# Morbidity and Mortality of Premature Birth at Ramadi Teaching Hospital for Maternity and Children/West of Iraq

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**Abstract-** The consequences of prematurity is a very fundamental subject. With improvement of neonatal care facilities, it still comprises a burden on health care centers, with a lot of costs and increasing mortality. To determine the morbidity and mortality of premature birth at Ramadi teaching hospital for maternity and children. A prospective cohort study was done at Ramadi teaching hospital for maternity and children/Anbar/Iraq. Data was collected from 1st July 2022 till 1st January 2023, all live births at Ramadi Teaching Hospital during that period were included. All admitted premature newborns were followed up in neonatal care unit for variable periods depending on clinical situation and those who develop complications were recorded (Respiratory distress syndrome, Intracranial hemorrhage, asphyxia, sepsis, hypoglycemia, pneumothorax) furthermore any newborn died during hospitalization period also recruited. The total number of neonates was 204. All of them were preterm babies. About 121 (59.3%) need resuscitation while 83 (40.7%) not need resuscitation. Regarding complications respiratory distress syndrome 156(76.5%), intracranial hemorrhage 9(4.4%), asphyxia 17(8.3%), sepsis 35(17.2%), hypoglycemia 22 (10.8%), pneumothorax 31(15.2%). 148 premature babies discharged well (72.5%) while 56 premature newborns died (27.5%). Result of analysis of logistic regression to determine the relationship between different risk factors and mortality shows significant association with birth weight <1500-gram Odd's ratio (30.041), and triplet pregnancy Odd's ratio (3.62). Respiratory distress syndrome is the most prevalent complication of preterm babies followed by sepsis. Extremely low birth weight and triplet pregnancy have significant association with preterm mortality



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## Introduction

Preterm babies are those who are born alive before the full 37 weeks of pregnancy. Preterm birth can be categorized into three subcategories depending on gestational age: very preterm (less than 28 weeks), moderate to late preterm (32 to 37 weeks), and extremely preterm (less than 28 weeks) (1,2).

About 15 million babies are delivered before their due date every year, making up over 10% of all babies born worldwide (3) For children under five, preterm delivery ranks as the second most common cause of death (4).

However, for every week that a baby is born prematurely, the chance of death and other poor consequences connected to preterm grows considerably (5). It is estimated that preterm birth complications caused almost one million fatalities in 2015, making them the greatest cause of mortality for children under the age of five (6). It is the primary reason of mortality in infant and children, making it a serious public health concern (7) Several developing nations still lose preterm babies because they cannot receive proper neonatal care, despite improvements in the survival rates of premature children in wealthier nations (8).

Deficits in vision and hearing are substantially

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associated with premature birth. In addition The community also bears significant financial and social costs as a result of the prolonged hospital stays in the intensive care unit and the requirement for specialized therapy, it results in more expenses for the healthcare system once the baby is discharged from the neonatal intensive care unit (9,10).

It is known that infants delivered at gestational age between 34 and 36 weeks can still experience negative long-term neurodevelopmental outcomes. Difference in ranges of gestational age of preterm newborns thought to have a decreased risk of neurodevelopmental abnormalities, in comparism with infants born extremely prematurely are labeled with a variety of terminology (e.g., near-term and slightly preterm birth). Compared to their full-term counterparts, neonates born moderately and late preterm (MLPT) have an increasing risk of complication and death because they are born during a critical time for development of the brain (1,2,11,12).

Finding out the consequences and death rate from premature delivery at the Ramadi Teaching Hospital for Mothers and Children is the aim of this study.

The aim of this study is to investigate the prevalence of thyroid dysfunction and the presence of anti-thyroid antibodies in diabetic patients attending healthcare facilities in Zabol City, Iran. By conducting a cross-sectional analysis of 300 diabetic individuals, the research seeks to identify the relationship between thyroid disorders and various clinical parameters, including glycemic control and the presence of diabetic complications. Additionally, the study aims to highlight the significance of routine thyroid screening in this population, particularly given the high prevalence of thyroid dysfunction observed in diabetic patients. Ultimately, the findings will contribute to a better understanding of the interplay between diabetes and thyroid health, informing clinical practices to enhance patient outcomes. This research aspires to raise awareness among healthcare providers regarding the importance of monitoring thyroid function in diabetic patients, especially in underserved regions. There is increasing prevalence of premature birth in Ramadi city. Little information is known about those who born prematurely in Ramadi teaching hospital for maternity and children with no available researches. So, we want to highlight this subject in the hope of reducing complications and improving outcomes of preterm delivery via improving neonatal care unit facilities, nursing care and close monitoring of anticipated complications.

