quarters between 1990 and 2015 (WHO, 2015:1). The global maternal mortality ratio (MMR) was estimated at 210/100 000 in 2013, down from 400/100 000 live births in 1990 (WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division, 2013:11).

The developing countries account for more than 99% of the estimated maternal deaths worldwide (WHO, 2015:1). From the areas (regions) participating in the Millennium Development Goals (MDGs), sub-Saharan Africa (SSA) has the highest regional MMR of 510/100 000 (WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division, 2014:1).

South Africa, one of the developing countries in SSA, still experiences high maternal morbidity and mortality. By the end of 2015, the official MMR in South Africa increased from 150 per 100 000 in 1990 to 269/100 000 in 2015 against the UN target of 38/100 000 (Pettifor, 2015:2).

STATEMENT OF THE RESEARCH PROBLEM

South Africa has not been able to reverse its MMR from the 1990 levels. However, an analysis of the progress towards achieving the targets set for Millennium Development Goal (MDG) 5 shows varying MMRs from 230 per 100 000 to 702 per 100 000 live births (Blaauw & Penn-Kekana, 2010:7; Buchmann, 2011:3). The inconsistent and even contradicting reporting of maternal deaths is a reflection of the uncertainties, misunderstandings and disagreements in the estimation of the South African MMR. The current reported MMR of 269/100 0000 is of particular public health concern because of the perceived underestimation of maternal deaths.

It is important to note that the MMR reported for South Africa constitutes only institutional maternal mortality ratio (iMMR), that is, the number of facility-based maternal deaths in South Africa (NCCEMD, 2014:3). According to Buchmann (2011:4), the maternal deaths that occur in the communities do not seem to be reported and the figures are thus unknown. The latest Saving Mothers Reports of the National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD) confirmed that there is currently no specific system for routinely identifying deaths in the community (NCCEMD, 2014:3).

Although knowledge on the number of women dying due to complications relating to pregnancy and childbirth is improving, much remains unrecorded and unreported. A major challenge is the lack of comprehensive, accurate and reliable data on maternal deaths to inform policy and action.

THE PURPOSE OF THE STUDY

The purpose of this study is to explore the views of the South African experts on the magnitude of the maternal mortality ratio. The findings might be able to influence policy development in the area of reproductive health including maternal and child health in South Africa and other developing countries.

DEFINITIONS OF KEYWORDS/CONCEPTS

An **estimate** is a calculated guess of the actual value or statistic for a current or past time period. It involves the extrapolation or interpolation of actual data for one or more known periods (Swanson & Tayman, 2012:2).

Inconsistencies are factual discrepancies among the sources in data values that describe the same objects (Information Resources Management Association, 2011:1705).

Maternal mortality is defined in the International Classification of Diseases 10th revision (ICD-10) as deaths of women while pregnant or within 42 days of the termination of a pregnancy (WHO, 2012:9). Three (3) measures of maternal deaths are the maternal mortality ratio (MMR), the maternal mortality rate (MMrate) and the lifetime risk of maternal deaths.

The **maternal mortality ratio (MMR)** is the number of maternal deaths during a given time period per 100 000 live births during the same time (WHO, 2007:4). This measure only captures the risk of death of a woman once she is pregnant, in other words, the obstetric risk (WHO, 2007:4).

The **maternal mortality rate** (MMrate) is calculated as the number of maternal deaths in a given time period per 100 000 women of reproductive age (that is, women aged 15–49 years), or woman-years of risk exposure in the same time period (Wilmoth, Mizoguchi & Oestergaard *et al*., 2012:4; WHO, 2007:5). The maternal mortality rate measures the impact of maternal deaths on the population of women of reproductive age, and not just on pregnant women (Wilmoth *et al*., 2012: 5).

The lifetime risk of maternal deaths takes into account both the probability of becoming pregnant and the probability of dying as a result of that pregnancy, cumulated across a woman's reproductive years (WHO, 2007:5).

