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The maternal mortality rate in Al-Diwaniyah Province in Iraq: retrospective data retrieval of four years

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ABSTRACT

The term maternal mortality is applied when women die during pregnancy, at time of delivery or during puerperium. This catastrophic event carries gloomy future to the index child, rest of children as well as the rest of family; also, the high rate of maternal mortality is an indication of inadequate health care system. Estimation of maternal mortality rate and identifying significant causes are mandatory steps toward making a plan to improve the health care system in our country particularly in the mid-Euphrates region. This study was aimed to estimate maternal mortality rate based on a hospital study in Al-Diwaniyah Province in the Mid-Euphrates region of Iraq. Data were obtained from the records belonging to Al-Diwaniyah Maternity hospital and other hospitals in the province. We were able to retrieve information regarding women who died during pregnancy, labour, and puerperium for the years 2014, 2015, 2016 and 2017. Data included the age of the mother, gestational age, parity, educational level, residency, site of delivery and mode of delivery. The results of this study revealed that maternal mortality rates were 22.8, 42.9, 34.7 and 35.7 per 100000 live births concerning the years 2014, 2015, 2016 and 2017 respectively, and 33.9 per 100000 live births in average for the included four years. The leading causes of death were haemorrhage and pulmonary embolism. The maternal mortality rate is higher in Iraq; however, it is less in Al-Diwaniyah Province than national figures, and the leading causes of maternal mortality are haemorrhage and pulmonary embolism.

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INTRODUCTION

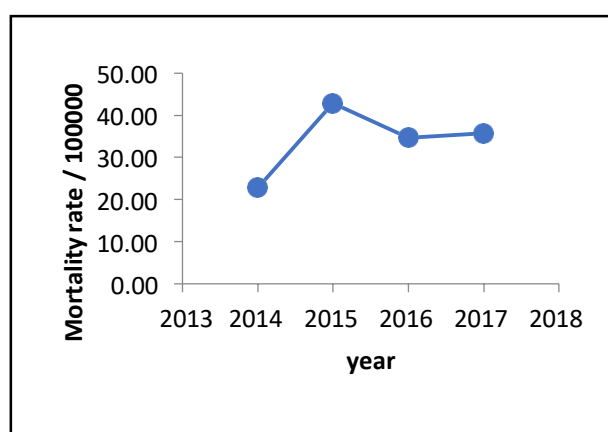
The term maternal mortality is applied when women die during pregnancy, at time of delivery or during puerperium (Maddorman *et al.*, 2016). This catastrophic event carries gloomy future to the index child, rest of children as well as the rest of family (Fischer *et al.*, 2015; Hogan *et al.*, 2010; Hunt

and Bueno De Mesquita, 2011; Maddorman *et al.*, 2016; Watts, 2014); in addition, the high rate of maternal mortality is an indication of inadequate health care system (Hogan *et al.*, 2010; Hunt and Bueno De Mesquita, 2011; Maddorman *et al.*, 2016; Watts, 2014). The health care system, is a reflection of the political and social philosophy of the country, can be reasonably expressed using maternal mortality (Sajedinejad *et al.*, 2015; Wilmoth *et al.*, 2012). Enhancing maternal wellbeing and decreasing maternal mortality proportion (MMR) by 75% somewhere in the range of 1990 and 2015 have been characterised as the Millennium Development Goal 5 (MDG 5A) (The General assembly, 2000). Accomplishing all MDGs is as yet a noteworthy test to the wellbeing frameworks overall (Ronsmans *et al.*, 2006). Regardless of the way that most maternal deaths are preventable, advance in controlling such ends has not been palatable (UNDP, 2011). In this manner, the MDGs cannot be

Table 1: Mortality rate expressed as the number of deaths per 100000 live birth

Year	Number of admissions	Number of died women	Mortality rate/ 100000
2014	39407	9	22.8
2015	37326	16	42.9
2016	37468	13	34.7
2017	36405	13	35.7
Total	150606	51	33.9

expertly rehearsed because of information holes, conflicting pointers, and continuous corrections (Nations *et al.*, 2010). Even though social insurance assumes a primary job in maternal mortalities, the impacts of different variables, e.g., female instruction and openness to wellbeing offices, ought not to be disregarded (Berg *et al.*, 2001). In any case, the explanations behind higher decreases in MMR in a few nations and the nonattendance of advancement in some others have not been completely found (Bank and The World Bank, 2010; Sajedinjad *et al.*, 2015). In our country, little is known about the exact rate of maternal mortality and about the causes contributing to that catastrophic event. This is mainly due to the poverty of national articles dealing with this subject and also because of the poverty of the national database with his regard and that the few studies that have raised this issue mainly resided on hospital-based studies rather than community-based studies. For that reason, the estimation of maternal mortality rate and identifying significant causes, are mandatory steps toward making a plan to improve the health care system in our country particularly in the mid-Euphrates region. For the best of our knowledge, this is the first study, in Al-Diwaniyah province, a big governorate in the mid-Euphrates region of Iraq that raised the issue of maternal mortality regarding rate and causes.

