



ISSN: 2520-5234

Available online at <http://www.sjomr.org>

SCIENTIFIC JOURNAL
OF MEDICAL RESEARCH

Vol. 4, Issue 13, pp 5 - 11, Winter 2020



ORIGINAL ARTICLE

Maternal Mortality in Basra City from 2014 to 2018

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ARTICLE INFORMATIONS

Article History:

Submitted: 12 December 2019

Revised version received:

15 January 2020

Accepted: 22 January 2020

Published online: 1 March 2020

Key words:

Maternal mortality

Basra

Obstetrical haemorrhage

Pulmonary embolism

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ABSTRACT

Background: Worldwide maternal mortality still high, especially in developing countries. The maternal mortality act as an indicator of the quality of maternity care in society, the health status of women, and above all the development of a nation.

Objectives: The aims of this study were to estimate maternal mortality ratio in Basra from 2014-2018, define the main causes of maternal deaths; describe sociodemographic factors of dead mothers, features related to pregnancy and death.

Methods: A descriptive, retrospective registries based study Data were collected from the vital registration of Basra governorate and hospitals' medical records through a structured questionnaire applied by the researcher.

Results: During the five years period included in the study (2014-2018) there were 206 cases of maternal deaths. Obstetrical haemorrhage was the top cause of maternal death 31.6% followed by pulmonary embolism 10.2%.

Conclusion: Maternal mortality in Basra still unacceptably high. Obstetric haemorrhage is still the main cause of maternal deaths in Basra.

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Citation: Mohammed H.M., Shiaa N.R. and Hussein R.A. "Maternal mortality in Basra city from 2014 to 2018". Sci. J. Med. Res. 2020; 4 (13): 5- 11.

INTRODUCTION

Getting pregnant, having children and building up a lovely family is a dream that many women chase, but unfortunately, not all pregnancies end up happily. Maternal death is the most tragic end that could ever happen to a pregnant woman; it results not only in human suffering but also has a negative social and economic impact¹. Maternal death defined by 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 site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes"². Worldwide, approximately 810 women died every day in 2017 day from causes linked to pregnancy and childbirth, the majority of these causes are avoidable³. The rate of maternal mortality varies from country to country where it has been higher in developing countries.

Sub Saharan African and South Asia comprise 86% of worldwide maternal mortality⁴.

Country estimates of maternal mortality are vital to notify the planning of maternal and reproductive health programs and to direct researches at the national level. Exploring the extent and causes of maternal mortality in Basra seems justifiable given the high rates of pregnancy and childbirth.

Maternal mortality ratio (MMR): Is known as the number of maternal deaths that result from the reproductive process at age 15-49 years during a given time period per 100000 live births throughout the same period, it describes the risk of death per live births⁵.

It might seem more rational to measure maternal mortality in relation to the population at risk, which is pregnant women, or female at reproductive age but unfortunately, not all pregnancies are registered and we could not find the exact number of the females at reproductive age.

Aetiology: Worldwide, maternal deaths causes are the same although the rate and the relative contribution of each cause are different from country to other⁶. Causes of maternal deaths are classified as either direct or indirect cause, where direct causes nearly account for 73% of all-causes³.

Direct obstetric deaths: deaths resulting from obstetric complications of the pregnancy state (pregnancy, labour, puerperium), from interventions, omission, incorrect treatment or from a chain of events resulting from any of the above².

Indirect obstetric deaths: deaths resulting from pre-existing disease or disease that developed throughout pregnancy and which was not due to direct obstetric causes, but which was aggravated by physiologic effects of pregnancy².

Coincidental death: Death resulting from an external unrelated cause which happens to occur during pregnancy or puerperium termed like death resulting from the accident and some infections^{6,7}.

MATERIALS AND METHODS

The A descriptive, retrospective, registry-based study was designed to measure MMR in Basra, define the main causes of maternal deaths and describe the sociodemographic characteristics of dead mothers, features related to pregnancy and time and place of death.

Necessary permission and clearance were obtained from Basra health directorate /Iraq ministry of health to review hospitals' medical records, death certificates and maternal deaths related statistics. This study was carried out in Basra health directorate /statistic departments /vital registration and hospitals that had reported a case of maternal death. All reported cases of maternal deaths, according to WHO definition, were included in this study, coincidental deaths were not included. Data were obtained from vital registration system of Basra governorate, Basra health directorate/ statistics unit, forensic medicine reports and hospitals medical reports. Information was extracted by using a structured questionnaire administered by the researcher.