The main study defined maternal mortality as deaths of women due to matters related to the reproductive system, its functions and processes before, during and after pregnancy.

Health policy refers to decisions and principles, stated or unstated and the related plans, and actions that are undertaken to achieve specific health care goals within a society (WHO, 2016:1). These 'characterise distribution of resources, services and political influence that impact on the health of the population of concern' (Miller, quoted in Stein, 1997:269).

RESEARCH METHOD AND DESIGN

A qualitative descriptive method of research was used in this study. The framework developed by the WHO's Commission on Social Determinants of Health (CSDH) in 2007 was used as the frame of reference for this study. In-depth face-to-face interviews were conducted with six (6) purposefully selected experts working in the field of reproductive health.

Setting and sample

The study took place in 2011 in South Africa. The researcher recruited experts in the field of reproductive health by means of telephone calls after having identified and located them with the help of other officials in the field of reproductive health.

The population comprised the experts working in the area of reproductive health in South Africa. Available literature about women's health in South Africa was surveyed in order to find the names of experts in the field. A list of experts who hold positions in policy making and health service delivery in the field of maternal and reproductive health was then compiled with the help of officers from the National Department of Health. From the list, six (6) experts were identified and purposefully selected for the study. The inclusion criteria for the experts were that they had to be working in the field of policy making or health service delivery in reproductive health. Their names were concealed for ethical reasons.

Development of the instrument

A list of interview questions was compiled to guide the interviews with the experts in the field of reproductive health. The interviews with the experts were preceded by pre-testing a data collection tool to establish reliability and validity. The tool was adequate in many respects, except that the interviews were quite lengthy and took longer than the planned 20–30 minutes. Not much could be done to revise the tool to shorten the time of the interview, as all questions were very important and could not be eliminated from the tool.

Data collection

The study was conducted from 5th January to 26th February in 2011. The identified experts were contacted telephonically. Face-to-face interviews were subsequently arranged. All the experts requested the background material before the interview, which the researcher subsequently sent through an e-mail with a confirmation of the interview appointment. All the experts were visited and interviewed in their offices at a time suitable to them. All the interviews followed the same guidelines that were structured to elicit the views of the experts. The interviews, which were conducted in English, were

audio-taped with the participants' permission to capture their responses. Field notes were also taken during the interviews.

The interviews began with the following request: 'Please tell me about the MMR in South Africa.' This request was then followed by many prompts depending on the answer. Some of these prompts included the following: 'What can be done to make the MMR more reliable? What can improve the reporting systems? What would give a clear picture in your opinion? What measures could be put in place to enable adequate capturing of all maternal deaths in the country? Are there any lessons to be learned from other countries?'

Ethical considerations

Ethical clearance was obtained from the ethics committee of the University of South Africa (UNISA) prior to conducting the study. The research participants were given an opportunity to accept or refuse to participate in the research, followed by signing the pre-prepared consent forms. The consent to participate in the study was voluntary and was obtained only after the researcher had disclosed the relevant information to the prospective participants.

Confidentiality was maintained by using participants' allocated numbers and not their names. The rooms used for the interviews were their offices and provided privacy. The participants were free to withdraw from the study at any time they wished to, and that was emphasised throughout the study.

All other universal ethical principles relating to research with human subjects were observed.

Data analysis

The social determinants of health (SDH) framework developed by the WHO's CSDH (2007) was used as a guide in the thematic analysis of the data. According to the WHO, the social determinants of health (SDH) are the conditions in which people are born, grow up, work, live, age, and where and why people die, often prematurely (CSDH, 2007:10). The SDH includes the wider set of forces and systems shaping the conditions of daily life. The SDH framework holds that medical-technical solutions are important but not sufficient to improve the health status of a population (CSDH, 2007:12).

