

# Prevalence and factors associated with pre-term delivery at ad-din women's medical college and hospital.

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## Abstract

**Background:** Pre-term birth is the leading cause of newborn deaths and second leading cause of death in children under five years old. Pre-term birth defines as any birth before 37 completed weeks of gestation or fewer than 259 days since the 1st day of women's last menstrual period. Of the estimated 130 million babies born each year globally, approximately 15 million are born preterm. WHO estimates the prevalence of pre-term deliveries to be 5-18% across 184 countries of the World. Prematurity is a major hindrance to the attainment of the Millennium Development Goals (MDG)-4 target given its high contribution to neonatal mortality. The survival chances of babies born preterm vary significantly depending on where they are born. The risk of neonatal death due to complications of preterm birth is at least 12 times higher for an African baby than for a European baby. Though most countries especially the low and middle income one's lack reliable data on preterm birth, nearly all of those with reliable trend data show an increase in preterm birth rates over the past 20 years. Indeed, all but 3 out of 65 countries in the world with reliable trend show an increase in preterm birth rates in the last 20 years. Significant progress has been made in the care of premature infants but not in reducing the prevalence of preterm birth which is generally on the rise. Causes of preterm birth are unknown in over 50% of spontaneous preterm labor while mechanisms of preterm labor remain poorly understood. Identifying and understanding the risk factors for preterm birth has the potential to help address this problem. Bangladesh like other most developing countries lacks reliable data on the burden of preterm delivery. Ad-Din Women's Medical College and Hospital is the largest regional referral and handles many high risk pregnancies some of which result in preterm birth. Locally, few studies have looked at the prevalence of pre-term deliveries and factors associated with it. This study determined the prevalence of preterm birth and factors associated with preterm deliveries at Ad-Din Women's Medical College and Hospital, Bangladesh.

**Methods:** This is cross-sectional descriptive study was conducted at the maternity unit of Ad-Din Women's Medical College and Hospital in Dhaka in January'2016. A total 200 mothers who met the eligibility criteria and their babies were enrolled in to the study. Mothers were interviewed using a pre-tested questionnaire and additional data extracted from medical records. The maternal nutritional status assessed using BMI. Gestational age was assessed clinically using SFH.

**Results:** The prevalence of preterm birth was found to be 19%. Common risk factors associated preterm birth were maternal age, parity, previous pre-term birth (43.3%), PPRM (446.6%), multiple gestation (13.3%), pregnancy induced hypertension (40%), Antepartum hemorrhage (30%). On the other hand, level of education, ANC attendance, anemia, maternal MUAC and inter pregnancy interval were not associated with preterm birth.

**Conclusion:** Preterm birth among women delivering at Ad-Din Women's Medical College and Hospital in Dhaka, Bangladesh is a significant problem. Prolonged PROM, PIH and APH are independent determinants of preterm birth. The prevalence of preterm deliveries was 19%. Maternal age < 20 years, parity > 4, twin, maternal UTI, PIH, APH, PPRM, previous history of preterm deliveries were significantly associated with preterm deliveries. So, at risk mothers should receive intensified antenatal care to mitigate preterm deliveries. Better management of these obstetric complications and research to elucidate the mechanisms by which they cause preterm birth, offers a practical approach of reducing the high preterm birth rates.

**Keywords:** Pre-term Delivery, Pre-Eclampsia, Antepartum hemorrhage, BMI.

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## Introduction

Preterm birth (PTB) is the leading cause of infant morbidity and mortality in the world. The World Health Organization

(WHO) defines preterm birth as any birth before 37 completed weeks of gestation or fewer than 259 days since the first day of woman's last menstrual period (LMP) [1].

Of the estimated 130 million babies born each year globally, approximately 15 million are born preterm. Prematurity is a major hindrance to the attainment of the Millennium Development Goals (MDG)-4 target given its high contribution to neonatal mortality. The survival chances of babies born preterm vary significantly depending on where they are born [2].