**Figure 1: Mortality rate expresses as number per 100000 according to year**

PATIENTS AND METHODS

Data were obtained from the records belonging to Al-Diwaniyah Maternity hospital and other hospitals, Iraq. We were able to retrieve information re-

garding women who died during pregnancy, labour, and puerperium for the years 2014, 2015, 2016 and 2017. Data included the age of the mother, gestational age, parity, educational level, residency, site of delivery and mode of delivery. These data were transformed into an SPSS spreadsheet, version 23, and statistical analysis was then performed and mainly was descriptive regarding number and percentage.

Table 2: Demographic of patients

Characteristic	Value
Age (years)	
Mean \pm SD	30.9 \pm 7.72
Range	16-47
<20, n (%)	5 (9.8)
20-35, n (%)	27 (52.9)
>35, n (%)	19 (37.3)
Gravida	
Median (IQR)	3 (3)
Range	1-13
Para	
Median (IQR)	3 (4)
Range	0-10
Abortion	
Median (IQR)	0 (1)
Range	0-3
Primigravida, n (%)	3 (5.9)
Para 1-4, n (%)	32 (62.7)
Multiparous, n (%)	16 (31.4)
Gestational age (Weeks)	
Mean \pm SD	32.71 \pm 9.68
Range	4-41
Education	
Illiterate, n (%)	34 (66.7)
Primary, n (%)	14 (27.5)
Secondary and higher	3 (5.9)
Residency	
Urban, n (%)	30 (58.8)
Rural, n (%)	21 (41.2)
Ante-natal care	
No, n (%)	30 (58.8)
Irregular, n (%)	14 (27.5)
Regular, n (%)	7 (13.7)
Mode of delivery	
Still pregnant, n (%)	13 (25.5)
NVD, n (%)	11 (21.6)
CS, n (%)	25 (49.0)
Abortion, n (%)	2 (3.9)
Site of delivery	
Hospital, n (%)	38 (74.5)

Home, n (%) 13 (25.5)

To estimate mortality rate, the exact numbers of annual obstetric admissions of the years 2014 through 2017 were also retrieved from hospital records. Mortality rate was expressed regarding some women deaths per 100000 hospital obstetric admissions. Categorical variables were expressed regarding quantity and percentage while numeric variables were expressed regarding mean, standard deviation, median, range, and inter-quartile range.

Table 3: Possible risk factors

Risk factor	n	%
No ANC	30	58.8
Age > 35	19	37.3
Multiparous	16	31.4
Previous CS	11	21.6
Primigravida	9	17.6
PET	7	13.7
Hypertension	6	11.8
Previous abortion	6	11.8
Age <20	2	3.9
Anaemia	2	3.9
D.M.	2	3.9
Primary infertility	2	3.9
PROM	2	3.9
History of IUD	2	3.9
Renal failure	1	2.0
Malignancy	1	2.0
Handicap	1	2.0
Placenta accreta	1	2.0
Angina	1	2.0
Psychiatric	1	2.0
Intestinal obstruction	1	2.0
Severe HEG	1	2.0
Severe asthma	1	2.0
SLE	1	2.0
Twin	1	2.0

RESULTS

Maternal mortality rates were 22.8, 42.9, 34.7 and 35.7 per 100000 live births concerning the years 2014, 2015, 2016 and 2017 respectively, and 33.9 per 100000 live births in average for the included four years, as shown in table 1. Figure (2) showed that the highest rate was recorded in 2015 and that maternal mortality rates were higher in 2016 and 2017 than in 2014. Demographic characteristics of the study sample are shown in table 1. Possible risk factors associated with maternal mortality are shown in table 2; clearly, that lack of antenatal care is the leading risk factors being observed in 58.8% of cases. Majority of women had multiple risk factors, as shown in figure 2. Causes of death according to autopsy findings are shown in table 4, and the leading causes of death were haemorrhage and

pulmonary embolism. Majority of case died during puerperium, as shown in figure 3.