Tabulations and frequencies were used to categorise and compare expert opinion and literature by using the SDH framework. To ensure credibility of the study, the researcher used member checking by asking the participants if what she has written is what they had said. This was further corroborated by an expert in qualitative research who read the transcripts independently and affirmed findings.

RESULTS AND DISCUSSION

The findings are presented as the profile of the study participants and as themes that emerged from the study.

The profiles of the study participants

The expertise ranged from public health to reproductive health fields. The five (5) national experts were based in Gauteng province and only one (1) expert was a provincial official, based in KwaZulu-Natal province. During the study period, the experts occupied the following positions and specialties: the National Cluster Manager for Maternal, Neonatal, Child and Women's Health was an obstetrician; the KZN Provincial Director for Maternal, Neonatal and Child Health and HIV/AIDS was a public health specialist; the National Specialist: Child Health was a paediatrician; the National Programme Manager for Child and Youth Health was a nurse with a postgraduate qualification in public health; and, the National Chairperson of the Saving Babies Committee was a neonatologist. The sixth expert in women's health and reproductive health was an independent consultant who had worked in the field of women development and reproductive health for almost 30 years, and was working closely with the National Department of Health as an advisor.

All the participants had experience ranging between 10 and 30 years in the healthcare and social development system. Their ages ranged from 38 to 52. Of the six participants, two were males and four were females.

Themes generated from the study

Four (4) key themes emerged in the final step of the data analysis, namely:

- Exclusion or underreporting community-based maternal deaths in the estimations of the MMR;
- Underreporting of maternal deaths, leading to underestimation of MMR;
- Misclassification of maternal deaths; and
- Non-uniformity in reporting and measuring of maternal deaths coupled with the absence of an official source for reporting maternal deaths.

These were cited by the experts as the four main problems in the measuring and reporting of maternal mortality in South Africa.

Theme 1: Exclusion or underreporting of community maternal deaths

The non-inclusion of maternal deaths taking place in the community in the estimation of the MMR was reported by all the participants. The participants viewed it as a serious

concern that negatively impacted policy and planning efforts. This statement was supported by the following extracts:

> We have not started counting maternal deaths. What we have are just estimates. We might be having more maternal deaths than what we see. The confidential enquiry into maternal deaths which only counts deaths in the facility, only looks at:
>
> - What could have been prevented, and
> - The reasons for a death rather than the quality.
>
> Outside of health care facilities, reporting often does not involve the community or family members to verify the cause of death of women; it often misses out the real cause of death; they do not ask if the woman was pregnant – hence maternal deaths could be underestimated or misclassified (Male participant, 22 years of experience).

> Even the actuarial science reports are just estimates. Again, what we have not done as South Africa is that we have not involved the community to report deaths ... the absence of a credible comprehensive death notification process.

> The death registration and certification is done by the Department of Home Affairs. At Home Affairs, the certificate does not ask: Was this woman pregnant? The process does not ask if the death took place within 42 days of delivering a baby. The maternal death rate in my opinion should be way above what we see reported now. The MMR could be in the region of 600/100 000 (Male participant, 18 years of experience).

> Some of the maternal deaths occur in the community, hence there is significant proportion of deaths which is varying between 5-30%, because of the deaths that happen at home, particularly because of the emphasis on home-based care, for example, those who are suffering from AIDS. Therefore, we might be having more maternal deaths than what we see.

> In my own impression, the maternal death rate is 400-425 [meaning the MMR is 400–425/100 000] (Female participant, 15 years of experience).

Theme 2: Underreporting of maternal deaths leading to underestimation of MMR

Underestimation of the MMR as a result of underreporting emerged as a concern in estimating the South African MMR. Some interviewees recounted underestimation of maternal deaths in the following extracts:

> The two sources of data on maternal deaths are Stats SA and the assessors [meaning assessors for the NCCEMD].

> The NCCEMD would have a figure of mothers who die in the facility. Some mothers still die post-delivery and would not have been admitted in the obstetric ward, but in other wards such as medical wards … these mothers are missed out, hence inaccuracy about the maternal deaths.