In developing countries, the main causes of preterm births include infectious diseases and poor availability and accessibility of health care resources. In high-income countries, the increase in the number of preterm births is linked to conception among older women and increased number of multiple pregnancies as a result of usage of fertility drugs. In some developed countries, medically unnecessary inductions and caesarean section deliveries before full term also increase preterm birth rates. In rich and poor countries, many preterm births remain unexplained [3].

Approximately three-fourths of perinatal deaths occur in foetuses that are delivered at <37 weeks, and about 40% of these deaths occur in those delivered at <32 weeks. In addition to its contribution to mortality, preterm birth has lifelong effects on neurodevelopmental functioning such as increased risk of cerebral palsy, impaired learning, and visual disorders and an increased risk of chronic disease in adulthood. The economic cost of preterm birth is high in terms of neonatal intensive care and ongoing health care and educational needs. The social cost is also high, with many families experiencing the sudden loss of a preterm baby or a stressful hospital stay, sometimes for month [4].

The risk of neonatal death due to complications of preterm birth is at least 12 times higher for an African baby than for a European baby. Preterm birth (PTB) is a global problem with prevalence ranging between 5 and 18% across 184 countries. The highest rates of preterm birth are in Sub-Saharan Africa and Asia which account for half the world's births, more than 60% of the world's preterm babies and over 80% of the world's 1.1 million neonatal deaths annually due to complications related to preterm birth. Though most countries especially the low and middle income one's lack reliable data on preterm birth, nearly all of those with reliable trend data show an increase in preterm birth rates over the past 20 years. Indeed, all but 3 out of 65 countries in the world with reliable trend show an increase in preterm birth rates in the last 20 years. Significant progress has been made in the care of premature infants but not in reducing the prevalence of preterm birth which is generally on the rise. Causes of preterm birth are unknown in over 50% of spontaneous preterm labor while mechanisms of preterm labor remain poorly understood. Identifying an understanding the risk factors for preterm birth has the potential to help address this problem. Defining risk factors for prediction of preterm birth is a reasonable goal for several reasons. First, identification of at-risk women allows initiation of risk-specific treatment. Second, the risk factors might define a population useful for studying specific interventions. Finally, identification of risk factors might provide important insights into mechanisms leading to preterm birth [5].

## Materials and Methods

### Study Area

Ad-din Women's Medical College and Hospital is the largest referral hospital in Dhaka, Bangladesh. Ad-din Foundation was established in 1980 with the aim of supporting the underprivileged majority of Bangladesh. During its thirty-seven years with development, Ad-din has expanded its existence of diverse projects in several parts of the country. The hospital has a busy maternity unit registering over 10,000 deliveries annually. It also has a busy newborn unit (NBU) which offers specialized neonatal care. Being a teaching and referral hospital, Ad-din handles many high risk pregnancies whose outcomes often include preterm birth.

### Participants

The study population comprised of all mothers who had live births at Ad-Din Women's Medical College and Hospital and their newborns. A total of 200 mothers who met the eligibility criteria were enrolled into the study. These mothers delivered a total of 207 babies 14 of which were twins.

### Data collection

All mothers who had live births at Ad-Din in December 2016 were identified using the birth register within 24 h of delivery. Systematic sampling was used to recruit mother-baby pairs. Mothers were traced to the postnatal wards. Informed consent was obtained from the mothers and babies admitted to the newborn unit were also traced. A standard pretested questionnaire was administered to the mothers while additional data was obtained from the mothers' and babies medical records as required. The records examined for additional data included the mothers' antenatal and admission records and the babies' medical records for those admitted in the NBU after delivery. Information collected from the mother included maternal age, level of education, occupation, parity, date of current and preceding delivery (for calculation of interpregnancy interval) and history of previous preterm birth. Information obtained from medical records included antenatal clinic (ANC) attendance and number of visits, hemoglobin level, mode of delivery, onset of labor (spontaneous or medically indicated), pregnancy outcome (singleton or multiple), prelabor rupture of membranes (PROM) for >18 h, pregnancy induced hypertension (PIH), antepartum hemorrhage (APH), history of burning sensation during pregnancy or treatment for urinary tract infection (UTI). Anemia was defined as hemoglobin level of <10 g/dL. PIH was defined clinically as a blood pressure of > 140/90 mmHg after 20 weeks of gestation with or without proteinuria and/or edema as diagnosed and documented by the attending clinician. APH was defined as any vaginal bleeding in the mother after 24 weeks of gestation as documented in the records by the attending clinician. UTI was defined as a documented clinical/laboratory diagnosis of UTI any time during the pregnancy and/or a positive history of treatment of burning sensation with micturation as reported by the mother.

