Maternal Mortality Ratio in Basrah City During the Year 2024

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Abstract*—Maternal mortality remains a critical global public health issue. In Iraq, particularly in Basrah, maternal mortality trends have fluctuated, prompting renewed attention to the underlying causes and associated risk factors. This study aimed to estimate the maternal mortality ratio (MMR) in Basrah during 2024 and to identify the direct and indirect causes of maternal deaths, as well as relevant demographic and obstetric risk factors. A retrospective analysis was conducted using maternal death records from the Basrah Health Directorate for the year 2024. Data from 56 maternal deaths were analysed according to WHO ICD-10 criteria, examining sociodemographic, obstetric, and clinical variables including age, parity, antenatal care attendance, timing and location of death, and causes of mortality. The MMR in Basrah in 2024 was 64.59 per 100,000 live births, representing a substantial increase compared with previous years. Most deaths occurred among women older than 35 years (30.36%) and those residing in peripheral areas (60.71%). Notably, 62.5% of women had not received antenatal care, and 26.79% had not delivered at the time of death. Direct causes accounted for 64.3% of deaths, with obstetric haemorrhage (21.43%) and hypertensive disorders (16.07%) being the most common, while indirect causes represented 35.7%, with haematological conditions, particularly sickle cell disease, being prominent (8.93%). These findings indicate an alarming rise in maternal mortality in Basrah, with most deaths being preventable, highlighting significant gaps in healthcare access, antenatal care quality, and emergency obstetric services, especially in rural areas.

Keywords: Maternal mortality, Maternal mortality ratio, Antenatal care, Obstetric complications, Iraq

INTRODUCTION

Maternal mortality is defined by the World Health Organization (WHO) and the International Classification of Diseases, 10th Revision (ICD-10), as the death of a woman during pregnancy or within 42 days following its termination, regardless of the duration or location of the pregnancy (1). The ICD-10 further expands this definition to include pregnancy-related deaths, which occur during pregnancy or within 42 days of its termination irrespective of cause, and late maternal deaths, which result from direct or indirect obstetric causes occurring between 42 days and one year after the end of pregnancy (1).

Maternal mortality demonstrates marked global disparities, with the highest burden observed in developing regions. Sub-Saharan Africa and South Asia together account for approximately 86% of maternal deaths worldwide (2). The Maternal Mortality Ratio (MMR) is defined as the number of maternal deaths per 100,000 live births within a specified period among women aged 15–49 years (3). This indicator reflects the risk associated with each live birth. Although measuring maternal deaths relative to the population at risk may seem more appropriate, this approach is limited by incomplete reporting of pregnancies, particularly in low-resource settings (4).

In 2017, an estimated 810 women died each day from pregnancy- and childbirth-related complications, with most of these deaths being preventable (5). Notably, 94% of maternal deaths occurred in low- and lower-middle-income countries. During the same year, the MMR in developing countries was 462 per 100,000 live births, compared with 11 per 100,000 live births in developed countries, highlighting a substantial inequity in maternal health outcomes (5).

In Iraq, data published by the Ministry of Health identified Basrah as having a relatively high maternal mortality ratio in 2016, reaching 55 deaths per 100,000 live births, which exceeded the national average of 40 per 100,000 live births. However, a notable improvement was observed in 2017, when the MMR in Basrah declined to 28 per 100,000 live births, falling below the national rate for that year (6).

Maternal deaths are broadly categorised into direct, indirect, and coincidental causes. Direct maternal deaths, which account for approximately 73% of cases globally,

result from obstetric complications occurring during pregnancy, labour, or the postpartum period, as well as from medical interventions or their absence (7,14). Common direct causes include haemorrhage, hypertensive disorders, pulmonary embolism, amniotic fluid embolism, infections, obstructed labour, unsafe abortion, and anaesthesia-related complications (8–15).

Indirect maternal deaths arise from pre-existing medical conditions or diseases aggravated by pregnancy that are not directly obstetric in origin (16). These include cardiac disease, stroke, hepatic disorders, epilepsy, sickle cell disease, thrombotic thrombocytopenic purpura, haemorrhagic fever, renal disease, and diabetes mellitus (17–24). Coincidental deaths refer to fatalities during pregnancy or the postpartum period due to external causes unrelated to pregnancy, such as accidents or trauma (16).

Several demographic and obstetric factors increase the risk of maternal morbidity and mortality, including advanced maternal age, lifestyle factors such as smoking, and multiple pregnancies (25). More recently, the COVID-19 pandemic has emerged as an additional risk factor. Physiological and immunological changes during pregnancy may predispose women to severe COVID-19 infection, with increased risk of respiratory complications due to reduced pulmonary reserve (11,26).

