Maternal mortality at the Maternity Teaching Hospital in Erbil, Kurdistan: A hospital-based data 2011-2013

Mahabad S. Ali *   **Ariana. K. Jawad ****   **Rojan K. Jawad ****

Abstract

Background and objective: Maternal deaths are still leading problems in many developing countries, including Iraq. Iraq is, in fact, far away to reach the Millennium Development Goal declared to reduce the maternal mortality ratio by three quarters between 1990 and 2015. The aim of this study was to highlight the main causes of avoidable deaths that lead to maternal mortality among those admitted to Maternity Teaching Hospital in Erbil.

Methods: This survey was carried out in the Maternity Teaching Hospital in Erbil city, Kurdistan region, Iraq. Variables included in this study were those related to patient's age, number of parity and mode of delivery of the last baby. Data were collected from patient's records. In addition, some clinical data were included related to causes leading to death and underlying condition of death.

Results: Of the total 75000 live birth recorded in the hospital during the study period (2011-2013), 33 maternal deaths were recorded which gives an overall maternal mortality ratio of 44 per 100,000 live births. Pre-eclampsia and eclampsia were among the top causes of maternal deaths in this study (42.4%) followed by obstetrical bleeding and rapture uterus (30.3%).

Conclusion: Maternal mortality rate in Maternity Teaching Hospital was 44/100,000 total live births. The main cause of the maternal deaths was pre-eclampsia and its complications. Most of those died were residents of rural areas and were illiterate women.

Keywords: Maternal mortality, Pre-eclampsia, Rupture of uterus.

Introduction

Maternal mortality data reflect the health care status of any given country in general and the efficiency of health care to women in particular. Maternal mortality is defined by the World Health Organization (WHO) as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.[1] Direct maternal deaths are those resulting from obstetric complications of the pregnant state (pregnancy, delivery and postpartum), interventions, omissions, incorrect treatment, or a chain of events resulting from any of the above.

Deaths due to, for example, obstetric hemorrhage or hypertensive disorders in pregnancy, or those due to complications of anesthesia or cesarean section are classified as direct maternal deaths. Indirect maternal deaths are those resulting from previously existing diseases, or from diseases that develop during pregnancy and that are not due to direct obstetric causes but aggravated by physiological effects of pregnancy. For example, deaths due to aggravation of an existing cardiac or renal disease are considered indirect maternal deaths. Approximately 500,000 to 1 million women die each year worldwide because of pregnancy complications.[2-4] The vast majority of these deaths occur in developing

* Maternity Teaching Hospital, Erbil, Iraq.
** Head and supervisor of gynecology department of kurdistan board for Medical Specialist.
*** Department of gynecology, College of medicine, Hawler Medical University, Erbil, Iraq.

countries. According to the WHO, 55% of maternal deaths occur in Asia, 40% occur in Africa, and only 1% occurs in developed countries.[4,5] The available statistical data most likely underestimate the actual numbers of deaths because of underreporting and misclassification.[4,5] Although, the main objective of the Millennium Development Goal (MDG) 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.[6] However, 99% of maternal deaths occurring in developing countries can be prevented through well-known interventions.[7] Each case of maternal death represents an individual tragedy, as pregnancy is not a disease and as pregnancy–related mortality is almost always preventable. Effective interventions to reduce maternal deaths exist but they are often not available to women in poor countries.[8] According to estimates developed by WHO, UNICEF, and The World Bank, the maternal mortality ratio in Iraq fell by 29% from 89 in 1990 to 63 in 2010; However, this progress will still not be enough for Iraq to meet the planned MDG 5 target of reducing the maternal mortality ratio by 75% in 2015.[9] Moreover, Iraq is located among the 68 countries lacking good complete registration data on maternal deaths.[10-11] The aim of this study was to determine the maternal mortality rate and highlight the main causes of maternal mortality in Maternity Teaching Hospital within three years period.

