

Maternal mortality in Basra from 2019–2021

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ABSTRACT

Background: Maternal mortality is a crucial community health indicator. The World Health Organization defines maternal death as “the annual number of female deaths from any cause related to or aggravated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and labor or within 42 days following the termination of pregnancy, irrespective of the duration and location of the pregnancy.” **Aim:** This study aims to calculate the maternal mortality ratio in Basra over three years, identify the causes of death, and describe the sociodemographic factors of deceased mothers. **Methods:** A registry-based, descriptive, and retrospective study conducted over three months. Data were collected from maternal mortality-related registries using a structured questionnaire. **Results:** A total of 129 maternal deaths were recorded. The primary causes of death were obstetric hemorrhage (27 cases) followed by COVID-19 infection (22 cases). Deaths were most prevalent among women aged 30–39 years, particularly among those with a primary level of education and those who were housewives. **Conclusion:** Unfortunately, maternal mortality remains high, with obstetric hemorrhage identified as the leading cause of maternal death.

Keywords: maternal, mortality.

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INTRODUCTION

Maternal Mortality

The annual number of female deaths, regardless of the duration or location of the pregnancy, from any cause connected to or exacerbated by pregnancy or its management (excluding accidental or incidental causes) during pregnancy and delivery or within 42 days following the termination of pregnancy.¹

According to the World Health Organization (WHO), application of the International Statistical Classification of Diseases 10th revision (ICD-10) to deaths during

pregnancy, childbirth, and puerperium (2012), maternal deaths are classified into²:

Direct Obstetric Deaths

Fatalities caused by interventions, omissions, incorrect treatment, and obstetric complications of the pregnant state (pregnancy, labor, and puerperium), or by a sequence of occurrences stemming from any of the preceding factors.²

Indirect Obstetric Deaths

Deaths resulting from pre-existing diseases or diseases that developed during pregnancy, which were not due to direct obstetric causes but were made worse by the physiological repercussions.²

The maternal mortality ratio (MMR) is calculated as (Number of maternal deaths/Number of live births) × 100,000. The MMR can be computed directly using data collected from vital registration systems.³

MATERIALS AND METHODS

A registry-based, descriptive, retrospective study was conducted from March to June 2022 on 129 cases. It is designed to gauge MMR, identify the main causes of maternal deaths, and describe the sociodemographic characteristics of deceased mothers, as well as features related to pregnancy time, and place of death.

Manually calculating the number of documented maternal fatalities against the number of recorded live births during the same period, and then multiplying the result by 100,000 to determine the MMR.

Necessary permissions and clearances were obtained from the Basra Health Directorate. All reported cases of maternal death, according to the WHO definition, were included.

Data were obtained from the vital registration system of Basra Governorate, the Basra Health Directorate/Statistics Unit, forensic medicine reports, and hospital medical reports. Information was extracted using a structured questionnaire administered by the researcher.

Frequencies and graphical presentations of data were conducted using Microsoft Excel 2016, and percentages were calculated manually.

RESULTS

Socio-demographic characteristics

The total number of deceased mothers was 129. Regarding the sociodemographic features of deceased mothers, approximately 43% were in the age range of 30–39 years, followed by those aged 20–29 years. About 47% of deceased mothers were from the peripheral areas of Basra City.

About 71% of deceased mothers had a primary level of education, compared to only 6% among those with a college degree. The majority of deceased mothers (91%) were housewives. (Table1).

Annual Maternal Mortality

During the three years of this study, the highest number of maternal deaths occurred in 2020 (49 cases), followed by 2021 (44 cases). (Fig. 1). MMR was the highest in 2020 (53 per 100000 live births). (Table2).

Pregnancy-related factors of deceased mothers

About 36.4% of the deceased mothers were multigravida (2–4 pregnancies), and 63% had received antenatal care. Among the 82 women who delivered, 50% underwent cesarean sections, and the majority (94%) delivered in hospitals. (Table 3).

Traditional birth attendant intervention

The traditional birth attendant intervention was noted in only 4 (5%) of deliveries. (Table 4)

Pregnancy outcomes of deceased mothers

Among women who delivered, 64.6% had live births and 23.2% had stillbirths. (Table 5).

Timing and place of death

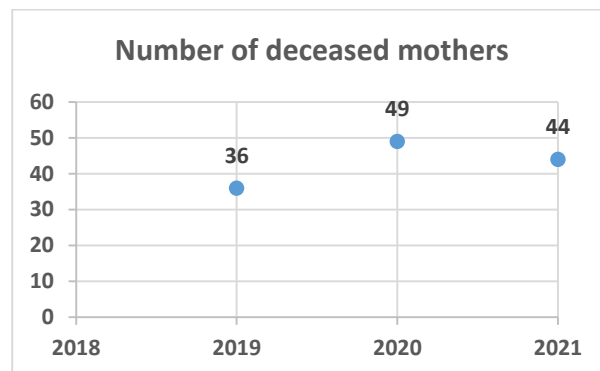
Regarding the timing of death concerning pregnancy, approximately 84 women died during the puerperium, with 84% of deaths occurring in hospitals. (Table 6).

