

Trends in Maternal Mortality at the Mukalla City, Yemen, 2000 – 2010

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Abstract

Background: Maternal deaths are still leading problems in many developing countries, including Yemen. However, it is far away to reach the Millennium Development Goal (MDG) declared to reduce the maternal mortality ratio by three quarters between 1990 and 2015. Variations could be found between country to other or in different regions in the same country.

The aim of this study is to highlight the main cause of avoidable death that leads to maternal mortality among those admitted to Al Mukalla hospital, Hadhramout, Yemen.

Methodology: This survey was carried out in Al-Mukalla City, the capital of Hadhramout Province. The data collected were from the obstetrics and gynecology medical records at this department in Al-Mukalla Teaching Hospital. Variables included in this study are those related to dates of admission and of death, patients' age, number of parity, mode of delivery of the last baby. In addition, some clinical data were included related to causes leading to death and underlying condition of death.

Results: Of the total 39651 live birth recorded in the hospital during the study period (2001 to 2010), 42 maternal deaths were recorded which gives an overall Maternal Mortality Ratio (MMR) of 106 per 100,000 live births. Bleeding was among the top causes of maternal deaths in this study (28.6%) followed by hypertensive disorder, pulmonary embolism, and anemia (21.4%, 9.4%, 9.4%, respectively).

Conclusion: There was a downward trend in the maternal death ratio, but it is still far from rates in developed countries whereas the majority of these deaths were preventable. Efforts must be made on the part of health care providers, hospital managers, individuals, and government to maintain the current downward trend in our maternal mortality ratio to meet the globally accepted level.

Keywords: Maternal; Mortality; Mukalla; Yemen; Hadhramout

Introduction

Although, the main objective of the Millennium Development Goal declared the importance of reducing the world's maternal mortality ratio by three quarters between 1990 and 2015, progress towards this objective has been slow [1]. However, 99% of maternal deaths occurring in developing countries can be prevented through well-known interventions [2]. Each case of maternal death represents an individual tragedy, as pregnancy is not a disease and as pregnancy-related mortality is almost always preventable [3]. Effective interventions to reduce maternal deaths exist but they are often not available to women in poor countries [4]. Where resources are limited, information on the costs and health effects of interventions is thought to be important to aid decisions on how to reach the MDGs [5]. Globally, maternal mortality is the leading cause of death among females aged 15-49 years old. More than 1500 women die each day from pregnancy related causes resulting in an estimated 550,000 maternal deaths annually [6].

According to estimates developed by WHO, UNICEF, UNFPA and The World Bank (2008), maternal mortality ratio in Yemen reached 210 deaths per 100 000 live births (range from 110-400) [7]. However the country is located among the 85 countries lacking good complete registration data on maternal deaths. An accelerated reduction of the Maternal Mortality Rate (MMR) is imperative in Yemen, where rates remain unacceptably high among the Middle East and North African (MENA) region [8]. This rate is also attributable of high level of maternal morbidity and mortality which is linked to economic, social, cultural and religious factors compounded by poor access to services in rural areas and limited health infrastructure. This is amply demonstrated by the fact that only 25% of women receive comprehensive antenatal care and 12% receive post natal care. Over 77% of deliveries take place at

home with the majority of women receiving care from untrained birth attendant [9].

Reduction in maternal deaths by 75% in 2015 is a cardinal target of the millennium development goals [10]. However, with less than three years to go until 2015, the year for realization of a two-thirds reduction in maternal mortality (610 per 100,000 in 1990 and 200 per 100,000 in 2010), Yemen's figures remain unacceptably high, around 200 per 100 000 live births in 2011 [11]. The country is a signatory of both the International Conference on Population and Development (ICPD) and the MDGs and is one of 10 countries chosen for the UN Millennium Project. However, recent MDG process reviews suggest that it is unlikely that the maternal health MDG will be reached by the target date of 2015 [12,13].

Maternal mortality data reflect the health care status of any given country in general and the efficiency of health care to women in particular [14]. The major causes of maternal mortality are hemorrhage, hypertensive disorders, sepsis, obstructed labour and abortions. All of these causes are mostly preventable through proper understanding, diagnosis and management of labour complications [15,16]. Such

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causes of maternal mortality in Mukalla city were not studied yet. Therefore, this study is aiming to highlight the main cause of avoidable death leads to maternal mortality among those admitted to Al-Mukalla hospitals in 10 years period.