## Materials and Methods

A prospective cohort study was done at Ramadi teaching hospital for maternity and children/Anbar/Iraq. This hospital is a tertiary care center for maternity and children located in Ramadi city and provide good facilities for supporting newborns with special consideration for those who born prematurely. The study includes inborn and out born neonatal care unit of Ramadi hospital. Estimation of gestational age was done by either using last normal menstrual period (LNMP)or by ultrasound done early in first trimester.

### Inclusion criteria

All live births 20 weeks of gestation or more admitted to neonatal care unit in Ramadi were included. Preterm deliveries defined as babies born alive before 37 weeks of pregnancy are completed.

### Exclusion criteria

Still births, congenital anomalies, unknown length of gestation, Infants who did not survive to neonatal unit admission and families who refuse to participate all were excluded.

Data was collected from 1st July 2022 till 1st January 2023(6 months), all live births at Ramadi Teaching Hospital during that period were included. Data collected include newborn information (gender, gestational age, birth weight, need for resuscitation). Maternal information including (age, parity & abortions, history of prematurity, mode of delivery, antenatal visits, pregnancy complications, pregnancy outcome).

All admitted premature newborns were followed up in neonatal care unit for variable periods depending on clinical situation and those who develop complications were recorded (Respiratory distress syndrome, Intracranial hemorrhage, asphyxia, sepsis, hypoglycemia, pneumothorax) furthermore any newborn died during hospitalization period also recruited.

### Statistical analysis

Data was analyzed by using the Statistical Package for Social Sciences (SPSS) version 26. The ranges, standard deviation, and mean of the data were displayed. frequency and percentage displays for categorical data. When the predicted frequency was less than five, the Fisher Exact Test was utilized instead of the Chi Square Test to evaluate the relationship between mortality and specific data.

Death was used as the dependent variable in a logistic regression analysis, and the factors that showed

significance in a binary analysis were added to the model as independent variables. *P* less than 0.05 were regarded as significant at this level.

## Results

The total number of neonates was 204. All of them were preterm babies. The table presents demographic and clinical data from a sample of 204 participants. It categorizes the participants by gender, showing that 55.4% are male and 44.6% are female. In terms of birthweight, the majority (51.0%) fall within the 1500-2499 grams range, while 23.0% weigh less than 1500 grams. The gestational age (GA) at delivery indicates that a significant portion (84.6%) were delivered before 32 weeks. Overall, the data highlights important trends in gender distribution, birthweight, and gestational age among the participants (Table 1).

**Table 1. Distribution of study patients by general and clinical characteristics of baby**

| Variable | No. (n=204) | Percentage (%) |
|---|---|---|
| **Gender** | | |
| **Male** | 113 | 55.4 |
| **Female** | 91 | 44.6 |
| **Birthweight (gm)** | | |
| **<1500** | 47 | 23.0 |
| **1500-2499** | 104 | 51.0 |
| **2500-4000** | 53 | 26.0 |
| **GA at delivery** | | |
| **<32** | 48 | 84.6 |
| **32–34$^{+6}$** | 69 | 33.8 |
| **35–36$^{+6}$** | 87 | 42.6 |

The table provides a comprehensive overview of various demographic and clinical factors affecting a cohort of 204 mothers. In terms of age, the largest group (44.1%) falls within the 25 to 34-year range, while younger mothers under 25 years constitute 38.7%. The majority of participants are housewives (91.2%), indicating a traditional family structure. Regarding parity, more than half (56.4%) have had between two to four pregnancies, with 22.1% being primigravida. A notable 31.4% of mothers reported having previous abortions, and 19.6% have a history of prematurity. The mode of delivery shows a preference for cesarean sections (61.3%) over vaginal deliveries (38.7%). Most mothers (60.3%) attended six or more healthcare visits during their pregnancy, reflecting proactive health management. The pregnancy outcomes predominantly resulted in single births (69.6%), while complications such as urinary tract infections (36.3%) were common. Lastly, a significant majority (86.3%) of mothers reported using tonics during their pregnancy, underscoring the importance of nutritional support in maternal health (Table 2).