The objective of this study is to estimate the maternal mortality ratio and identify the primary causes of maternal mortality in Basrah city during the year 2024.

METHODS

This retrospective study was conducted in maternity hospitals across Basrah Governorate and focused on maternal deaths occurring during the year 2024. The study population included all women of reproductive age (15–49 years) who died in Basrah during the study period. Maternal deaths were identified and included according to the definitions provided by the World Health Organization and the International Classification of Diseases, 10th Revision (ICD-10). Deaths unrelated to obstetric causes, as well as cases with incomplete or unavailable medical records, were excluded from the analysis.

Data were obtained from multiple official sources, including the Basrah Health Directorate and the Iraqi Ministry of Health. Information was extracted from hospital medical records, death certificates, maternal mortality reports, forensic medicine records, and other relevant hospital documents. To ensure consistency and completeness, data collection was guided by a structured questionnaire developed by the researchers. This tool captured detailed information on sociodemographic characteristics, obstetric history, and clinical circumstances surrounding each death.

The variables collected included age, level of education, place of residence, and occupation, as well as obstetric factors such as gravidity, antenatal care attendance, past medical and surgical history, and the state and mode of delivery. Additional variables related to mortality included the underlying cause of death, the timing of death in relation to pregnancy or delivery, and the place where death occurred. All available records were carefully reviewed and compiled by the research team to ensure accuracy and completeness of the dataset.

Ethical approval for the study was obtained from the Ethics Committee of the Basrah Health Directorate and the Basrah Medical College Committee. Confidentiality was strictly maintained throughout the study, and all data were anonymised to ensure that no personally identifiable information was disclosed.

RESULTS

In 2024, Basrah recorded a MMR of 64.59 per 100,000 live births, derived from 56 maternal deaths out of 86,700 live births. The distribution of maternal deaths across age groups reveals a slight predominance among women over 35 years (30.36%). In rural areas deaths was (60.71%). Educational attainment was notably low among the deceased, with 50% having only primary education and a combined 14.28% being illiterate or barely literate. Additionally, the overwhelming majority (94.64%) were housewives (Table1).

Table 1. Sociodemographic characteristics of maternal deaths

Sociodemographic Features		No. (56)	≈100%
Age (years)	18-25	15	26.79
	26-30	12	21.42
	31-35	12	21.43
	>35	17	30.36
Residence	Basra City Centre	20	35.71
	Peripheries	34	60.71
	Another governorate	2	3.57
Level of Education	Illiterate	4	7.14
	Just read and write	4	7.14
	Primary education	28	50.0
	Intermediate education	14	25.0
	Secondary education	3	5.36
	University and higher	3	5.36
Occupation	Housewives	53	94.64
	Employees	2	3.57
	Students	1	1.79

Among 56 individuals, nearly half (48.21%) had 1–4 previous pregnancies, while 28.57% were primigravida. Antenatal care was poor, with 62.5% receiving no visits. Delivery modes were split, with 33.93% undergoing caesarean section and 28.57% delivering vaginally, while 26.79% had not delivered yet which counts 15. Most deliveries occurred in Basrah City Centre hospitals (57.14%) (Table 2).

Table 2. Pregnancy-Related factors

Feature Related to Pregnancy		No. (56)	≈100%
Parity	Primigravida	16	28.57
	1-4	27	48.21
	≥5	13	23.21
ANC	More than 2 visits	14	25.0
	One visit	7	12.0
	No ANC	35	62.5
Mode and State of Delivery	Vaginal Delivery	16	28.57
	Caesarean Section	19	33.93
	Not Delivered	15	26.79
	Miscarriage	6	10.7
Place of Delivery	Basra City Centre hospitals	32	57.14
	Peripheral hospitals in Basra City	9	16.07

Maternal deaths predominantly occurred during the puerperium (53.57%) and antenatal period (41.07%), particularly in the second trimester (25.0%). Hospital-based deaths were predominant in Basrah City Centre (57.14%), while Peripheral hospitals reached 42.85% (Table 3).

Table 3. Timing and location of maternal death

Time and Place of Death			No. (N=56)	≈ 100%
Time of Death in Relation to Pregnancy	During Pregnancy No. (N=23) 41.07%	1st trimester (1st 12 week)	2	3.57
		2nd trimester (13-28week)	14	25.0
		3rd trimester (29-40 week)	7	12.5
	During delivery		3	5.36
	Puerperium		30	53.57
Place of Death	At hospital No. (N=56)	Basra City Centre hospitals	32	57.14
		Peripheral hospitals	24	42.85

Direct obstetric causes accounted for the majority of maternal deaths (64.29%), with obstetric hemorrhage and hypertensive disorders being the most prevalent. Among indirect causes (35.71%), hematological diseases, particularly sickle cell anemia, were notably significant (8.93%). The presence of rare causes like amniotic fluid embolism and hyperemesis gravidarum, though minimal. Globally, indirect causes are responsible for 27% of maternal deaths (Table 4, Fig. 1).

