



Original Article



Clinical and Demographic Factors Associated with Preterm Labor in Twin Pregnancies at Mardan Medical Complex

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ABSTRACT

Twin pregnancies (TP) were often associated with preterm labor due to excessive dilation of the endometrium. Most twin pregnancies result in delivery before 37 weeks of gestation. In this study, which did not focus on cervical selection, the average pregnancy duration was 35.83 ± 8.7 weeks, with 50% of the babies delivered before 37 weeks. **Objective:** To figure out how frequently twin pregnancies that present at Mardan Medical Complex, Mardan, result in preterm labor. **Methods:** This descriptive case series was conducted over six months, from January 1st, 2022, to June 30th, 2022, in the Obstetrics and Gynaecology Department of Mardan Medical Complex. The study included 98 women pregnant with twins, and each was followed up until 36 weeks of pregnancy. Data analysis was performed using SPSS version 23.0. **Results:** There was a significant association between preterm labor and maternal weight. Women weighing 70 kg or less had a higher rate of preterm labor (55.7%) compared to those weighing more than 70 kg (35.1%) with a p-value of 0.048. Preterm labor occurred in 49.2% of women aged 18–30 years and 45.5% of those over 30 years ($p=0.724$). **Conclusions:** Maternal weight appears to be a key factor in the risk of preterm labor. Future studies should investigate the impact of weight on preterm labor and explore weight management interventions as part of antenatal care.

INTRODUCTION

During the past few years, the frequency of twin pregnancies has risen significantly due to the increasing incidence of older mothers and the widespread use of technologies for assisted reproduction [1, 2]. Twin gestations are becoming more common, which is a major medical and social issue that baffles doctors and patients alike. Preterm deliveries before 37 weeks were 8.13% for singles and 59.43% for twins, respectively [3]. This resulted in significant rates of perinatal illness and death in twins [4, 5]. Furthermore, compared to women carrying one child, women carrying twins are three times more likely to experience serious problems [6]. Since the majority of

patients are conscious of the risks involved in having twins, they choose to increase their chances of having singles [7]. Although just 2% of conceptions end in multiples, twin pregnancies account for 15% of extremely preterm births (≤ 32 weeks). As a result, preventative strategies for preterm delivery are crucial to the administration of healthcare systems everywhere [8]. Because of excessive uterine dilation, twin pregnancies are linked to preterm; typically, twins deliver before the 37th week of gestation. In those who were not chosen by the cervix, the average duration of a pregnancy with twins was 35.83 ± 8.7 weeks, and 50% of the babies were delivered before 37 weeks [9].



In addition to spontaneous preterm delivery, medical and obstetric conditions that cause preterm birth frequently compromise having multiple babies [10]. The risk of restricted intrauterine growth, fetal anomalies, hypertension, placental abruption, and fetal compromise increased with the total number of fetuses in a pregnancy [10]. According to an investigation by Gashi AM and colleagues, 47% of twin pregnancies resulted in preterm labor [11]. According to a study by Wagura P and colleagues, 6.8% of twin pregnancies resulted in preterm labor [12]. Like the majority of developing nations, Pakistan does not have adequate statistics on the prevalence of preterm delivery in twin pregnancies. International research findings vary, making it impossible to extrapolate findings to the broader community. For example, one study reported a 47% prevalence of preterm labor in twin pregnancies, while another found a 6.8% frequency [11, 12]. The precursor for this study arises from the realization of gaps in the knowledge of the cause of preterm labor, which is one of the leading causes of morbidity and mortality among neonates. Despite the studies, the significance of the demographic factors, including age, gestational age, parity, and weight, in preterm labor has not been established. Through analyzing these factors, this paper seeks to identify the extent of their contribution to the occurrence of preterm labor. Estimating influential variables like weight can help in the development of specific preventions and enhance patient care approaches. Consequently, this research aims to fill existing gaps in the available literature and inform the development of evidence-based interventions to prevent/pre-treat preterm labor and improve the well-being of mothers and newborns. Determining the prevalence of preterm labor in twin pregnancies was, thus, the goal of this research.

The study's findings will be useful in determining the true cost of this morbidity to the broader public.

