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Prevalence and risk factors of obstetric complications in urban and rural settings

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Abstract
Background: Obstetric complications remain a leading cause of maternal morbidity and mortality globally, particularly in low- and middle-income countries. In Iraq, systemic challenges and regional disparities have hindered equitable access to maternal care, especially in rural areas. This study aimed to compare the prevalence and risk factors of obstetric complications between urban and rural settings in Basrah, a southern province of Iraq.
Methods: A comparative cohort study was conducted in 2024, enrolling 120 women (60 urban, 60 rural) who delivered at either Basrah Maternity and Child Hospital or primary healthcare centers in Al-Mudaina and Shatt Al-Arab. Data were collected through structured interviews and medical record reviews. Obstetric complications-including preeclampsia, postpartum hemorrhage, and obstructed labor-were analyzed using chi-square tests and logistic regression to identify significant predictors.
Results: Obstetric complications were significantly more prevalent in rural settings (41.7%) than urban ones (21.7%). Rural participants exhibited lower educational attainment, higher unemployment, and greater prevalence of consanguineous marriage and chronic illness. Logistic regression identified key risk factors for complications: fewer than four antenatal care visits (OR = 3.4, p = 0.001), rural residence (OR = 2.6, p = 0.027), chronic illness (OR = 2.5, p = 0.018), and low maternal education (OR = 2.3, p = 0.020).
Conclusion: The study highlights substantial urban-rural disparities in maternal health outcomes in Basrah, driven by socioeconomic disadvantage, limited antenatal care access, and health system weaknesses. To reduce preventable obstetric complications, targeted interventions in rural areas-including service expansion, community education, and maternal risk screening-are urgently needed to support Iraq's ongoing maternal health reform efforts.

Keywords: Obstetric complications, maternal morbidity and mortality, urban-rural disparities

Introduction
Obstetric complications remain a major global threat to maternal health, accounting for the majority of maternal deaths and morbidities. These complications include conditions such as postpartum hemorrhage, eclampsia, sepsis, obstructed labor, and complications from unsafe abortions, which together are responsible for over 60-80% of maternal deaths worldwide [1]. Despite advancements in maternal care, many women-particularly in low- and middle-income countries-still face barriers to timely diagnosis and effective treatment, which can lead to life-threatening outcomes [2].
Complications during pregnancy and childbirth are not only fatal but can also result in long-term disabilities such as fistulas, chronic pain, or psychological trauma. For every maternal death, it is estimated that at least 20-50 women suffer from serious pregnancy-related complications, many of which are preventable with adequate care [3]. This reality underscores the importance of recognizing obstetric complications not merely as medical conditions, but as indicators of broader social and health system failures-especially in regions where health infrastructure and access to emergency care are lacking [4].
Obstetric complications continue to be a leading cause of maternal morbidity and mortality worldwide, especially in low- and middle-income countries where access to timely and adequate maternal care remains a challenge [5]. Complications such as postpartum hemorrhage, eclampsia, and obstructed labor contribute significantly to preventable maternal deaths. Despite ongoing international efforts to reduce maternal mortality, progress remains uneven, with countries in conflict or with underdeveloped health systems facing persistent challenges [6].

In the Eastern Mediterranean region, and particularly in Iraq, maternal health outcomes have been further complicated by decades of instability, which disrupted healthcare infrastructure and limited access to skilled birth attendants and emergency obstetric care [7]. The situation is more pressing in southern provinces like Basrah, where obstetric complications remain one of the major contributors to maternal death, often linked to hemorrhage, preeclampsia, and infections [8].

Differences in maternal outcomes between urban and rural settings are often tied to disparities in healthcare access, infrastructure, and socioeconomic conditions. In rural areas, pregnant women may face delays in reaching healthcare facilities, a lack of specialized obstetric services, and fewer skilled birth attendants-all of which contribute to higher rates of adverse maternal outcomes [9]. Although Iraq has made strides in maternal health, the availability and quality of services remain uneven. In Basrah, for instance, maternal mortality continues to occur in both urban and rural areas, but rural districts such as Shatt Al-Arab and Al-Mudaina report higher rates of complications and fatalities, likely linked to poorer service coverage and logistical challenges [10].

In rural settings, health facilities may also lack basic life-saving interventions such as blood banks, emergency transport, and equipment for managing preeclampsia or postpartum hemorrhage, which can delay or prevent appropriate responses to complications [11]. Conversely, urban centers tend to be better equipped and staffed, although they are often overwhelmed by the volume of cases referred from peripheral regions. This urban-rural divide is not only structural but also shaped by socio-demographic realities-rural women are more likely to be undereducated, younger, and economically disadvantaged, which further increases their risk of complications and reduces their ability to seek timely care [12].