Table 4. Causes of maternal death

Causes of Maternal Death			No. (56)	≈ 100%
Direct obstetric death (No. =36)	Obstetric Hemorrhage No. (N= 12) 21.43%	Postpartum hemorrhage	9	16.07
		Rupture uterus	3	5.36
	Pulmonary embolism		8	14.29
	Hypertensive disorder of pregnancy		9	16.07
	Early pregnancy death No. (N= 4) 7.14%	Abortion	2	3.57
		Rupture ectopic	1	1.79
		Hyperemesis gravidarum	1	1.79
	Sepsis		2	3.57
	Amniotic fluid embolism		1	1.79
Indirect obstetric death (No. =20)	Central nervous system disorder No. (N= 5) 8.93%	Stroke	3	5.36
		Epilepsy	2	3.57
	Cardiovascular disease No. (N= 4) 7.14%	Heart failure	3	5.36
		Mitral stenosis	1	1.79
	Hematological disease No. (N=7) 12.50%	Sickle cell anemia	5	8.93
		Thrombotic thrombocytopenic purpura	2	3.57
	Hemorrhage fever		1	1.79
	Respiratory		3	5.35

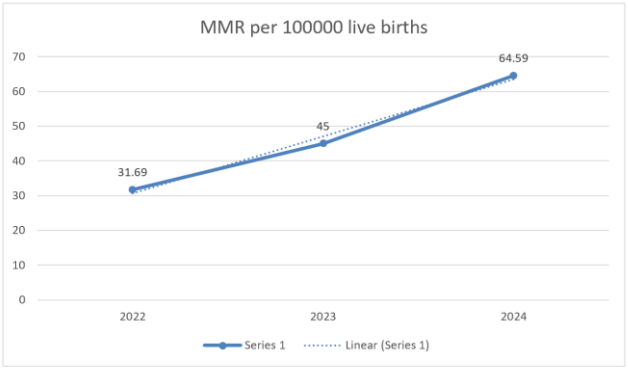

Figure 1. Comparative Maternal Mortality Ratio in Basrah over the years

DISCUSSION

In Basrah, the maternal mortality ratio (MMR) was 64.59, representing a concerning rise compared with 2022 (31.69) and 2023 (45.0), as demonstrated in our findings and consistent with reports from the Iraqi Ministry of Health. This upward trend may reflect not only a deterioration in healthcare quality but also improvements in death reporting systems following the establishment of maternal mortality review committees after 2012. The MMR in Basrah remains markedly higher than that reported in Baghdad (29.1 in 2023) and Erbil (8.4 in 2023) (27,28).

Regarding maternal age, the highest proportion of deaths (30.36%) occurred among women older than 35 years. In contrast, a study from Thi Qar in 2016 reported the highest maternal mortality in the 31–35-year age group (29). Advanced maternal age is a recognised risk factor due to increased comorbidities and reduced physiological reserve. Although overall maternal mortality is lower in developed countries, the proportion of pregnancies among older women is increasing and has been associated with rising maternal deaths in some settings. Older women are more likely to have conditions such as hypertension, diabetes, and cardiac disease, which may complicate pregnancy and result in adverse outcomes including preeclampsia, gestational diabetes, and haemorrhage (30). They are also more likely to require caesarean delivery, which carries additional risks such as infection and haemorrhage. Advanced maternal age is further associated with increased risks of stillbirth and preterm birth, both of which may contribute to maternal mortality (31).

In this study, 60.7% of maternal deaths occurred among women residing in rural areas, echoing previous findings suggesting limited access to specialised services and emergency obstetric care outside Basrah city. Rural populations often face challenges related to delayed access to healthcare facilities and skilled care, while urban settings may experience different disparities in healthcare quality (29,32).

Education plays a crucial role in maternal health by enabling women to understand health information, communicate effectively with healthcare providers, and access appropriate services. Lower levels of maternal education are a significant risk factor for maternal mortality. Educated women are more likely to seek antenatal care, deliver in healthcare facilities with skilled birth attendants, and recognise warning signs during pregnancy and the postpartum period, thereby reducing the risk of fatal complications (33).