METHODS

The outcomes of 98 women with multiple pregnancies were assessed in this comprehensive case series study, conducted at the Department of Obstetrics and Gynecology, Mardan Medical Complex, in Mardan from January 1st, to June 30th, 2022. The sample size of 98 was calculated by WHO sample calculator software using 95% confidence interval, 5% margin of error and anticipated frequency of preterm labor about 6.8% [13]. The sample size deemed sufficient to ensure the statistical power of the study and to capture significant associations between maternal characteristics and preterm labor. Participants were selected using non-probability sequential sampling based on the study's inclusion and exclusion criteria. Women between 18 to 40 years of age with a diagnosed twin pregnancy and a gestational age of less than 24 weeks based on their last menstrual period were included in the study. Eligible participants were recruited irrespective of

their parity status. The exclusion criteria includes women with a history of smoking, those with pre-existing hypertension or pregnancy-related hypertensive disorders, women with a history of previous pregnancy loss, and participants who were lost to follow-up during the study period were also excluded. Written informed consent was obtained from all participants, who were fully briefed on the study's objectives, potential risks, and benefits. The consent form detailed the voluntary nature of participation, the right to withdraw at any time without repercussions, and assurances of confidentiality and data protection. Ethical approval was obtained from the ethics committee (No. 165/BKMC). Baseline demographic data, including weight, parity, age, and gestational age, were recorded. Clinical features relevant to preterm labor, such as uterine contractions, cervical dilatation, and effacement, were systematically monitored and documented throughout the study. A specifically designed proforma was used for recording these clinical features and instances of preterm labor, adhering to a predefined operational definition. Participants were followed up until they reached 36 weeks of gestation. Data analysis was performed using IBM SPSS software version 23.0. Quantitative variables like age, gestational age, parity, and weight were summarized using means and standard deviations, while categorical variables, such as age groups and cases of preterm labor, were presented as frequencies and percentages. The chi-square test was employed to assess the statistical significance of the association between preterm labor and variables like age, gestational age, parity, and weight. A p-value of < 0.05 considered statistically significant.

RESULTS

In a study involving 98 patients, the age range was between 18 and 40 years, with a mean age of 29.510 ± 2.40 years. The mean gestational age among these patients was 19.153 ± 2.26 weeks, and the mean parity was 1.632 ± 1.35 . The average weight recorded was 68.581 ± 4.76 kg. Among the participants about 66.3% were within the 18-30 years' age group, while 33.7% were above 30 years. Preterm labor was observed in 48% of the patients, while 52% did not experience preterm labor (Table 1).

Table 1: Demographic Characteristics, Age Distribution, and Preterm Labor Frequency Among Patients (n=98)

Histopathological Findings		Mean \pm SD
Continuous	Age (Years)	29.510 \pm 2.40
	Gestational Age (Weeks)	19.153 \pm 2.26
	Parity	1.632 \pm 1.35
	Weight (Kg)	68.581 \pm 4.76
Categorical		N (%)
Age Groups (Years)	18-30	65 (66.3%)
	>30	33 (33.7%)
	Total	98 (100%)

Preterm Labor	Yes	47(48%)
	No	51(52%)
	Total	98(100%)

Stratification of preterm labor was further analyzed concerning various demographic factors. When examining the relationship between age and preterm labor, it was found that 49.2% of patients aged 18-30 years and 45.5% of patients above 30 years experienced preterm labor. However, the difference was not statistically significant ($p=0.724$). Regarding gestational age, preterm labor was slightly more common in patients with a gestational age of less than 20 weeks (47.5%) compared to those with a gestational age of 20 weeks or more (48.7%). This difference was also not statistically significant ($p=0.903$) (Table 2).

Table 2: Stratification of Preterm Labor Concerning Age and Gestational Age (n=98)

Variables	Preterm Labor Yes N (%)	Preterm Labor No N (%)	p-Value
Age (Years)			
18-30	32 (49.2%)	33 (50.8%)	0.724
>30	15 (45.5%)	18 (54.5%)	
Total (Age)	47 (48%)	51 (52%)	-
Gestational Age (Weeks)			
<20	28 (47.5%)	31 (52.5%)	0.903
≥20	19 (48.7%)	20 (51.3%)	
Total (Gestational Age)	47 (48%)	51 (52%)	-

When stratified by parity, 50% of patients with parity between 0 and 2 experienced preterm labor, compared to 43.8% of those with parity greater than 2. This difference was not statistically significant ($p=0.561$). Finally, stratification by weight revealed a statistically significant relationship between weight and preterm labor. Patients weighing 70 kg or less had a higher incidence of preterm labor (55.7%) compared to those weighing more than 70 kg (35.1%), with a p-value of 0.048 (Table 3).