The questionnaire was about: age , education , residence , occupation , gravidity , antenatal care (ANC), past medical and surgical history, state and mode of delivery, cause of death, time and place of death. Data were collected and reviewed from 18th of March 2019 to first of May 2019. Frequencies and percentages were calculated by SPSS-23 (statistical package for social science – version 23). MMR was calculated manually. Graphical presentation of data was done by Microsoft Excel 2016.

RESULTS

The total number of maternal deaths was 206. The results in Figure 1 indicate that the highest number of deaths was in 2016, with 55 deaths.

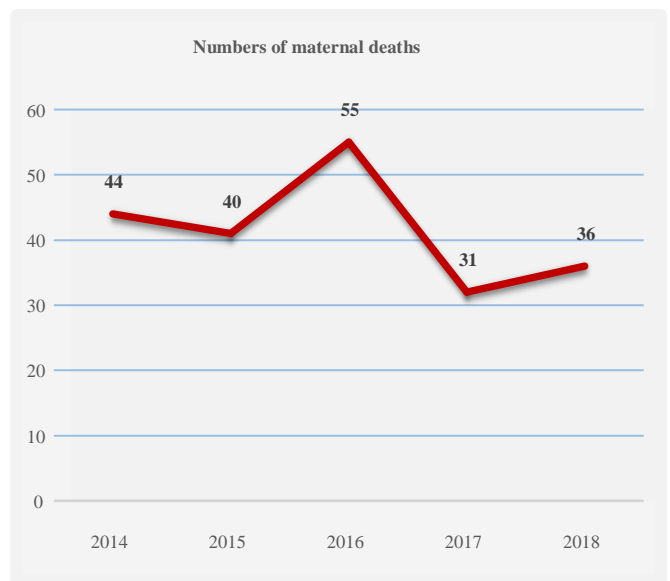


Figure 1: Numbers of maternal deaths in Basra according to the years of the study

Table 1: Annual maternal deaths, live births and MMR during the 5 years included in the study.

Year	Number of maternal deaths	Number of live births	Maternal mortality ratio per 100000 live births
2014	44	106779	41.2
2015	40	101635	39.4
2016	55	100261	54.9
2017	31	100321	30.9
2018	36	96267	37.4

Table 2: Sociodemographic characteristics of mothers who died from 2014 to 2018.

Sociodemographic features of dead mothers		NO. (no=206)	%
Age In years	12-19	17	8.3
	20-24	32	15.5
	25-29	40	19.4
	30-34	50	24.3
	35-39	39	18.9
	40-47	28	13.6
Residence	Basra city centre	82	39.8
	Peripheries	115	55.8
	Another governorate (Maysan & Thi Qar)	6	2.9
	Missing	3	1.5
Level of education	Illiterate	74	35.9
	Just read and write	2	1.0
	Primary education	92	44.7
	Intermediate education	10	4.9
	Secondary education	6	2.9
	University and higher	18	8.7
	Missing	4	1.9
Occupation	Housewives	189	91.7
	employees	15	7.3
	Students	2	1.0

Table 3: Pregnancy-related features of mothers who died from 2014-2018.

Features related to pregnancy		No.=206	%
Parity	Primigravida	25	12.1
	2 - 4	96	46.6
	5 and more	68	33.0
	missing	17	8.3
ANC	yes	155	75.2
	no	40	19.4
	missing	11	5.3
Risk factors	Yes	112	54.4
	-One risk factor	97(86.6%)	
	-Two risk factor	15(13.4%)	
	None	75	36.4
	missing	19	9.2
Mode and state of delivery	Delivered	138	67.0
	Vaginal delivery	59(42.8%)	
	Caesarean section	79(57.2%)	
	Not delivered	68	33.0
Place of delivery	Delivered	138	67.0
	-Delivered at hospital	129(93.5%)	
	Basra city centre hospitals	113(87.6%)	
	Peripheral hospitals	16(12.4%)	
	-Delivered at home	9(6.5%)	
	Not delivered	68	33.0

Table 4: Traditional birth attendant intervention during delivery.

TBA intervention	No.=138	%
Yes	13	9.4
No	123	89.1
Missing	2	1.4

Table 5: Traditional birth attendant intervention during delivery.

Pregnancy outcome	No.=206	%
Not delivered	68*	33.0
Delivered	138	67.0
Live birth	102(73.9%)	
Stillbirth	33(23.9%)	
Not mentioned	3(2.2%)	

Table 6: Distribution of deliveries (live births and stillbirths) in Basra from 2014-2018 according to the mode of delivery.