The table presents key outcomes and complications experienced by the 204 infants in the study. It shows that a significant majority (59.3%) required resuscitation at birth. The most common complication was Respiratory Distress Syndrome (RDS), affecting 76.5% of the infants. Other notable complications included sepsis (17.2%), pneumothorax (15.2%), and hypoglycemia (10.8%). Tragically, 27.5% of the infants did not survive, while the remaining 72.5% were discharged in good health. These statistics highlight the challenges and risks associated with preterm births and the importance of advanced neonatal care to improve outcomes (Table 3).

The table analyzes the mortality outcomes of 204 infants, highlighting the relationship between various factors and survival rates. Among the 56 infants who died, a higher percentage were female (34.1%) compared to males (22.1%), with a p-value of 0.057 indicating a trend towards significance. Birthweight was a critical determinant of survival, as 87.2% of infants weighing less than 1500 grams did not survive, with a highly significant *P* of 0.001. Gestational age also played a significant role, with 68.8% of infants born before 32 weeks not surviving (*P*=0.001). Other factors, such as maternal age and occupation, showed no significant association with mortality, while complications during pregnancy and the use of tonics also did not significantly affect outcomes. Overall, the data underscores the importance of birthweight and gestational age in predicting infant mortality (Table 4).

The table presents the results of a logistic regression analysis, identifying two significant risk factors for

infant mortality. Infants with a birthweight less than 1500 grams had 30.041 times higher odds of mortality compared to those with higher birthweights, with a 95% confidence interval ranging from 9.965 to 90.568 and a highly significant *P* of 0.001. Additionally, infants born as triplets had 3.62 times higher odds of mortality than those born as singletons, with a 95% confidence interval of 1.26 to 8.15 and a significant *P* of 0.041. These findings underscore the critical importance of birthweight and multiple gestations in predicting infant mortality risk (Table 5).

**Table 2. Distribution of study patients by information of their mothers**

| Variable | | No. (n= 204) | Percentage (%) |
|---|---|---|---|
| **Mothers' age (Year)** | **< 25** | 79 | 38.7 |
| | **25 - 34** | 90 | 44.1 |
| | **≥ 35** | 35 | 17.2 |
| **Mother occupation** | **Housewife** | 186 | 91.2 |
| | **Employee** | 13 | 6.4 |
| | **Student** | 5 | 2.4 |
| **Parity** | **Prim gravida** | 45 | 22.1 |
| | **2 - 4** | 115 | 56.4 |
| | **> 4** | 44 | 21.6 |
| **Previous abortions** | **Yes** | 64 | 31.4 |
| | **No** | 140 | 68.6 |
| **History of prematurity** | **Yes** | 40 | 19.6 |
| | **No** | 164 | 80.4 |
| **Mode of delivery** | **VD** | 79 | 38.7 |
| | **C/S** | 125 | 61.3 |
| **Number of healthcare visits** | **No** | 5 | 2.5 |
| | **< 6** | 76 | 37.3 |
| | **≥ 6** | 123 | 60.3 |
| **Pregnancy outcome** | **Single** | 142 | 69.6 |
| | **Twin** | 53 | 26.0 |
| | **Triple** | 9 | 4.4 |
| **Complication during pregnancy** | **No** | 37 | 18.1 |
| | **Urinary Tract Infection** | 74 | 36.3 |
| | **Premature Rupture of Membrane** | 42 | 20.6 |
| | **Hypertension** | 31 | 15.2 |
| | **Polyhydramnios** | 21 | 10.3 |
| | **Bleeding** | 17 | 8.3 |
| | **Oligohydramnios** | 17 | 8.3 |
| **Use tonics** | **Yes** | 176 | 86.3 |
| | **No** | 28 | 13.7 |

**Table 3. Distribution of study patients by outcome of prematurity**

| Outcome | | No. (n=204) | Percentage (%) |
|---|---|---|---|
| **Need resuscitation** | **Yes** | 121 | 59.3 |
| | **No** | 83 | 40.7 |
| **Complication** | **Respiratory Distress Syndrome** | 156 | 76.5 |
| | **Intracranial Hemorrhage** | 9 | 4.4 |
| | **Asphyxia** | 17 | 8.3 |
| | **Sepsis** | 35 | 17.2 |
| | **Hypoglycemia** | 22 | 10.8 |
| | **Pneumothorax** | 31 | 15.2 |
| **Mortality** | **Discharged well** | 148 | 72.5 |
| | **Died** | 56 | 27.5 |