Methods

This study was carried out in the Maternity Teaching Hospital, Erbil city, Kurdistan region, Iraq. The data were collected from medical records of the hospital. Maternity Teaching Hospital is a tertiary care referral hospital in the Erbil city with the main obstetrics and gynecology department. It is recognized as a training and teaching hospital for paramedical and medical students at the College of Medicine in Hawler Medical University and postgraduate studies, including Kurdistan, Iraq and Arab councils of medical specialties. This hospital receives referrals from any hospital in countryside of Erbil city. Authorization was obtained formally from the directory board of the hospital to access these data and to deal with it confidentially. The proposal of the study was approved by the Scientific and Ethical Approval Committee at the Maternity Teaching Hospital. The standard definition of maternal death as "deaths attributed to pregnancy, child birth and the perperium was considered for the enrollment of the dead women. It was also confirmed through the use of the WHO international code for classifying disease and health problem (ICD-10).[1] Maternal deaths that occurred outside the hospital were not included in this study. The annual number of births in this hospital is around 20000 to 25000 deliveries per year. All maternal deaths reported in the hospital during the period 2011 to 2013 were included in the study and data from the patient's medical records were used for the purpose of this study. Patients were identified by personal characteristics such as age, parity, socioeconomic status, site of residence, and also by pregnancy factors such as gestational age, antenatal care (ANC), mode of delivery, place of delivery, history of medical diseases and time of death. All these data were entered into the statistical package for the social sciences (version 17) and then analyzed to obtain relations between the maternal death and perinatal factors. 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 75000 live births recorded in the hospital during the three years study period, 33 maternal deaths were recorded giving an average maternal mortality ratio of 44 per 100,000 live births as shown in Table 1. The mean age (± SD) of women

who died from pregnancy-related causes was 27.5 ± 5.1 years (range 19 to 44 years). Forty two percent of mothers were at the age group 20-30 years. Among them 78.8% (26 mothers) were illiterate, and 24% (7 mothers) were educated and 55% of them were unemployed. Ten cases were referred to the Maternity Teaching Hospital in Erbil by ambulance. Seven cases were delivered at home then transferred to hospital; three cases of them were recorded as death on arrival. Table 2 shows that preeclampsia and eclampsia were among the top causes of maternal mortality (42.2%) followed by obstetrical bleeding; rupture uterus. Pulmonary embolism, sepsis and medical diseases

have a lower rate as causative factors for maternal mortality. Table 3 shows the distribution of cases according to parity, majority of patients were para two and three (39.4%). Five patients (15.5%) died before delivery. Cesarean section was associated with 48.5% of maternal deaths while vaginal delivery was associated with 36.4% of maternal deaths. Most of those patients died at Maternity Teaching Hospital, as it is the referral center for the other five hospitals in country site. In our study 30.3% of cases were referral cases, with poor linkage between refereeing hospital and tertiary hospital, with no telecommunication.

Table 1: Demographic characteristic of the patients.

Variable	No.	%
Educational level		
Illiterate	26	78.8
Educated	7	21.2
No ANC*	13	39.4
Referral cases	10	30.3
Home delivery	7	21.2

*ANC: Antenatal care

Table 2: Causes of maternal deaths.

Causes of death	No.	%
Obstetrical bleeding and rupture uterus	10	30.3
Preeclampsia and eclampsia	14	42.4
Medical disease/heart disease	2	6.06
Pulmonary embolism	2	6.06
Sepsis	2	6.06
Complications of anesthesia	3	9.09
Total	**33**	**100**

Table 3: Distribution of cases according to parity.

Variables	Death	
	No .	%
<2	10	30.3
2 - 3	13	39.4
4- 5	7	21.2
>6	3	9.1

Discussion

Maternal mortality remains a major public health issue in many developing countries as it is for Iraq. With the lack of a national register for maternal deaths in Kurdistan, hospital based statistics will remain the only source of information regarding maternal mortality as a reflection of maternal care in Erbil city. Death in the hospital is indirect representative of the number of deaths in the community because not all childbirths take place in the hospital. The Maternity Teaching Hospital in Erbil serves more than 1 million of the Kurdistan population, account for more than 60% of birth rate in Erbil city (total birth 42-46000/year).[12] The reported range of maternal mortality rate in Maternity Teaching Hospital was found to be 44/100,000 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. Accurate data collection on maternal deaths is lacking throughout the gover-norate in particular and in the country as a whole, where available. The data were not comprehensive, but much less than many developing countries including Arabic countries as shown in Table 4. The causes of maternal mortality are multiple, inter-related, complex and almost always preventable.[14] A Ministry of Health (MOH) maternal deaths study in 2009 found that the leading direct causes of pregnancy-related deaths in Iraq were hemorrhage (33%), thromboembolism (25%), pre-eclampsia/eclampsia (9%), maternal sepsis (5%) and obstructed labour (4%). One in four delivering women in Iraq faces serious complications during pregnancy and childbirth. All of these causes are mostly preventable through proper understanding, diagnosis and management of labour complications.[15] There is difference of maternal mortality ratio in this study and official figures in Iraq; according to MOH study the major causes are hemorrhage. The reason behind this is the persistent tradition of deliveries in domiciliary (home delivery) settings and poorly trained birth attendants. In the current study, hemorrhage was the second cause of death, accounting for 30.3% of the causes, with likely same explained reason, although there was a dramatic decrease in home delivery services in 1990 from 50% to 10% of deliveries in Kurdistan region.[15] These findings also do not go with a study done by Ahlam, which was carried out in Al-Mukalla City, the capital of Hadhramout Province, as total 39651 live birth recorded in the hospital during the study period (2001 to 2010), 42 maternal deaths were recorded. The major cause of death in that study was hemorrhage (28.6%), with maternal mortality ratio of 106 per 100,000 live births.[16] Our findings also do not go with a study done by Aiman Al-Sumadi in the Royal Medical Services Hospitals, Jordan over a five years period (2000-2005). The maternal mortality ratio