Years	Mode of delivery		Total	
	Vaginal delivery	Gaesarean section		
2014	No.	26218	21706	107924
	%	79.9	20.1	100
2015	No.	80016	22709	102725
	%	77.9	22.1	100
2016	No.	77137	24234	101371
	%	76.1	23.9	100
2017	No.	74998	26332	101330
	%	74.0	26.0	100
2018	No.	71593	25604	97197
	%	73.7	26.3	26.3

Table 7: Distribution of deliveries (live birth and stillbirths) in Basra from 2014-2018 according to the place of delivery.

Years	Place of delivery		Total	
	Health institution	Home		
2014	No.	94423	13501	107924
	%	87.5	12.5	100
2015	No.	91444	11281	102725
	%	89.0	11.0	100
2016	No.	89517	11854	101371
	%	88.3	11.7	100
2017	No.	89925	11405	101330
	%	88.7	11.3	100
2018	No.	87969	9228	97197
	%	90.5	9.5	100

Table 8: Distribution of maternal deaths according to time and place of death.

Time and place of death		No.=206	%	
Time of death in relation to pregnancy	During pregnancy (before delivery)	71*	34.5	
	-first trimester(first 12 weeks)	11(15.5%)**		
	-second trimester (13-28week)	29(40.8%***)		
	-third trimester(29-40week)	30(42.3%)		
	-Post term(after 42 week)	1(1.4%)		
	During delivery	8		3.9
	puerperium	127		61.7
Place of death	At hospital	186	90.3	
	Basra city centre hospitals	173(93.0%)		
	Peripheries hospitals	13(7.0%)		
	At home	17	8.3	
	On the road	3	1.5	

Table 9: Detailed causes of maternal deaths in Basra from 2014-2018.

Causes of maternal deaths		No.=206	%	
Direct obstetric death No. 121 58.7%	Haemorrhage	65	31.6	
	Postpartum haemorrhage	53		
	Antepartum haemorrhage	7		
	Rupture uterus	5		
	Pulmonary embolism	21	10.2	
	Hypertensive disorder of pregnancy	16	7.8	
	Early pregnancy death	7	3.4	
	Abortion	6		
	Rupture ectopic	1		
	Sepsis	4	1.9	
	Anaesthesia-related death	4	1.9	
	Amniotic fluid embolism	2	1	
	Other direct cause of death	2	1	
	Hyperemesis gravidarum	1		
	Intrahepatic cholestasis of pregnancy	1		
	Indirect obstetric death No. 42 20.4%	Central nervous system disorder	10	4.9
		Stroke	6	
Guillain Barre syndrome		2		
Epilepsy		1		
Cerebral sinus thrombosis		1		
Cardiovascular disease		10	4.9	
Heart failure		9		
Myocardial infarction		1		
Haematological disease		6	2.9	
Sickle cell anaemia		2		
Iron deficiency anaemia		2		
Thrombotic thrombocytopenic purpura		1	2.9	
Thrombocytopenia		1		
Hepatic failure		6		
Diabetic ketoacidosis		3	1.5	
Chronic kidney disease	3	1.5		
Gastrointestinal disease	2	1		
Bleeding duodenal ulcer	1			
Pancreatitis	1			
Asthma	1	0.5		
Systemic lupus erythematosus	1	0.5		
Undetermined cause of death		43	20.9	

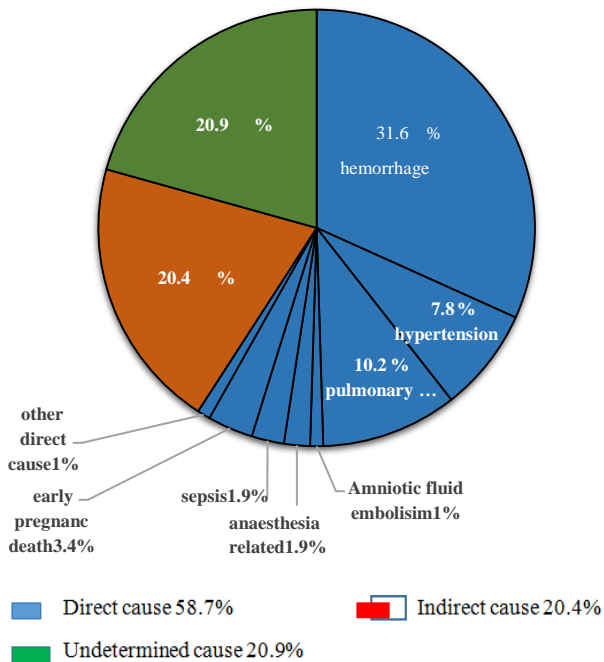


Figure 2: Causes of maternal deaths in Basra from 2014-2018.