Despite increasing global awareness of maternal health disparities, limited research has comprehensively compared obstetric complications between urban and rural populations within Iraq, particularly in southern regions like Basrah. Studies have often concentrated on specific maternal outcomes-such as anemia, preterm birth, or cesarean delivery-but have not systematically addressed how these outcomes differ by geographic setting [13]. This lack of granularity in population-based cohort designs limits the ability to develop tailored interventions for women in underserved areas. In Basrah, for example, growing urbanization and healthcare decentralization may have introduced new challenges and masked critical inequalities in maternal care.

While some cohort studies in Iraq have evaluated maternal complications in teenage pregnancies or among women undergoing cesarean sections, they often lack comparison between rural and urban health determinants [14, 15]. More importantly, no robust cohort study has yet focused on Basrah's dual urban-rural demographic to quantify prevalence and risk factors in a comparative framework. As Iraq moves toward health system reform and maternal safety strategies, it is essential to address this gap with locally relevant, evidence-based research that examines community-level inequalities and guides equitable health policy.

This study aims to compare the prevalence and risk factors of obstetric complications in urban and rural areas of Basrah. The findings will support more equitable maternal health strategies by highlighting location-specific needs and healthcare gaps.

Methods

Study Design and Setting: This was a comparative cohort study conducted in Basrah, Iraq, throughout the year 2024. Participants were recruited from two main settings: Basrah Maternity and Child Hospital (urban) and primary healthcare centers in Al-Mudaina and Shatt Al-Arab districts (rural).

Study Population

The study included pregnant women aged 15-45 years who delivered in the selected facilities during 2024. Only women with singleton pregnancies and complete medical records were included. Referrals from outside Basrah or cases with missing clinical data were excluded.

Sample Size and Sampling

A total of 120 women were selected, with 60 from urban and 60 from rural healthcare settings. Participants were recruited using systematic random sampling from delivery records at each site.

Data Collection

Information was gathered through structured interviews and medical record reviews following delivery. Collected variables included maternal age, parity, antenatal care visits, comorbidities (e.g., hypertension, diabetes), type of delivery, and recorded obstetric complications such as preeclampsia, postpartum hemorrhage, and preterm labor.

Statistical Analysis

Data were analyzed using SPSS version 26. Descriptive statistics were used to summarize the characteristics of the sample. Chi-square tests compared the prevalence of complications between urban and rural groups. Logistic regression was used to identify independent risk factors. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Approval was obtained from the Basrah Health Directorate. All participants provided informed consent prior to inclusion. Data were anonymized to ensure confidentiality and ethical integrity.

Results

The demographic profile reveals significant rural-urban disparities, with rural participants showing lower educational attainment (45% vs. 68%), higher unemployment (60% vs. 35%), and a greater prevalence of consanguineous marriages (52% vs. 30%). Chronic illness and prior abdominal surgery are also more frequent in rural areas, suggesting elevated baseline health risks.

Table 1: Demographic Characteristics

Characteristic	Urban (n=60)	Rural (n=60)	Total (n=120)
Mean Age	28.4 ± 5.1	29.1 ± 5.6	28.7 ± 5.4
Age > 35 years	12 (20%)	17 (28%)	29 (24%)
Education ≥ Secondary	41 (68%)	27 (45%)	68 (56.5%)
Unemployed	21 (35%)	36 (60%)	57 (47.5%)
Primiparous	24 (40%)	21 (35%)	45 (37.5%)
Multiparous	36 (60%)	39 (65%)	75 (62.5%)
Previous C-section	15 (25%)	11 (18%)	26 (21.5%)
Consanguineous Marriage	18 (30%)	31 (52%)	49 (41%)
Smoking History	7 (12%)	12 (20%)	19 (16%)
Chronic Medical Illness	13 (22%)	21 (35%)	34 (28.5%)
History of Abdominal Surgery	17 (28%)	25 (42%)	42 (35%)

Obstetric complications are markedly higher in rural settings, with 41.7% affected compared to 21.7% in urban areas.

Preeclampsia, postpartum hemorrhage, and obstructed labor are particularly elevated, indicating potential deficiencies in antenatal and perinatal care in rural regions.