Table 4: Maternal mortality ratio by country.[13]

Country	MMR/ 100000 live birth
Australia	7
USA	7.5
UK	6.7
Saudi Arabia	18
Yemen	1040
Sudan	522
Pakistan	279
New Zealand	20.4
Mexico	60
Nigeria	800

was calculated to be 17.08 per 100,000 live births and obstetric hemorrhage was major cause of maternal death (26.3%).[17] Another study done by Al-Meshari in Suadi Arabia also showed that bleeding was the major cause of maternal mortality. Throughout period of the study, total live birth was 880 248 and maternal mortality ratio was 18 per 100,000 births. Both antepartum and postpartum hemorrhage were the leading cause of maternal death, constituting 43% of direct causes.[18] A study done by Chibber in a Kuwait Tertiary Teaching Hospital (1980-2009), over 29 years with 55,979 total live births, 14 maternal deaths were recorded (25/100,000 live birth) and obstetric hemorrhage (21.5%) and Eclampsia (14.3%) were the leading causes of direct deaths.[22] In Kurdistan region there is still a tragedy of home deliveries and there is evidence of a strong association with maternal mortality and the presence of a skilled traditional birth attendant (TBA) at home delivery; may reduces the morbidity and mortality rate.[24] Lack of hematologist skill in Maternity Teaching Hospital, unavailability of blood and blood products for top obstetric emergencies whom are in need of massive replacement of blood are another two important causes of maternal mortality. Lack of well-organized multidisciplinary teamwork in top obstetric emergency may be one of the critical causes of maternal death. In the current study, hypertensive disorders of pregnancy were the first leading cause of death, accounting for 42.4% of all the deaths. Studies from other countries showed that half of the causes of maternal deaths were due to hypertensive disorders of pregnancy. A study done by MAAE Ounsa (2011) in Ribat University Hospital, Khartoum over seven years period, where total live births was 19604. The number of maternal deaths was 10, giving a maternal mortality ratio of 51:100000 live births. The study revealed that 50% of the causes of maternal deaths were due to hypertensive disorders comparable with our study while obstetric

bleeding was second cause of maternal mortality (20%).[20] While in MOH-Kurdistan study 2009, hypertensive disorder was the third cause of maternal mortality with only 9% of causes.[15] Our study also goes with a study done by Jean-François (2005) in Bmako, Mali, over one year period. There were 4580 live births (96%), with 15 maternal deaths were recorded, yielding an overall maternal mortality ratio of 327 per 100,000 live births. Hypertensive disorders and hemorrhage were the main causes of death.[23] Lack of ANC and MgSo4 was the main causes of maternal mortality in the MOH Iraq study and in other studies. In our study the scenario was different, in which the quality of ANC and low percentage of patients received ANC among maternal death were causes of maternal mortality, majority of pre-eclamptic cases were referral cases and they didn't have ANC. In Ounsa study in 2011, 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 diag-nosis and earlier treatment.[20] In our study the percentage of pulmonary embolism as a cause for maternal mortality was only 6%, which is most probably related to the great job done by producing unique protocol for thromboprophylaxis for whole Kurdistan maternity hospitals that made administration of thromboprophylaxes to all cases who have risk factors for thromboembolism. Maternal deaths due to pulmonary embolism are undiagnosed or under reported in many countries probably due to lack of autopsy information in developing countries.[21] Education is an important factor in reducing maternal mortality. In the current study, more than 78.8% of deaths occurred in patients who were not educated. This finding was similar to studies reports abroad. In Jordan education influences the level of ANC, considering 78% of females in Jordan with university degrees use prenatal services,

compared to only 24% of illiterate females.[25, 26] 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. The authors were unable to detect maternal mortality according to parity or ages because of lack of computer database. All data were handled through hard copies of original records, which make the situation difficult to collect the number of patients who deliver according to different age or parity groups and these regarded as a limitations for the study. Women were not dying because of untreatable diseases. They were dying because societies have to make the decision that their lives are worth saving, educating pregnant women about pregnancy and parturition's complications to decrease home delivery rate.