Table 3: Stratification of Preterm Labor Concerning Parity and Weight (n=98)

Variables	Preterm Labor Yes N (%)	Preterm Labor No N (%)	p-Value
Age (Years)			
0-2	33 (50%)	33 (50%)	0.561
>2	14 (43.8%)	18 (56.2%)	
Total (Parity)	47 (48%)	51 (52%)	-
Gestational Age (Weeks)			
≤70	34 (55.7%)	27 (44.3%)	0.048
>70	13 (35.1%)	24 (64.9%)	
Total (Weight)	47 (48%)	51 (52%)	-

DISCUSSION

The findings of this study provide valuable insights into the prevalence of preterm labor in twin pregnancies in Pakistan. In this cohort, 48% of the women experienced preterm labor, a rate comparable to that found by Gashi AM

et al., where 47% of twin pregnancies led to preterm delivery [11]. This high incidence can be attributed to the unique physiological demands of twin gestations, which were often linked to premature births. This finding was higher than what Ngambwa T et al., reported in their study, where only 6% of twin pregnancies resulted in preterm labor [12]. This discrepancy could stem from differences in study populations, healthcare systems, or research design. One of the significant findings in this study was the association between maternal weight and preterm labor. We found that women weighing 70 kg or less had a higher rate of preterm labor (55.7%) compared to those weighing over 70 kg (35.1%), with a statistically significant p-value of 0.048. This supports the hypothesis that maternal weight plays an important role in pregnancy outcomes, specifically in twin gestations. Future studies should explore weight management interventions as part of antenatal care to mitigate the risks of preterm labor. The findings regarding maternal weight and preterm labor were in line with previous studies. Similar associations have been documented in research focused on singleton pregnancies, where low maternal weight has been linked to a higher risk of preterm birth [13]. However, limited research exists on twin pregnancies, indicating a gap that needs further exploration. Regarding other factors like maternal age, this study did not find a statistically significant relationship between age and preterm labor ($p=0.724$), a finding consistent with prior studies [14]. Besides preterm labor, this work also identified other severe pregnancy-related risks. We found that all the women in this study had hypertension during pregnancy, while a global percentage estimate of 8% to 10% was given by Beketie ED et al., in 2021 study [14]. These consistencies show that these findings were relevant to the current state of affairs in the international maternal health study. Further, gestational diabetes was identified in 12 patients. We found a higher prevalence of gestational diabetes in women compared to 2% to 10% in the Zhu and colleagues study of 2022, among both singletons and multiple pregnancies [15]. The observed differences in study findings may be attributed to variations in diet, age, sex, and methodology, highlighting the need for further research. In the present study, most patients with a parity between 0 and 2 experienced preterm labor compared to those with a parity greater than 2. These findings align with the study by Kashani-Ligumsky L et al., 2024, which found that women with high parity (more than 2 pregnancies) had a reduced risk of preterm birth compared to women with first-time pregnancies [16]. In our study, there was a significant association between weight and preterm labour. Our findings are consistent with a study conducted

by Özçil MD., 2021 from Turkey who found that higher maternal weight increases the risk of preterm labor [17]. They also reported that the rate of preterm delivery is slightly higher in the primiparae and multiparae who have a history of ART (Assisted Reproductive Technology) pregnancies because of maternal complications and medical intervention. A study conducted in Nepal by Gurung et al., 2020 also found that the rate of preterm birth was higher in women with primary pregnancies than in multiple pregnancies [18]. Another study by Szyszka M, et al., 2023 from Poland also reported that over 50% of preterm deliveries were observed in primiparous women [19]. In contrast to our study findings, studies by Alhainiah et al., 2018 from Saudi Arabia, Luo et al., 2020 from China reported preterm birth to be more prevalent in multiparous women [20]. The high rate of preterm labor in twin pregnancies observed in this study has significant implications for maternal and neonatal health in Pakistan. The findings suggest that weight management and close monitoring of ART pregnancies should be integral parts of antenatal care in twin pregnancies. Moreover, this study emphasized the need for targeted interventions to prevent preterm labor, particularly in lower-weight women carrying twins. Despite the strengths of this study, several limitations must be considered. Future longitudinal studies with larger sample sizes were needed to confirm these associations and provide more generalizable results. Further research was necessary to explore these relationships in greater depth, especially in resource-limited settings where healthcare access may differ significantly from urban and developed areas.

CONCLUSIONS

The study revealed an exceptionally high frequency of preterm deliveries (48%) among twin pregnancies. These findings not only highlight the urgent need for targeted strategies to prevent and manage preterm labor in twin gestations but also serve as a critical foundation for further research on this subject in Pakistan. The data gathered from this investigation could contribute to the development of a population-based database for multiple pregnancies, which would be invaluable for both research and clinical applications. Such a resource could aid in the identification of risk factors and improve healthcare outcomes for women with twin pregnancies.

Authors Contribution

Conceptualization: NB

Methodology: NB, SS, S

Formal analysis: S, NB

Writing, review and editing: S, SQ, AA, SS, NB, SJK

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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