Causes of maternal death

Obstetric hemorrhage was the leading cause of death (21% of cases followed by COVID-19 (17% of cases). (Table 7).

Table 1: Socio-demographic characteristics of deceased mothers.

Sociodemographic features of deceased mothers		No. (n = 129)	%
Age	Less than 20	13	10%
	20–29	45	35%
	30–39	55	43%
	40 and above	16	12%
Residence	Basra City Center	54	42%
	Peripheral areas	61	47%
	Other governorates	12	9%
	Missing	2	2%
Education	Illiterate	7	5%
	Just read and write	4	3%
	Primary level of education	91	71%
	Intermediate level	10	8%
	University and higher	8	6%
	Missing	9	7%
Occupation	Housewives	117	91%
	Employee	6	4.6%
	Student	1	0.7%
	Missing	5	3.8%

**Figure 1:** Numbers of maternal deaths in Basra City according to the years of the study.**Table 2:** Annual maternal deaths, live births, births, and MMR during the three years included in the study.

Years	Number of maternal deaths	Number of live births	Maternal mortality ratio per 100000 live births
2019	36	94,137	38.2
2020	49	92,621	53
2021	44	91,569	48

Table 3: Pregnancy-related factors of deceased mothers.

Pregnancy-related factors		No. = 129	%
Parity	Primigravida	24	18.6%
	2-4	47	36.4%
	5 and more	35	27%
	Missing	23	18%
ANC	Yes	82	63%
	No	15	12%
	Missing	32	25%
Mode and state of delivery	Postpartum deaths	82	64%
	Normal vaginal delivery	37 (45%)	
	Cesarean section	41 (50%)	
	Missing	4 (5%)	
	Antepartum death	47	36.4%
Place of delivery	Postpartum deaths	82	64%
	Delivered at hospital	77 (94%)	
	Delivered 15 (14%) at home	5 (6%)	
	Antepartum death	47	36.4%

Table 4: Traditional birth attendant intervention.

	No. (n = 82)	%
TBA intervention	4	5%
Midwife intervention	1	1.2%
No intervention	75	91.4%
Missing	2	2.4%

Table 5: Pregnancy outcomes of deceased mothers.

Pregnancy outcome	No (n = 82)	%
Live births	53	64.6%
Stillbirths	19	23.2%
Missing	10	12.1%

Table 6: Timing and place of death.

Timing and place of death	No. (n = 129)	%
Time of death concerning pregnancy	Antepartum maternal death: 38	29.5%
	First trimester: 1 (2.6%)	
	Second trimester: 19 (50%)	
	Third trimester: 18 (47.3%)	
	Peripartum deaths: 7	5.4%
	Post-natal deaths: 84	65%
	First 24 hours: 40 (47.6%)	
From 24 hours to one week: 21 (25%)		
One week to the end of puerperium: 13 (15.4%)		
Missing: 10 (11.9%)		
Place of death	At the hospital: 109	84%
	Basra City Center Hospital: 94 (86%)	
	94 (86%) Basra peripheral hospitals: 15 (14%)	
	At home: 9	7%
	On the road: 11	9%

Table 7: Causes of maternal death.

Causes of maternal deaths		No. (n = 129)	%
Direct obstetric causes: 49 (38%)	Obstetric hemorrhage	27	21%
	Hypertensive disease of pregnancy	12	9.3%
	Pulmonary embolism	4	3.1%
	Amniotic fluid embolism	1	0.7%
	Sepsis	3	2.3%
	Anesthesia-related causes	1	0.7%
	Hyperemesis gravidarum	1	0.7%
Indirect obstetric causes: 45 (35%)	Heart failure	8	6.2%
	Malignancy	6	5%
	Acute pancreatitis	2	2%
	Intestinal obstruction	1	0.7%
	Hemorrhagic stroke	1	0.7%
	COVID-19	22	17%
	Systemic lupus erythematosus (SLE)	1	0.7%
	Anaphylactic shock (drug allergy)	1	0.7%
	Liver injury (hemorrhagic shock)	1	0.7%
	Pulmonary edema (pheochromocytoma)	1	0.7%
Pneumonia	1	0.7%	
Undetermined causes	35	27.1%	

DISCUSSION

MMR is considered an important indicator of a nation's overall health status and quality of life.