Conclusion

Maternal mortality rate in the Maternity Teaching Hospital was 44/100,000 live birth. Main cause of the maternal deaths was pre-eclampsia and its complications.

Conflicts of interest

The authors report no conflicts of interest.

References

1. World Health Organization, UNICEF, UNFPA and The World Bank. Trends in maternal mortality: 1990 to 2010 WHO, UNICEF, UNFPA and The World Bank estimates, 2012.
2. Fikree FF, Gray RH, Berendes HW, Karim MS. A community-based nested case-control study of maternal Mortality. Int J Gynaecol Obstet 1994; 47:247-55.
3. World Health Organization. New estimates of Maternal Mortality. Wkly Epidemiol Rec 1996; 97-110.
4. Court C. WHO claims maternal mortality has been underestimated. BMJ 1996; 312:398-9.
5. Salanave B, Bouvier-Colle MH, Varnoux N. Classification differences and maternal mortality: European study. MOMS group. Mothers' Severe morbidity. Int J Epidemiol 1999; 64-9.
6. Requejo JH, Merialdi M, Bustreo F .Improving global maternal health:progress, challenges, and promise. Curr Opin Obstet Gynecol 2011; 465-70.
7. Bueno de Mesquita J, Kismodi E .Maternal mortality and human rights: landmark decision by United Nations human rights body. Bull World Health Organ 2012; 90: 7.
8. Campbell OM, Graham WJ, Lancet Maternal Survival Series steering group .Strategies for reducing maternal mortality: getting on with what works. Lancet 2006; 1284-99.
9. WHO. Trends in Maternal Mortality: 1990 to 2008 Estimates developed by WHO, UNICEF, UNFPA and The World Bank. WHO Library Cataloguing-in - Publication Data. 2010.
10. UNHRC .The Millennium Development Goals report. New York: UN Human Rights Council; 2011.
11. WHO . World Health Statistics 2012. Geneva, Switzerland: World Health Organization.
12. Nawzad T. Draft of Regional Development Strategy- Kurdistan region 2013-2017. Ministry of Planning 2012;139-41.
13. Zahr CA, Wardlaw TM, Hill K, Choi Y. Maternal mortality in 2000: Estimates developed by WHO, UNICEF and UNFPA. Geneva: WHO; 2004.
14. Kilpatrick SJ, Prentice P, Jones RL, Geller S State Maternal Mortality Review: Process and Impact. J Womens Health (Larchmt). JCommunity Med Health Educ. 2012;
15. WHO, UNICEF, UNFPA ,The World Bank and United Nations population Division. Maternal mortality in Iraq 1990-2013. 2014.
16. Ahlam Saleh Bin-Berik1 and Amen Ahmed Bawazir. Trends in Maternal Mortality at the Mukalla City, Yemen, 2000–2010,
17. Al-Sumadi MD, Rami SM. Maternal mortality ratio at the Royal Medical services Hospitals: Hospital-based data. JRMS April 2009;16(1):26-9.
18. Al-Meshari A, Chattopadhyay SK, Younes B, Hassonah M. Trends in maternal mortality in Saudi Arabia. Int J Gynaecol Obstet 1996; 52 (1):25-32.
19. Etard JF, Kodio B, Traore S. Assessment of maternal mortality and late maternal mortality among a cohort of pregnant women in Bamako, Mali. Br J Obstet Gynaecol 1999;106:60-5.
20. Ounsa MAAE, Mohamed EY .Maternal Mortality in Ribat University Hospital, Khartoum, Sudan: Seven years of experience. Sudan Med J.2011; 6.
21. Ikeako LC, Onah HE, Iloabachie GC. Influence of formal maternal education on the use of maternity services in Enugu, Nigeria. J Obstet Gynaecol. 2006; 26(1):30-4.
22. Chibber R1, Al-Hijji J, Al-Adwani AR, Rammah A, Fouda M, Al-Saleh E, Tasneem MA.Trends in maternal mortality over 29 years in a Kuwait Tertiary Teaching Hospital: signs of progress? Eur J Contracept Reprod Health Care. 2009;14 (1):75-82.
23. François J , Kodio B , Traoré S. Assessment of maternal mortality and late maternal mortality among a cohort of pregnant women in Bamako, Mali. BJOG 1999 ; 106 (1):60-5.

24. WHO Reproductive Health Library, No. 2. Geneva, World Health Organization, 1999.
25. Report of Arab Conference on Safe Motherhood, Amman, Jordan, 1988; 1-34.
26. Ikeako LC, Onah HE, Iloabachie GC. Influence of formal maternal education on the use of maternityservices in Enugu, Nigeria. J Obstet Gynaecol 2006; 26(1):30-4.