**Table 4. Association between prematurity and certain characteristics of baby and mothers**

| Variable | Mortality | | Total (%) n=204 | *P* |
|---|---|---|---|---|
| | Died (%) n=56 | Alive (%) n=148 | | |
| **Gender of baby** | | | | |
| **Male** | 25 (22.1) | 88 (77.9) | 113 (55.4) | 0.057 |
| **Female** | 31 (34.1) | 60 (65.9) | 91 (44.6) | |
| **Birthweight (gm)** | | | | |
| **< 1500** | 41 (87.2) | 6 (12.8) | 47 (23.0) | |
| **1500 - 2499** | 15 (14.4) | 89 (85.6) | 104 (51.0) | 0.001 |
| **2500 - 4000** | 0 (0) | 53 (100.0) | 53 (26.0) | |
| **Gestational Age at delivery** | | | | |
| **< 32** | 33 (68.8) | 15 (31.3) | 48 (23.5) | |
| **32 – $34^{+6}$** | 18 (26.1) | 51 (73.9) | 69 (33.8) | 0.001 |
| **35 – $36^{+6}$** | 5 (5.7) | 82 (94.3) | 87 (42.6) | |
| **Mothers' age (Year)** | | | | |
| **< 25** | 23 (29.1) | 56 (70.9) | 79 (38.7) | |
| **25 - 34** | 25 (27.8) | 65 (72.2) | 90 (44.1) | 0.784 |
| **≥ 35** | 8 (22.9) | 27 (77.1) | 35 (17.2) | |
| **Mother occupation** | | | | |
| **Housewife** | 51 (27.4) | 135 (72.6) | 186 (91.2) | |
| **Employee** | 3 (23.1) | 10 (76.9) | 13 (6.4) | **0.77** |
| **Student** | 2 (40.0) | 3 (60.0) | 5 (2.5) | |
| **Parity** | | | | |
| **Prim gravida** | 13 (28.9) | 32 (71.1) | 45 (22.1) | |
| **2 - 4** | 35 (30.4) | 80 (69.6) | 115 (56.4) | 0.292 |
| **> 4** | 8 (18.2) | 36 (81.8) | 44 (21.6) | |
| **Previous abortions** | | | | |
| **Yes** | 15 (23.4) | 49 (76.6) | 64 (31.4) | 0.385 |
| **No** | 41 (29.3) | 99 (70.7) | 140 (68.6) | |
| **History of prematurity** | | | | |
| **Yes** | 5 (12.5) | 35 (87.5) | 40 (19.6) | 0.018 |
| **No** | 51 (31.1) | 113 (68.9) | 164 (80.4) | |
| **Mode of delivery** | | | | |
| **VD** | 27 (34.2) | 52 (65.8) | 79 (38.7) | 0.087 |
| **C/S** | 29 (23.2) | 96 (76.8) | 125 (61.3) | |
| **Number of healthcare visits** | | | | |
| **No** | 3 (60.0) | 2 (40.0) | 5 (2.5) | |
| **< 6** | 22 (28.9) | 54 (71.1) | 76 (37.3) | 0.216 |
| **≥ 6** | 31 (25.2) | 92 (74.8) | 123 (60.3) | |
| **Pregnancy outcome** | | | | |
| **Single** | 30 (21.1) | 112 (78.9) | 142 (69.6) | |
| **Twin** | 22 (41.5) | 31 (58.5) | 53 (26.0) | 0.009 |
| **Triple** | 4 (44.4) | 5 (55.6) | 9 (4.4) | |
| **Complication during pregnancy** | | | | |
| **Yes** | 45 (26.9) | 122 (73.1) | 167 (81.9) | 0.731 |
| **No** | 11 (29.7) | 26 (70.3) | 37 (18.1) | |
| **Using tonics** | | | | |
| **Yes** | 50 (28.4) | 126 (71.6) | 176 (86.3) | 0.442 |
| **No** | 6 (21.4) | 22 (78.6) | 28 (13.7) | |

**Table 5. Logistic regression analysis for different risk factors association with mortality**

| Variables | Odd's ratio | 95% C.I for odd's ratio | *P* |
|---|---|---|---|
| **Birthweight** | | | |
| **< 1500** | 30.041 | 9.965 – 90.568 | 0.001 |
| **Pregnancy outcome** | | | |
| **Triple** | 3.62 | 1.26 – 8.15 | 0.041 |

## Discussion

Detecting the morbidity and mortality of premature delivery is the main goal of this study. The finding in this study was total number of neonates was 204 all of them premature delivery. male baby (113. 55.4%), female (99. 44.6 %.) while, In Turkey (53.7% male and 46.3% female) (13), Asmara, Eritrea (59.9% boys and 40.1% girls) (14), Northern Ethiopia (60%) were males (15) and USA (51.0% male and 49.0% female) (16), while in Eastern Sudan ( 50.8%) were female (17).