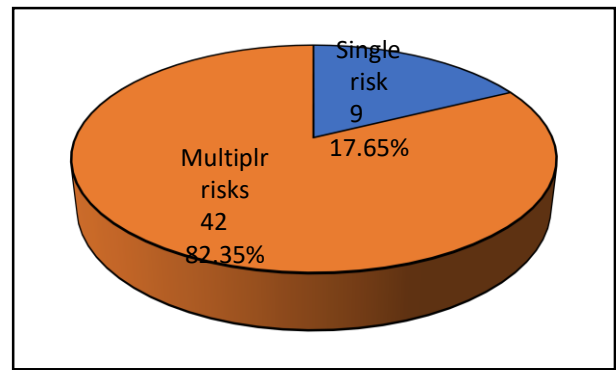


Figure 2: Single versus multiple risk factors

Table 4: Causes of death according to autopsy findings

Autopsy Findings		n	%
Cardio respiratory	Pulmonary embolism	19	37.3
	Cardiac arrest	2	3.9
	Heart failure	2	3.9
	AF with embolism	1	2.0
	Respiratory failure	1	2.0
Obstetric	All	25	49.0
	Bleeding/ DIC	13	25.5
	Rupture uterus	4	7.8
	Ruptured ectopic pregnancy	1	2.0
CNS	All	18	35.3
	Cerebral vein thrombosis	3	5.9
	Cerebral anoxia	2	3.9
	Brain death	1	2.0
	Brain tumour	1	2.0
	Intracranial H. ICH	1	2.0
	All	8	15.7
All	51	100.0	

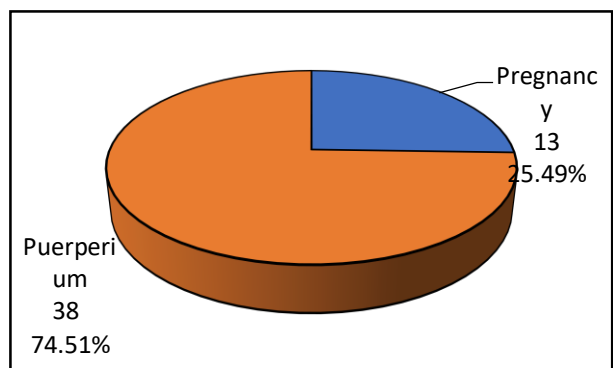


Figure 3: Frequency and percentage of cases according to the time of death

DISCUSSION

The present study showed that the average mortality rate of 4 successive years, 2014 through 2017, was 33.9 per 100000 births, with some variation among years, ranging from 22.8 to 42.9 per

Table 5: Maternal mortality rate by country according to WHO report (15)

Country	1990	1995	2000	2005	2013
Iraq	110	84	71	77	67
Saudi Arabia	41	31	24	19	16
Syria	130	94	75	58	49
Jordan	86	73	65	58	50
Kuwait	12	10	8	6	14
Iran	83	60	44	31	23
Turkey	48	39	33	27	20

Figure 4: Trends in MMR according to WHO report

100000 births. Also, the trend of mortality rate in the years 2015 through 2017 is toward rising, indicating an overall decline in the quality of the

Health care system. To demonstrate the big difference in the trend of maternal mortality rate between our country and that of the nearby countries we made a table (5) and figure (4) with data obtained from WHO report (WHO *et al.*, 2014). When we look to figure (4) we see that Iraq was the second in the highest rate of maternal mortality at 1990 preceded by Syria and we remain the second till 2000, then we became the first country with the highest maternal mortality rate in comparison with nearby countries. These figures are horrible and clearly showed the poor health system in our country and that we failed to provide health policies and measures with the aim of reducing maternal mortality to rates comparable to that of Turkey, Iran, Saudi Arabia, and Kuwait by the year 2014. However, our hospital-based study indicates that our province, Al-Diwaniyah province, had a lower mortality rate in comparison with our national figure, 33.9 versus 67 per 100000 live births. We believe that many measures are needed to lower the maternal mortality rate, and this requires cooperation between the ministry of health and social and political representatives and financial support.

In this study, the relatively large proportion of patients were of extreme ages, either young, < 20 years, making (9.8%) or old, > 35 years, making 37.3%. This observation is supported by the findings of some authors (al-Meshari *et al.*, 1996; Blanc *et al.*, 2013; Yego *et al.*, 2014). Some global studies have highlighted that the maternal mortality ratio (MMR) increases non-linearly with age, in particular after the age of 30 years, and is highest in the oldest age groups (Blanc *et al.*, 2013; GBD 2013 Mortality and Causes of Death Collaborators, 2015). One of the studies highlighted the causes of high mortality in women older than 35 years and concluded that Five factors were found to be significantly associated with increased odds of death among women aged ≥ 35 years: smoking during pregnancy (adjusted odds ratio (aOR) 2.06, 95% CI 1.13–3.75), inadequate use of antenatal care (aOR 23.62, 95% CI 8.79–63.45), medical comorbidities (aOR 5.92, 95% CI 3.56–9.86) and previous pregnancy problems (aOR 2.06, 95% CI 1.23–3.45). The odds associated with death increased by 12% per year increase in age (aOR 1.12, 95% CI 1.02–1.22) (Yego *et al.*, 2014).