DISCUSSION

A new goal for the global MMR was set for 2030, the target is to reduce the global MMR to 70 per 100000 live births⁴.

The MMR in Iraq has markedly decreased from 127 deaths per 100000 live births in 2005 to 79 deaths per 100000 in 2017, but unfortunately still higher than the MMR in other countries of the region, the MMR per 100000 live births is 12 in Kuwait, 17 in Saudi Arabia, 17 in Turkey, 14 in Bahrain and 16 in Iran⁴.

Iraq is still recuperating from long years of conflicts and political mess. Conflicts, poor birth practice, insufficient emergency obstetric care and high prevalence of anaemia among pregnant women mainly in rural areas all play a role in increasing maternal mortality^{8,9}. In developed countries like Australia, the UK and the United States of America MMR in 2017 was 6, 7, 19 per 100000 live births respectively⁴.

According to the Maternal mortality report adopted by Iraq ministry of health, the MMR per 100000 live births in Basra was noticeably increased from 27.9 in 2010 and 25.8 in 2011 to 41.5 in 2012¹⁰. This rise can be attributed to improved hospitals' reporting and registration system of maternal deaths in Basra in 2012, the year when maternal deaths review committee was established¹¹.

Throughout the five years included in this study, MMR in Basra was fluctuating. In 2014 and 2015 MMR in Basra (41.2 and 39.4/100000 live births) was higher than that of Baghdad (31.8 and 29.1/100000 live births) and higher than that of Erbil (9.7 and 8.4/100000 live births)^{12,13}.

In 2016 Basra MMR (54.9/100000 live births) ranked the second following AL-Najaf (MMR 66.7/100000 live births)¹⁴.

In 2017 Basra MMR (30.9/100000) dropped to below that of Baghdad (MMR 37/100000 live births) but still higher than that of Erbil (MMR 8.7/100000 live births)¹⁵. This marked decline can be explained by the strict instructions adopted by Basra health directorate regarding specialist attendance during the night shift and adoption of teamwork framework in managing a risky pregnancy¹¹.

In 2018 MMR in Basra slightly increased to (37.4/100000 live births). Concerning sociodemographic characteristics of the dead mothers, from 206 dead mothers, the highest percentage of deaths (24.3%) occurred among women in the age group 30-34 years old; this is similar to what was seen in Enaas S. Al-Kayat study, 2016, Thi Qar¹⁶. The same finding was also noticed in the UK according to MBRRACE-UK report 2018¹⁷.

In this study (80.6%) of dead women were of a low level of education, as (44.7%) were with a primary level of education and (35.9%) were illiterate.

Illiteracy remains a major concern in Iraq, according to 2007 survey done by Iraqi Central Organization for Statistics and Information Technology (COSIT) about (18-20%) of the adults are functionally illiterate, (24.6%) of females are illiterate¹⁸.

High level of education is likely to improve the women capacity to recognise basic health information regarding the benefits of good ANC and maternity health care services needed to make appropriate health decision, also improve women self-esteem and their enablement to make a health-related decision, a relationship between maternal mortality and level of education was found in Karlsen, S. et al study, 2011¹⁹.

About (91.7%) of the dead mothers in Basra were housewives, a similar finding was obtained in Zolala F. et al study, 2012, Iran²⁰. A possible explanation is, employed women are less likely to be subjected to poverty as poverty has its effect on nutritional status, health care services utilization.

This study shows that maternal mortality was higher (55.8%) among women from outlying districts of Basra city, availability and accessibility to the health care facilities, the presence of specialist doctors, and different lifestyle might all have its effect on high maternal deaths in these areas.

This study revealed that maternal mortality was higher 46.6% among multigravida 2 - 4. This is the same finding in MDSR report and Enaas S. AlKayat study, 2016, Thi Qar^{10,16}.

There was an increase in the rate of caesarean section performance in Basra over the five years included in this study from 20.1% in 2014 to 26.3% in 2018. Among those who delivered 138 women about 57.2% delivered by caesarean section and 42.8% were delivered by vaginal delivery. This result is different from what was seen thirteen years earlier in Fouad H.AL-Dahhan et al study, 2006, Basra, where the majority of dead mothers delivered vaginally²¹. Also, different from the result of MDSR report¹⁰. Regardless of the indications of caesarean section, it is associated with a number of intra and postoperative complications that rise maternal mortality and morbidity when compared with vaginal delivery.