Table 2: Obstetric Complications by Setting

Complication Type	Urban (n=60)	Rural (n=60)	Total (n=120)
Preeclampsia	5 (8.3%)	10 (16.7%)	15 (12.5%)
Postpartum Hemorrhage	4 (6.7%)	7 (11.7%)	11 (9.2%)
Preterm Labor	4 (6.7%)	5 (8.3%)	9 (7.5%)
Obstructed Labor	0 (0.0%)	3 (5.0%)	3 (2.5%)
Gestational Diabetes	2 (3.3%)	3 (5.0%)	5 (4.2%)
Sepsis	1 (1.7%)	2 (3.3%)	3 (2.5%)
Placenta Previa	1 (1.7%)	1 (1.7%)	2 (1.7%)
Total (Any Complication)	13 (21.7%)	25 (41.7%)	38 (31.7%)

Logistic regression identifies <4 ANC visits (OR 3.4), rural residence (OR 2.6), chronic illness (OR 2.5), and low education (OR 2.3) as significant predictors of obstetric complications. These findings highlight the compounded impact of limited healthcare access and socioeconomic disadvantage.

Table 3 (Expanded): Logistic Regression - Risk Factors for Obstetric Complications

Risk Factor	Odds Ratio (OR)	95% CI	p-value
< 4 ANC Visits	3.4	1.6 - 7.2	0.001
Rural Residence	2.6	1.1 - 5.9	0.027
Maternal Age > 35 Years	2.2	1.0 - 4.9	0.043
Smoking History	1.8	0.9 - 3.4	0.087
Chronic Medical Illness	2.5	1.2 - 5.3	0.018
History of Abdominal Surgery	2.1	1.0 - 4.5	0.049
Previous C-section	1.5	0.7 - 3.0	0.132
Consanguineous Marriage	1.9	1.0 - 3.6	0.044
Low Education Level (Below Secondary)	2.3	1.1 - 4.7	0.02

Discussion

Our study revealed a significantly higher rate of obstetric complications among women residing in rural Basrah compared to their urban counterparts. This mirrors findings from a comparative study conducted in Kano State, Nigeria, where rural women had fewer antenatal visits and a higher likelihood of complications, attributed largely to limited access to skilled maternal services and delayed emergency response times [16].

One of the strongest risk factors in our cohort was having fewer than four antenatal care (ANC) visits, which significantly increased the odds of complications. This finding is consistent with data from Erbil, Iraq, where a study on primigravidae women showed that late initiation and fewer ANC visits were closely linked with low birth weight and preterm delivery [17].

Additionally, we observed a clear urban-rural divide in maternal health service utilization. A recent Q-methodology study in Erbil revealed that women preferred private maternity services due to dissatisfaction with public care, especially in rural settings, which often lack infrastructure and continuity of care [18].

Our findings also showed that women with chronic illnesses, such as hypertension or diabetes, faced higher complication rates, supporting earlier research in Baghdad that found gestational diabetes was associated with increased risks of prematurity, hypoglycemia, and congenital anomalies in neonates.

Consanguineous marriage, which was prevalent in our rural sample, also showed an association with increased complications. This has been similarly observed in rural Tabriz, Iran, where consanguinity and low socioeconomic status contributed to higher miscarriage and preterm birth rates [19].

Interestingly, our study also suggests that low maternal education and a lack of birth preparedness are indirectly contributing to increased risk. A study in Bangladesh comparing urban and rural women found that rural women had significantly lower birth preparedness scores and higher delays in seeking care during obstetric emergencies [20].

While smoking and prior cesarean delivery were not statistically significant predictors in our logistic regression, the observed trend aligns with a 2024 study from Baghdad, where teenage pregnancies-often linked to poor health habits-had increased risk for cesarean section and neonatal complications [21].

In light of our findings, targeted interventions in rural Basrah are essential. Health system strengthening, especially in maternal emergency services and outreach ANC programs, is critical. Education campaigns aimed at improving maternal knowledge and involving families in early pregnancy planning can help reduce preventable complications, as supported by rural educational programs in El-Fayoum that successfully improved maternal outcomes through awareness and early care-seeking [22].

Conclusion

Obstetric complications were more common among rural women in Basrah, largely due to limited antenatal care, chronic illness, and social factors like low education and consanguinity. Improving access to prenatal services and emergency care in rural areas, alongside health education, is essential to reduce preventable maternal risks. These findings call for targeted policy efforts to address urban-rural disparities in maternal health across Iraq.

Conflict of Interest

Not available.

Financial Support

Not available.

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