It was also observed, in this study, that grand multiparous women made 31.4% of patients enrolled.

Similar findings were reported by some studies (Afolabi and Adeyemi, 2013; Alsammani and Ahmed, 2015). It was stated that Grand multiparous had twice the likelihood of malpresentation and a threefold higher prevalence of meconium-stained liquor and placenta previa compared with lower-parity women even when adjusted for age (Afolabi and Adeyemi, 2013). In another study it was found that "There were significant association between grand multiparity and adverse pregnancy outcomes such as cesarean delivery (OR=2.699, CI=2.072-3.515, $p<0.001$), fetal macrosomia (OR=1.675; 95% CI=1.004- 2.796, $p=.048$), Diabetes mellitus (OR=1.634, 95%CI=1.076-2.481, $p=0.021$), and pregnancy-induced hypertension (OR=1.838, 95% CI=1.054-3.204, $p=.032$)" (Alsammani and Ahmed, 2015).

Level of education appears to affect the overall mortality, rate since 66.7% of women included in the current study was Illiterate. The association between high maternal mortality and low education was demonstrated in published articles (Greenaway *et al.*, 2012; Karlsen *et al.*, 2011). Education may have both an immediate and back-handed association with maternal mortality. Expanding levels of education fulfilment are probably going to improve the limit of ladies to acquire, process and comprehend essential wellbeing data about the advantages of good pre-birth care and the conceptive wellbeing administrations expected to settle on suitable wellbeing choices. For instance, more educated ladies might be more averse to acknowledge conventional clarifications forever and demise and rather go up against expansive data about birth separating, the indications of pregnancy complexities and the need to enhance their nourishing status to lessen the danger of iron inadequacy weakness, which are all of key significance in the drive to diminish maternal passing. Besides, more instructed ladies are probably going to be more particular about making inquiries about their human services needs and will probably be tuned in to by social insurance experts (Caldwell, 1979). The circuitous connection between instructive levels and maternal mortality might be through expanding ladies' confidence and along these lines their strengthening to settle on wellbeing related choices. Ladies' enhanced access to training is likewise demonstrative of their more equivalent position in the public eye (Shen and Williamson, 1999). The significance of advancement on MDG3 (to advance sex balance and female strengthening, incorporating concerning instruction) for the accomplishment of MDG5 ought not to be thought little of (The Lancet, 2010). The connections among instruction and status furnish all the more profoundly taught ladies with more self-governance to settle on choices about the number of

kids they have, their nourishment amid pregnancy and their entrance to therapeutic services (Shen and Williamson, 1999). The instruction of ladies changes the parity of familial connections which has significant potential for valuable consequences for maternal mortality. The expanded danger of maternal mortality among non-wedded/living together ladies is characteristic of the manners by which ladies' social and monetary drawback consolidate with mentalities towards childbearing outside marriage to influence ladies' lives (Ronsmans and Khat, 1999). Another striking observation in our study is that a substantial proportion, 58.8% out of all women, received no anti-natal care (ANC). "The pooled analysis also demonstrated that woman attending antenatal care had more than seven times increased chance of delivering in a health facility and that antenatal care and health facility delivery had a negative correlation with maternal mortality" (Berhan and Berhan, 2014). We also observed that home delivery, being primigravida, having pre-eclampsia, hypertensive women and history of previous cesarean section and history of prior abortion were among possible identifiable risk factors that may take part in increasing the rate of maternal mortality. In agreement with these findings, some articles were reported (Gumanga *et al.*, 2011). In this study, pulmonary embolism and haemorrhage were the leading causes of maternal death by many items with the causes of maternal mortality (Fawole *et al.*, 2012; Hasegawa *et al.*, 2016; Khumanthem *et al.*, 2012; Nour, 2008).

CONCLUSION

The leading causes of death were haemorrhage and pulmonary embolism. The maternal mortality rate is higher in Iraq; however, it is less in Al-Diwaniyah Province than national figures, and the leading causes of maternal mortality are haemorrhage and pulmonary embolism.

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