Methods

This survey was carried out in Al-Mukalla City, the capital of Hadhramout Province. The data were collected from medical records at Al-Mukalla Teaching Hospital. This is a tertiary care referral hospital in the costal Hadhramout with the main obstetrics and gynecology department and child care services. Also it is recognized as a training and teaching hospital for paramedical staff and medical students at the College of Medicine in Hadhramout University. Authorization was obtained formally from the directory board of the hospital to access these data and to deal with it confidentially. The standard definition of maternal death as “deaths attributed to pregnancy, child birth and the puerperium” was considered for the enrollment of the dead women. Also it was confirmed through the use of the WHO international code for classifying disease and health problem (ICD-10) [17]. Maternal deaths that occurred outside the hospital were not included in this study.

The annual number of births in this hospital is around 3000 to 5000 deliveries per year. All maternal deaths reported in the hospital during the period 2000 to 2010 were included in the study and data from the patients’ medical records were used for the purpose of this study. The data extracted from the medical records include the date of admission, date of death, age of the patient, parity, mode of delivery of the last baby. In addition, some clinical data on causes leading to death and underlying condition of death were included. All these data were entered into SPSS programme version 16 and then analyzed to obtain relations between the maternal death and prenatal factors and others occurred during labour and that leads to death. Autopsies were not performed for cultural reasons of not permitting the use the cadaver for the purpose of searching the reason of death as well as due to objections of relatives.

Results

Of the total 39,651 live birth recorded in the hospital during the 10 years study period, 42 maternal deaths were recorded giving an average maternal mortality rate of 106 per 100,000 live births as shown in table 1. Remarkable decrease in trend of MMR was seen in figure 1 where the average rate in maternal deaths was calculated in 2 cohort periods of 2001 to 2005 and 2006 to 2010. In the first cohort the MMR was 154 while in the second cohort it was 73 per 100,000 live births.

Demographic characteristics related to victims’ mothers such as age, educational level, and employment status is shown in table 2. The mean age of women who died from pregnancy-related causes was 27.5 years (SD ± 6.15) and range 18-43 years. Seventy eight percent of mothers were at the age group 20-34 years. In regard to the educational level, 64% of maternal deaths were occurred among illiterate women and 36% among educated women. Fifty five percent of women were unemployed.

Similar rates of deaths has occurred in those mothers with history of one parity, 2-3 parity or 4-5 parity with rates of 21.4%, 23.8% and 21.4%, respectively, as shown in table 3. However, high rate of mortality was seen among the age group <25 years old, followed by those at the age of 25-34 years, and low rate has been reported among women died at age group of ≥ 35 years old (45%, 38% and 17%, respectively).

Bleeding was among the top causes of maternal mortality in this

study (28.6%) followed by hypertensive disorder, pulmonary embolism, and anemia (21.4%, 9.4%, 9.4%, respectively). Other causes with lower rates were accounted as among the causes of death such as obstructed labour/ruptured uterus, anesthetic death from failed intubations, heart diseases and hepatitis.

Discussion

Maternal mortality remains a major public health issue in many developing countries as it was for Yemen. Although national and international reports recorded high rate of maternal mortality in Yemen, variations in rates were also found between governorates and within the governorate. For example, findings from our study showed a steady decrease in rates through the study period (2001-2010) with an average rate of 106 deaths per 100,000 live births. This rate is not similar to that estimated on the national level in 2003 (365/100,000 lives births) [18] or those reported in 2010 (200/100,000 lives births) [11]; however the estimated MMR for Yemen to meet the MDGs at 2015 is to reach 152 per 100,000 live births. Although the accelerated reduction of the MMR is imperative in Yemen, rates remain unacceptably high among the Middle East and North African (MENA) region [8].

The reported range of MMR in Al-Mukalla Teaching Hospital was found between 152 and 72 per 100,000 live births. Death in the hospital is fair representative of the number of death in the community because not all childbirths take place in the hospital. Over 77% of deliveries take place at home with the majority of women receiving care from untrained birth attendants [19]. Accurate data collection on maternal deaths is lacking throughout the governorate in particular and in the country as a whole, where available, the data are not comprehensive. It

Years	Total delivery (live birth)	Maternal death No. (%)	MMR /100,000 live birth
2001	3024	5 (11.9)	165.3
2002	3100	5 (11.9)	165.3
2003	3081	7 (16.7)	227
2004	3000	5 (11.9)	165.3
2005	4013	3 (7.1)	74.8
2006	4236	5 (11.9)	165.3
2007	4172	1 (2.4)	23.9
2008	4827	2 (4.8)	41.4
2009	5028	3 (7.1)	74.8
2010	5170	6 (14.3)	116
Total	39651	42 (100)	105.9

MMR: Maternal mortality rate

Table 1: Maternal deaths and maternal mortality rate in 10 years period. Al-Mukalla Hospital.