Despite a significant decrease in Iraq's MMR from 138 per 100,000 live births in 2007 to 79 per 100,000 live births in 2017, it remains higher than that of many other countries. For instance, the MMR is 10 per 100,000 live births in Jordan, 12 per 100,000 live births in Kuwait, and 3 per 100,000 live births in the United Arab Emirates.⁴

The MMR in Iraq was 31.5 and 34.2 per 100,000 live births in 2019 and 2020, respectively.^{5,6} In comparison,

the MMR in the Sultanate of Oman was 14.1 and 29.4 per 100,000 live births in 2019 and 2020, respectively, which is lower than that of Iraq.⁷

During the three years of this study, the MMR in Basra was 38.2, 53, and 48 per 100,000 live births for 2019, 2020, and 2021, respectively. This is higher than that of Baghdad (35.3 and 42.2 per 100,000 live births) and Erbil (3.5 and 12 per 100,000 live births) for 2019 and 2020.^{5,6} This high number can be attributed to different numbers of live births, a robust registration system in Basra, and disparities in the resources of healthcare facilities.

About 43% of deceased mothers were in the age group of 30–39 years, which is consistent with our previous study where 43.2% of deceased mothers fell within this age range of (30–39 years).⁸ This is also identical to the situation in Jordan.⁹

About 47% of deceased mothers are from the peripheries of Basra city; 71% had a primary level of education; and 91% were housewives.

Jordan's national maternal mortality report indicated that 43.5% of maternal deaths occurred among women with a secondary level of education, and (82.3%) were unemployed. Higher levels of education increase women's chances of gainful employment which may influence childbearing decisions and lead women to reduce or postpone pregnancies. The economic advantages associated with higher education likely improve maternal health by enhancing access to medical care.

Education also empowers women, supporting their autonomy at home. The earlier study produced similar findings.⁸ A causal relationship between women's education and maternal health, as well as the impact of education on women's health, was explored in a study by Abigail W. in Peru in 2017.¹⁰

Maternal mortality was higher (36.4%) among multigravida (2–4 pregnancies). Approximately 63% of deceased mothers received antenatal care. However, the adequacy of care was not assessed, as the exact number of visits was not recorded. These findings are consistent with a similar previous study.⁸

More than half of the deceased mothers (64%) had cesarean section deliveries. Maternal mortality and morbidity are approximately five times greater following cesarean sections compared to vaginal births, particularly due to risks, such as amniotic fluid embolism, thromboembolism, sepsis, and bleeding.

In subsequent pregnancies, cesarean sections increase the risks of placenta previa and adherent placenta, which may lead to higher risks of hemorrhage and peripartum hysterectomy. Adhesion-related complications can also raise the likelihood of bladder and bowel damage.¹¹

Most deliveries occurred in hospitals (94%), with only 6% taking place at home. The traditional birth attendant intervention was noted in only 5% of those who delivered.

Regarding pregnancy outcomes, 82 women delivered, of whom 64.6% resulted in live births and 23.2% resulted in stillbirths. Similar results were observed in a previous study of maternal deaths in Basra.⁸ About 65% of death cases occurred during the puerperium, primarily within the first 24 hours. Similar results were found in Ethiopia.¹²

Nearly 86% of death cases occurred in Basra city center hospitals. This is attributed to higher population density in central areas and a preference among women to give birth in these hospitals due to better equipment. Additionally, cases requiring advanced management are often referred from peripheral hospitals to central ones.

This study reveals that direct obstetric causes remain the primary cause of maternal death in Basra (38% direct causes vs. 35% indirect causes), with obstetric hemorrhage being the most significant contributor (21%). Consistent with findings from earlier research conducted in Basra,⁸ Obstetric hemorrhage was also the leading cause of maternal death in Sub-Saharan Africa and Iran.^{13,14}

The second leading cause of maternal death in Basra was COVID-19; previously, pulmonary embolism was reported as the second leading cause of maternal death in Basra.⁸ While a May 2020 study indicated no difference in overall clinical outcomes between pregnant and non-pregnant patients,¹⁵ other research

released in September 2020 suggested that the morbidity is made worse by pregnancy and it appears to increase as pregnancy progresses.¹⁶ The situation was mirrored in Palestine, where COVID-19-related maternal deaths were the primary cause of indirect obstetric deaths.¹⁷ There were 35 (27.1%) cases of maternal death with undetermined causes, as the deceased's family refused autopsy.

CONCLUSIONS

Unfortunately, maternal mortality in Basra remains high. Women aged 30–39 years and those residing in the peripheral areas of Basra City experience a higher rate of maternal deaths. The majority of deceased mothers were housewives with a primary level of education. Death rates were higher among multigravida (2–4 pregnancies). Of the women who gave birth, 50% underwent cesarean sections. More than half of pregnancies resulted in live births. More than half the cases of maternal death occurred during puerperium. Direct obstetric causes accounted for 38% of maternal deaths, while indirect obstetric causes were responsible for 35%. The leading cause of maternal mortality in Basra is obstetric hemorrhage, followed by COVID-19. Study limitations include the lack of live instances of women who gave birth during that period and inadequately organized and documented hospital medical records, which hindered the ability to determine if any particular variable was associated with maternal deaths.

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