In this study, most women who died were housewives (94.64%) and had a primary level of education or less (64.28%), reinforcing the association between low educational attainment, poverty, and adverse maternal outcomes, as previously reported by Karlsen et al. (2011) (34). Certain occupations, particularly those involving high physical demands, may also be associated with adverse pregnancy outcomes such as preterm birth, hypertension, and preeclampsia, all of which can contribute to maternal mortality. Some studies suggest that the type of work women undertake may influence their health during and after pregnancy, highlighting the need for further research into occupational risk factors (35).

The distribution of delivery types in this study was relatively balanced between caesarean section (33.93%) and vaginal delivery (28.57%), differing from earlier studies in Basrah where vaginal delivery predominated (36). Mode of delivery is an important determinant of maternal mortality, with evidence indicating that caesarean delivery—particularly repeated procedures—is associated with a higher risk of maternal death compared with vaginal delivery. Caesarean sections may be complicated by infection, haemorrhage, and adverse anaesthetic events, all of which contribute to maternal mortality (37). Reducing unnecessary caesarean sections may therefore help lower the overall MMR (38).

Place of delivery also significantly influences maternal outcomes. In this study, 57.14% of deliveries occurred in hospitals within Basrah city, while 26.79% of women had not delivered at the time of death. Facility-based deliveries are generally associated with lower mortality risks due to access to skilled healthcare providers and emergency obstetric services (38). Such facilities offer timely interventions, including operative delivery and management of complications such as postpartum haemorrhage and infection, which are critical in preventing maternal deaths (39).

Most deliveries occurred in Basrah city hospitals (57.14%), compared with only 16.07% in rural hospitals. This pattern is consistent with previous trends in which women sought care in central hospitals perceived to provide higher-quality services (29). The absence of home deliveries in this study and the higher rate of institutional births reflect improved awareness and access to healthcare facilities, a positive trend also noted in studies conducted between 2014 and 2018 (36). Nevertheless, the continued occurrence of maternal deaths within hospitals suggests systemic challenges, including staff shortages, delays in intervention, limited intensive care unit availability in peripheral facilities, and late presentations to healthcare services (40).

With respect to timing, 53.57% of maternal deaths occurred during the puerperium, consistent with findings from other studies (41,42), underscoring the need for improved postnatal monitoring and care. The causes of death identified in this study align with previous Iraqi and regional data, with haemorrhage remaining the leading cause of maternal mortality (36,41,43). Pulmonary embolism also reflected patterns observed in developed countries such as the United Kingdom and the United States (44). Indirect causes accounted for 35.7% of deaths and included cardiovascular and central nervous system disorders, haematological conditions such as sickle cell anaemia, and infections, mirroring global trends (45). A 10-year retrospective audit from India similarly reported that 27.5% of maternal deaths were due to indirect causes (46). In the United Kingdom, indirect maternal deaths have increased over the past decade, with the most recent confidential enquiry reporting that indirect causes account for 58% of maternal deaths, particularly those related to cardiac and neurological conditions (47).

Over recent decades, the World Health Organization has implemented global strategies aimed at ensuring that all women receive high-quality care during pregnancy, childbirth, and the postpartum period to eliminate preventable maternal deaths. The Sustainable Development Goal target is to reduce the global MMR to fewer than 70 per 100,000 live births by 2030. Despite global progress, Iraq's MMR remains high compared with neighbouring countries. Although Iraq's MMR declined from 127 per 100,000 live births in 2005 to 79 per 100,000 in 2017, it remains substantially higher than rates reported in Kuwait (12 per 100,000), Saudi Arabia (17 per 100,000), Turkey (17 per 100,000), Bahrain (14 per 100,000), and Iran (16 per 100,000) (48).

CONCLUSION AND RECOMMENDATIONS

The study demonstrated a significant increase in maternal mortality in Basrah, with a substantial proportion of deaths identified as preventable. Most maternal deaths were attributable to direct obstetric causes, particularly haemorrhage and hypertensive disorders, and were predominantly observed among women with limited antenatal care, low educational attainment, and those residing in rural areas. Despite an increase in hospital-based deliveries, deficiencies in the quality of emergency obstetric care and delays in referral remain major contributing factors. Reducing maternal mortality will require comprehensive improvements in healthcare systems, enhanced access to antenatal services, and targeted interventions for high-risk populations. In addition, implementing programmes aimed at improving maternal education, particularly for women with limited schooling, is essential.

Based on these findings, hysteroscopy with targeted biopsy should be recommended as a routine diagnostic approach in asymptomatic postmenopausal women with thickened endometrium, especially in those with risk factors such as obesity and associated medical comorbidities, to ensure accurate diagnosis, timely intervention, and improved clinical outcomes.

Conflicts of Interests: None

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Ethical Approvals: Ethical approval for the study was obtained from the relevant institutional review board, and informed consent was acquired from all participants prior to their inclusion in the study.

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