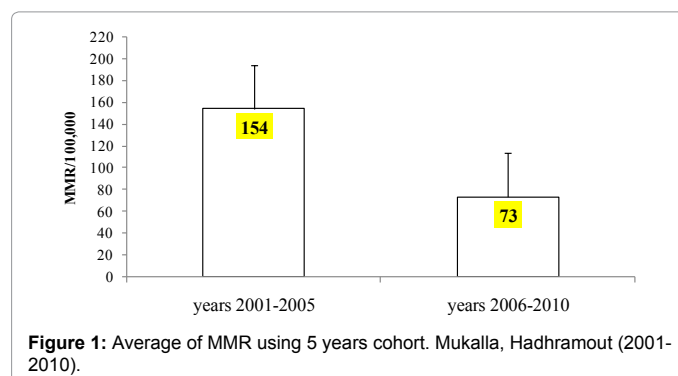


Figure 1: Average of MMR using 5 years cohort. Mukalla, Hadhramout (2001-2010).

Variables	No.	%	95% CI
Age groups			
15 - 19	2	4.8	1-17
20 - 24	17	40.5	26-57
25 - 29	6	14.3	6-29
30 - 34	10	23.8	13-40
3 - 39	4	9.5	3-24
≥ 40	3	7.1	2-21
Educational level			
Illiterate	27	64.3	48-78
Educated	15	35.7	22-52
Employment status			
Employed	7	16.7	8-32
Unemployed	34	81.0	65-91
Unknown	1	2.3	1-14

CI=confidence interval

Table 2: Socio demographic characteristics of the 42 maternal deaths.

	Age groups (years)			
	<25	25-34	≥ 35	Total
No. of parity	No. (%)	No. (%)	No. (%)	No. (%)
<2	6 (66.7)	3 (33.3)	0 (0)	9 (25.7)
2-3	4 (40.0)	6 (60.0)	0 (0)	10 (28.6)
4-5	4 (40.0)	3 (30.0)	3 (30.0)	10 (28.6)
≥ 6	0 (0)	4 (67.7)	2 (33.3)	6 (17.1)
Total *	14 (40.0)	16 (45.7)	5 (14.3)	35 (100)
Causes of deaths				
Bleeding	6 (50.0)	5 (41.7)	1 (8.3)	12 (35.3)
Hypertensive disorder	3 (33.3)	3 (33.3)	3 (33.3)	9 (26.5)
Rupture of uterus	0 (0)	2 (100)	0 (0)	2 (5.9)
Anesthesia/hepatitis/heart diseases	3 (100)	0 (0)	0 (0)	1 (8.8)
Pulmonary embolism	0 (0)	2 (50)	2 (50)	4 (11.8)
Anemia	2 (50)	1 (25)	1 (25)	4 (11.8)
Total *	14 (41.2)	13 (38.2)	7 (20.6)	34 (100)

* Percentages in this raw were calculated from the total of the raw data

Table 3: Number of parity and causes of the maternal deaths by age groups in Al-Mukalla Hospital.

is therefore expected that the outlying mortality data will underestimate the true maternal mortality either for Hadhramout governorate or to the country as a whole. Maternal death should therefore be made officially a notifiable event, and data collection enforced in order to review the problem. However, when compared with a maternal mortality rate of 12.1 per 100,000 live births in the Netherlands and 13.8 per 100,000 live births in the United Kingdom, the data presented in this study could be described as outrageous [20].

The discrepancy between Yemen and high-income countries is much greater for maternal death than for any other public health indicator. A closer look at the yearly trends shows that the figures remained very high up to 2004. In 2007 the hospital put in place mortality audit procedure so that detailed enquiries were made into every maternal death. The result was that people were held accountable for their actions and this helped to lower the MMR. The majority (78%) of those whom died were in the very active reproductive age group (20–34 years), and 5% were younger than 20 years. Moreover, 65% of dead women were illiterates.