Mortality rate in this study was (27.5 %) which is higher than in China (4%) (18), Huai'an China (6.8%) (19), Northern Ethiopia (16.7%) (20), Kenya (18.4%) (20), Turkey (20.9%) (13), USA (21.7%) (16) and Eastern Sudan 21.9% (17), And lower than in France 29 (27%) (21), Western Uganda (31.6%) (22), Busra, Iraq (34.7%) (23) and Amhara region of Ethiopia (37.8%) (24).

A high mortality rate for prematurely delivered babies persists despite advancements in healthcare facilities, improved prenatal and postnatal care management, and neonatal unit care. This rate is correlated with the baby's gestational age at birth, multiple pregnancies, early delivery, and baby weight, which is inversely correlated with the mortality rate. The availability of advanced medical equipment in neonatal care units also directly improves the rate of care provided to prematurely delivered babies. Several important variables that affect the death rate of neonates born preterm. The death rate is still a worry despite improvements in neonatal care and healthcare facilities. Age of Gestation: A baby's risk of complications and death increases with early birth. Most vulnerable are infants born very preterm (25,26).

Having twins, triplets, or more increases the risk of premature birth, which in turn raises the death risk. Birth Weight: A baby's weight at birth and their chance of dying are inversely correlated. Higher risks are linked to lower birth weights. Advanced Equipment Accessibility: can greatly increase survival rates. But this differs a lot between locations and establishments. Variation in Care: Differences in the standard of care given to premature babies can have an impact on the results. In order to increase survival rates, care techniques must be standardized (27-29).

The current study show the highest morbidity was Respiratory Distress Syndrome (76.5%) which the highest in compare with other studies, Kenya (63.3%) (20),Turky (50.4%) (13), Amhara region of Ethiopia (49.83%) (24), Western Uganda (43.0%) (22), Asmara, Eritrea (15.4%) (14) and Huai'an China (5.3%) (19).

The second most common morbidity in current study was Sepsis (17.2%) which is lower than all of the following studies Amhara region of Ethiopia (69.07%) (24), Asmara, Eritrea (35.5%) (14), Huai'an China (20.7%) (19) & Kenya (20%) (20). While higher than China (14%) (18). Pneumothorax was (15.2%) Which is mother than in Turkey (0.8%) (30). Hypoglycemia was (10.8%) which was more than Turkey (6,1%) (31), while less in other study Turkey (18%) (30).

Asphyxia in the current study was (8.3%) Which is lower than Huai'an China (20.2%) (19), Western Uganda (14.5%) (22) and Asmara, Eritrea (10%) (14).Intracranial Hemorrhage in the current study was (4.4%) Which is lower than Huai'an China (32.7%) (19), Turkey (8.4%) (14) and China (7%) (18).

Mortality in premature baby show high significant in four parameters of this study Birthweight, Gestational age at delivery, History of prematurity & Pregnancy outcome *P* was (0.001), (0.001), (0.018) & (0.009) Respectively. Logistic regression analysis of associated risk factors with mortality, current study shows significant association of low birth weight <1500 gm with mortality (odds ratio=30.041), (95% C.I for odd's ratio=9.965-90.568) this agree with study in Northwestern Ethiopia (32) It also consistent with a study in India (33), Bahir Dar, Ethiopia (34) and southern Ethiopia (35).

The possible explanation for this is that with lower birth weight all complications will increase like respiratory distress, sepsis, risk of infection, hypothermia, hypoglycemia and thus increasing death rate.

Current study shows significant association of multiple pregnancy with mortality (odds ratio=3.62), (95% C.I for odd's ratio=1.26-8.15) this agree with study in United States (36). On other hand Shah et al. shows no significant increase in mortality in multiple birth (37).

Preterm birth remains a significant burden on healthcare systems, with high rates of morbidity and mortality. This study found that premature infants frequently develop complications like respiratory distress syndrome, sepsis, and hypoglycemia. Extremely low birth weight (<1500 g) and triplet pregnancies were strongly associated with increased mortality risk. With over a quarter of preterm infants succumbing to complications, more research is needed to improve outcomes for this vulnerable population. Continued

efforts to prevent preterm birth and provide high-quality neonatal care are critical to reducing the burden of prematurity.

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