> Stats SA provides reports from Home Affairs – these may not be accurate. The 42 days may be missed in the documentation as to when women die. The maternal deaths in the community are underrecorded anyway; unless the mother is in the death register, the NCCEMD will miss out on this death (Female participant, 18 years of experience).

Theme 3: Misclassification and misdiagnosis of maternal deaths

The prevailing misclassification and misdiagnosis of maternal deaths emerged as contributing to masking the true state of maternal health in South Africa, and misdirecting the scarce resources and interventions in tackling the challenge of MMR. The extracts below confirm misclassification and misdiagnosis of maternal deaths:

> Obstetrical deaths in non-obstetrical health wards have been found to be classified according to conditions and diagnoses within those wards. For instance, in a medical ward, hypertension due to pre-eclampsia might be diagnosed and treated merely as hypertension and not in relation to the state of pregnancy of the patient. (Female participant …18 years of experience)

> Now, currently we measure hospital-based deaths. Women who die in hospital and are classified as maternal deaths, die mainly due to obstetrical conditions. If they do not die in hospitals they are likely to be missed and identified as having died of anaemia, when it was ectopic pregnancy or swelling in the abdomen called ascitis, and yet it could be blood from a pregnancy-related problem. Others die in medical wards due to pneumonia and yet they could be pregnant. These are misdiagnosed and they die. Others are anaemic, the cause of death is called as such and a pregnancy-related cause does not feature. Nobody realizes that it's maternal death. (Male participant …20 years of experience)

> The definition of maternal deaths and failure to differentiate between direct and indirect causes may lead to inaccurate reporting or capturing a maternal death. Failure to differentiate the causes may be problematic at times and lead to misclassification. For example, many women are killed by AIDS nowadays; however, AIDS is regarded as an indirect cause and not captured for recording as a cause of death (Female participant, 15 years of experience).

Theme 4: Non-uniformity in measuring and reporting maternal deaths and absence of official source for reporting maternal deaths

The South African MMR estimates have been produced from both local and international sources. Their estimates are often inconsistent with one another, reflecting the methodology used in deriving them or the type and quality of data sources. This has

created uncertainty with regard to the actual MMR in South Africa. The experts shared their experiences as follows:

> Different measures have been used to estimate maternal mortality. Nationally, MMR reports are based on different sources such as reports from the Department of Home Affairs, the National Committee on Confidential Enquiries into Maternal Deaths, and the District Health Information System. In addition to the DHIS [meaning Demographic and Health Information System], some provinces such as KZN derive their information on maternal mortality from the international sources, such as the World Health Organization, who have their specific ways of gathering information, resulting in different estimates.

> The MMR estimates from the different sources seem to be divergent. There is no uniformity in measuring or estimating maternal deaths. The confidential reports [meaning reports of the NCCEMD] estimated the maternal mortality rate to be 150/100 000. The community survey estimated the MMR to be 600/100 000. Then, if it is 600/100 000, then it would mean that for every mother that dies in a facility, there are 3 more that die at home. It is methodologically sound to estimate the MMR to be 400/100 000, but with a lot of uncertainty. There is enormous controversy and uncertainty on the methodology for estimation. My best guess is that it is 400/100 000. The 400/100 000 seems to be more credible (Female participant, 15 years of experience).

> There are no official records since the last DHS [meaning the Demographic and Health Survey] that was conducted 7 years ago in 2003. One has to rely on the DHS 2003 and DHIS in KZN if needing trends in her own province. The 2003 DHS has been criticized to be a non-credible source that is full of errors. We have been advised to rather use the 1998 DHS which is regarded as most reliable and credible (Female participant, 8 years of experience).