Education usually affords the woman the opportunity to make the right decision to save herself, especially during an emergency health situation [21]. Our study also revealed decrease frequency of maternal mortality with increasing age, high parity, but these findings were

not in agreement with study from Bahrain where the proportion of maternal death was highest in patients in the age group 35-39 years and in those with 5 parity and above [22].

The causes of maternal mortality are multiple, inter-related, complex and almost always preventable [23]. Complications of pregnancy and delivery are the leading causes of death and disability among women of childbearing age. The major cause in our study was hemorrhage (28.6%), however deaths due to haemorrhage are mostly known to be preventable. Successful treatment requires immediate, effective and resuscitative measures [24]. Despite the difference of maternal mortality ratio in this studies and official figure, the pattern of maternal mortality causes were same. Still the major causes are hemorrhage. The reason behind this is the persistent tradition of deliveries in domiciliary settings and poorly trained birth attendants. Over 77% of deliveries take place at home with the majority of women receiving care from untrained birth attendants [9]. As it is in many less developed countries, hospitals are suffering from many difficulties in their health care services. These include among others, poor management, limited resources and inadequate specialized personnel. Consequently, these factors are the main reasons for low level of satisfaction could be reflected on the use of these services. For example, in our hospital there is a great shortage of female specialist working in the labour room in comparison to male doctors. This factor makes women to avoid the help provided by male doctor in the delivery room (socially unacceptable) and make use of other women from the local community to assess her during the labour which probably explain the high rate of women delivering at home rather than use the hospital services.

The health of Yemeni women, particularly around the time of birth, is a significant concern. Out of 130,000 women give birth each year, 19,500 (15% of all pregnant women) are likely to experience some obstetrical and medical complications [22]. Existing health services should be improved and emergency obstetrical care should be available to all women round the clock. Equipping the existing basic health units and rural health centers with basic obstetrics care, ensuring availability of health professionals trained and experienced in obstetric complications may significantly reduce maternal mortality in Yemen.

In our study Hypertensive disorders of pregnancy were the second leading cause of death, accounting for 21.4% of all the deaths. Despite that this finding was similar to studies reports elsewhere [25,26], studies from other countries elsewhere showed that half of the causes of maternal deaths were due to hypertensive disorders of pregnancy [27]. Pulmonary embolism (Amniotic fluid embolism) was suggested as a cause of death in 9.5% of the cases. Although pulmonary embolism is rare, it is serious and dramatic. At present time, little can be carried out to prevent them; more efforts have been made for accurate diagnosis and earlier treatment.

Anemia is a unique cause of indirect maternal death, which account for 9.5% of complications during antenatal period which was an important predictor of maternal death especially anemia. Sepsis and septicemia were not found as causes of maternal mortality in our study. However, study, in Sudan, was reported that sepsis constituted one-third of the causes of maternal mortality [28]. Finding from other studies in Yemen show deaths due to sepsis is caused in 13% of maternal death [29]. Infection as a cause of death has not been totally eliminated in spite of widespread use of antibiotics, including new and very potent ones; hence, we could not be able to exclude this factor from our findings as 19% of cases were not given explanation for their causes of death.

This was a hospital-based study. The maternal mortality rate reported here should be looked at cautiously and may just represent the tip of the iceberg with regard to the magnitude of the problem. Different approaches such as community-based maternal deaths reviews (verbal autopsies), facility based maternal deaths reviews, Reproductive Age Mortality Surveys (RAMOS), and confidential enquiries into maternal deaths are used to ascertain maternal deaths.

Despite that hospital-based studies yield a good reflection of the causes of maternal mortality, we would not be able to exclude maternal deaths occurred outside the hospital which was unreachable.

Conclusion

There was a downward trend in the maternal death ratio in our tertiary hospital during the study period and so better than those rates reported at the national level. Also it was crossed the cut-off rate expected to meet for the year 2015 for country such as Yemen, it is still high compared with what was achieved in the developed world and far from acceptable whereas the majority of these deaths were preventable.

Efforts must therefore be made on the part of health care providers, hospital managers, individuals, and government to maintain the current downward trend in our maternal mortality ratio. This can be done by setting up a confidential inquiring into maternal deaths, increase beds in the ICU of this hospital, and ensuring availability of health professionals trained and experienced in obstetric complications may significantly reduce maternal mortality in Yemen.

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