About three-quarter of dead mothers 75.2% received some sort of ANC whether it is adequate or not, it was impossible to know as the number of visits was not mentioned in the records. A similar finding was seen in MBRRACE-UK report 2018¹⁷.

Regarding the place of delivery, it was noticed that most of the deliveries 93.5% took place in hospitals and only 6.5% of women were delivered at home. In Fouad H.AL-Dahhan et al. study, 2006, Basra, although 55,75% of deliveries occurred in the hospital, about 44.25% took place at home²¹. This is a high number in comparison to what was found in the current study. This can give the idea that there might be increased maternal awareness about the importance of giving birth in hospitals in the presence of well-trained personnel. There is a decline in the rate of home delivery in Basra from 12.5% in 2014 to 9.5% in 2018 as evident in the **Table 5**.

Regarding pregnancy outcome, 138 women gave birth of whom 73.9% resulted in live births and 23.9% resulted in stillbirth, this similar to the results in Ahmed M. Abbas *et al.* study, 2016, Egypt²².

The present study revealed that direct obstetric causes were blameable for death in 58.7% of dead mothers in Basra over the five years included in this study, haemorrhage was the main direct cause of maternal deaths in 65 (31.6%) women of which 53 deaths were due to PPH. Similar to what was found 13 years earlier in Basra²¹. Haemorrhage was also the main cause of death in Iraq\ Thi Qar, Iran, Japan^{16, 23, 24}. Obstetric haemorrhage was reported to be the main cause of maternal deaths in developing countries²⁵.

The second direct cause of maternal deaths was a pulmonary embolism. Pulmonary embolism is one of the 3 main causes of maternal deaths in western countries²⁶. Previously sepsis was reported to be the second leading cause of maternal deaths in Basra mainly due to lack of Antibiotics and utilization of unsterile equipment during home deliveries²¹. In this study, only 4 cases of maternal deaths were attributed to sepsis following delivery.

Traditional birth attendant training and qualification programs adopted by Basra health directorate might have reduced the incidence of sepsis following delivery at home.

Hypertensive disorder of pregnancy was found to be the main cause of maternal deaths in Erbil maternity teaching hospital followed by haemorrhage⁽²⁷⁾. Hypertension was also the main cause of death in Egypt and the Eastern province of Turkey^{22, 28}.

Indirect obstetric deaths account for 20.4% of maternal deaths in Basra, cardiac diseases and central nervous system disorders account for 4.9% of deaths for each. Cardiac diseases are the main cause of maternal deaths in the UK and Nordic countries^{17, 29}.

About 20.9% of dead mothers were buried with undetermined cause of death as an autopsy was refused by the deceased's family. If an autopsy was done perhaps numbers would be different.

More than half 61.7% of maternal death in Basra over the five years included in this study was during the puerperium period, similar to the finding obtained by Surekhe N. Khandala and Kshama kedar study, 2017, India³⁰.

Majority of deaths in this study were reported from Basra city centre hospitals, similar to what is found in Enaas S. Al-Kayat study, 2016, Thi Qar¹⁶.

A possible explanation is, some women from the outlying districts (peripheries) would rather give birth at Basra city centre hospitals because they believe that these hospitals are better and well equipped in comparison with peripheral hospitals. Besides that, some of them are under the care of specialists who are working at these hospitals.

Another reason is peripheral hospitals in Basra lack intensive care units, and emergency caesarean section is not always available when needed, so any pregnant woman with risk factors would be referred to give birth at Basra city centre hospitals.

This study was not intended to investigate institutional factors that might have an effect on maternal mortality.

CONCLUSIONS

Maternal deaths in Basra are still unacceptably high. More than half of the women were from Basra outlying districts, the majority of women were with a low level of education and were housewives. Deaths were highest among women in the age group 30 -34 years and among multigravida (2-4 pregnancy), despite the traditional belief that primigravida and women with 5 or more gestations have the highest risk of death. Among women who delivered, more than half delivered by caesarean section and the majority ended up with live birth. More than half of women died during puerperium. Direct obstetric causes account for 58.7% of maternal deaths. About 20.4% of maternal deaths were due to indirect obstetric cause. Obstetric haemorrhage was the main cause of maternal deaths in Basra during the last five years followed by pulmonary embolism. Many of the deaths were reported from Basra city centre hospitals.

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