DISCUSSION

The major finding of the study is that the current system of identifying and estimating maternal deaths in South Africa is inadequate in estimating the magnitude of maternal mortality ratio in the country. All the participants mentioned and described the exclusion of community maternal deaths in the reports as leading to underestimation of maternal mortality, thus obscuring the magnitude of the South African MRR. They further reported that underestimation is caused by the National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD) process that produces only facility-based figures of maternal deaths.

This finding is supported by Buchmann (2011:3), who indicates that there is a significant degree of underreporting of maternal deaths in South Africa, especially the home deaths. Moodley, Pattinson, Fawcus, Schoon, Moran and Shweni (2014:54) also confirm that the current process of measuring the MMR is institution-based – hence the name iMMR. Facility-based records are an important source of data on maternal mortality, but facility-based maternal death records alone identify only a fraction of all maternal deaths, as not all mothers utilise health care facilities for antenatal, intrapartum

or postnatal care (Moodley, Pattinson, Baxter, Sibeko & Karim, 2011:221). WHO (2006:2) confirms that problems related to using health services information in routine registers and the omission of deaths occurring outside maternity wards are fraught with inaccuracies. An earlier study done in Maryland in the United States of America also confirmed that the number of maternal deaths would be substantially underestimated when only one source of data is used to identify deaths (Horon, 2005: 480).

The second major finding reported by the study was underreporting of maternal deaths leading to underestimation of the South African MMR. The study participants reported that most women die in the post-natal period and their deaths are not captured as maternal deaths. One study in India found that maternal deaths resulting from re-admission of mothers who fell ill after they had been discharged post-delivery, to a non-obstetrical ward, were not counted as maternal deaths because of the absence of the patients' history on pregnancy. Such deaths were recorded as caused by other illness, when actually the illness resulted from an obstetric situation, leading to an underestimation of the problem of maternal mortality (WHO, 2006:5).

The participants further expressed the view that underreporting of maternal deaths in South Africa was associated with numerous factors, ranging from the workload of health professionals to failure to report abortion-related deaths or health staff not acknowledging maternal deaths. This finding was supported by one study in India where underreporting of maternal deaths was associated with the workload of medical doctors, who preferred to spend time treating patients over investigating maternal deaths through household verbal autopsies (Ranjini & Sahay, 2009:4). The study by Ranjini and Sahay (2009:10) further pointed to lack of transport to travel to the villages early in the morning or in the evening in order to find the people home an obstacle to investigating maternal deaths.

The report by Cooperative for Assistance and Relief Everywhere (CARE) revealed that 28 maternal deaths that were missed by facility-based data gathering processes were identified through verbal autopsies in Sierra Leone and enabled a calculation of MMR for the country (CARE, 2011: 3). Under-reporting of maternal deaths as result of facility-based review system only was further exposed in the community-linked maternal deaths reviews (CLMDR) system in a pilot study conducted in rural Malawi during 2011–2012. Of the 52 maternal deaths that were reviewed, only 25 were identified by the facility-based system (Bayley, Chapota, Kainja, Phiri, Gondwe, King, Nambiar, Mwansambo, Kazembe, Costello, Rosato and Colbourn, 2015:7). Accordingly, the CLMDR identified 43 maternal deaths including 4 that happened in the health facility but overlooked by the facility-based system (Bayley *et al*., 2015: 9). The researchers endorsed that the CLMDR system doubled the number of maternal deaths that were reviewed by the study (Bayley *et al*., 2015: 10).

The ability of community surveys and verbal autopsies to improve national statistics as a means to obtain accurate data emerged further in a study conducted in Ghana during 2004–2008 (Der, Moyer, Gyasi, Akosa, Tettey, Akakpo, Blankson and Anim, 2013).

The reported data on pregnancy-related maternal deaths were from the clinical records, community surveys and verbal autopsies (Der *et al*., 2013). Of the 634 pregnancy-related deaths reviewed, 81.5% occurred in the community and only 18.5% occurred in a health facility (Der *et al*., 2013). The abortion-related deaths contributed 20.7% from which 90.8% occurred in the community and only 9.2% occurred in a health facility (Der *et al*., 2013).

The other finding reported by the study was that of misclassification of maternal deaths as a factor in obscuring the extent of the South African MMR. Misclassification of maternal deaths refers to deaths, which are identified and reported but with incorrect attribution of the cause of death (Say & Chou, 2011:16). WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division highlight that AIDS-related maternal deaths have been categorised as a non-obstetric complication and referred to only as AIDS deaths (WHO *et al*., 2014).

In this study, participants reported that misclassification may occur in the following situations:

- Early discharge of the mother-baby pair post-natal;
- Readmission of the mother to another ward, other than the maternity ward; and
- A diagnosis not alluding to any post-natal condition but to a general diagnosis such as 'vaginal bleeding' instead of a possible post-partum haemorrhage.

One interesting finding of the study was the non-uniformity of data sources and procedures in the estimation of the South African MMR; this was found to be responsible for producing different MMRs. The participants mentioned that the MMR estimates are based on the vital registers from the Department of Home Affairs, Statistics South Africa's censuses and community surveys, and the Department of Health's NCCEMD. The participants further reported that international sources such as the United Nations organisations, the WHO and IHME (meaning the Institute for Health Metrics and Evaluation) et cetera, have been producing the South African MMR, and that all of these sources publish different MMRs, which render estimates debatable. This finding is consistent with some arguments from the literature that other countries that find a vital registration system to be inadequate, such as Indonesia, rely on alternative data sources such as population censuses, household sample surveys, demographic surveillance and sample registration systems to generate vital statistics such as MMRs (Joint Committee on Reducing Maternal and Neonatal Mortality in Indonesia, 2013:13). Mojekwu and Ibekwe (2012:141) confirm that estimates are sometimes based on reconciliation of data from different sources because of the type, completeness of information available or missing information. However, differing and inconsistent MMRs could have huge implications for policy making, planning, resource allocation and interventions to tackle the problem of maternal mortality.

A concerted effort to collect quality and reliable information about maternal deaths is needed if South Africa is to improve universal health for women. Valid, accurate

and reliable data and information should form the backbone of decision making and programme improvement. This is what South Africa is lacking for informed programming for better maternal outcomes.

CONCLUSION

The lack of complete and quality reporting of maternal deaths has led to misconceptions regarding the magnitude of the problem of maternal deaths. Although knowledge on the number of women dying and on the reasons behind their deaths is improving, much remains unrecorded and unreported. Maternal death records are an important source of data on maternal deaths, but these records in the facilities alone identify only a fraction of all maternal deaths.

Furthermore, the absence of reliable and consistent, locally produced national MMR estimates poses challenges to accurately estimating the South African MMR. Therefore, a major challenge in addressing maternal deaths in South Africa is the lack of accurate data. This means that making conclusive statements about whether the MMR is on the increase or decline is impossible; it remains a guess and a challenge for evidence-based planning and decision making.

The MMR estimate is one of the indicators commonly used to gauge the health status of any population and it is essential for priority setting for health development. Intensified efforts to collect quality and reliable information about maternal deaths are needed if South Africa is to improve universal health for women. Valid, accurate and reliable data and information should form the backbone of decision making and programme improvement.

RECOMMENDATIONS

Although knowledge on the number of maternal deaths is improving, much remains unrecorded and unreported. A key to addressing maternal health is the collection of accurate data comprehensively, including maternal deaths occurring in the community, to expose the conditions that subject women to the risk of dying. Data management and information systems therefore have to be such that they ensure that every maternal death in South Africa is counted, thus reflecting a reliable MMR.

LIMITATIONS OF THE STUDY

The study looked at the estimations of maternal mortality in public health care settings; the sources about deaths in community settings were found to be inadequate. Further, these findings may not translate directly to private health care settings. In addition, the study might have missed the views of experts in other fields such as social sciences

or health statisticians who might be more knowledgeable about specific measurement issues.

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