Maternal nutritional status was assessed by measuring the left mid-upper arm circumference (MUAC) using non-stretchable World Food Program MUAC tapes used for screening pregnant mothers. A low MUAC was defined as a measurement of less than 24 cm. Gestational age was calculated using a standard obstetric wheel based on menstrual dates and confirmed within 24 h of birth by clinical assessment using the Symphysio-fundal height and correlate with booking scan EDD. To limit observer bias, gestational assessment of all babies was done by only one research assistant trained by the principal investigator and aided by a printed pictorial scoring chart. Preterm birth was defined as a gestation of less than 37 completed weeks. Prematurity was further categorized as extreme (less than 28 weeks), severe (28–31 weeks), moderate (32–33 weeks) and late preterm or near term (34–36 weeks).

## Results

### Prevalence of preterm birth

The prevalence of preterm birth among live births was 21.5% (95% Confidence Interval (CI) of 14.1–22.5%).

### Socio-demographic characteristics

About 72.9% of mothers in the term and 73.3% in the preterm group were aged 20–34 years. 17.6% of mothers aged less than 20 years delivered at term compared to 16.6% who had preterm delivery ( $p=0.133$ ). The proportions of mothers aged 35 years and above were similar in the two groups. There was more preterm birth in unemployed women (56%) in comparison with term (23%). There was no difference between the preterm and term groups in terms of occupation ( $p=0.8356$ ), maternal MUAC ( $p=0.22$ ). None of the sociodemographic factors was significantly associated with preterm birth except maternal age less than 20 years which was negatively associated with preterm delivery (OR 0.236) and unemployment positively associated with preterm deliveries.. Table 1 shows the relationship between the socio-demographic characteristics and preterm delivery.

### Previous pregnancy characteristics

Most mothers had a parity of less than four. Women with a parity of 4 or more were nearly 5 times more likely to deliver preterm compared to those whose parity was < 4. About 44% of mothers who delivered before term had a history of previous preterm delivery compared to 17.6% of those who delivered at term and this was significant ( $p=0.0024$ ).

Approximately 10% of mothers in the preterm group and 12% in the term group had an interpregnancy interval of < 24 months but this was not statistically significant ( $p=0.8495$ ).

## Discussion

Most developing countries lack reliable data on the prevalence of preterm birth. This study aimed to determine the prevalence of preterm birth and associated factors at the largest teaching and referral hospital in Dhaka, Bangladesh.

Our findings demonstrate that preterm birth is a significant health problem in this population

with a hospital based prevalence rate of 183 per 1000 live births and that PIH, APH and prolonged PROM are independently associated with PTB. The high rate of preterm birth in this study is in agreement with World Health Organization (WHO) estimates that show that the highest rates are in sub Saharan Africa and South Asia and similar to the finding of other studies in India, Zimbabwe and Malawi. However, this PTB rate is higher than would be expected for community based studies. Compared to low and medium level health facilities in which most normal and uncomplicated deliveries are conducted, Ad-Din Women's Medical College and Hospital being a major referral hospital handles more complicated deliveries, a significant proportion of which are preterm. Consequently, when estimating the PTB rate, the numerator is higher in relation to the denominator for the tertiary hospital resulting in a higher prevalence. The prevalence of preterm birth in the current study is much higher than that reported by Olugbenga and others in a study in a teaching hospital in Nigeria . The difference in PTB rates between our study and the study done by Olugbenga et al. in almost similar setting in the sense of both being teaching hospitals could be explained by the distinct approaches in estimating the gestational age of the babies. While their study excluded mothers who were unsure of dates, those who had a discrepancy of more than 2 weeks between gestation by dates and Ballard's assessment as well as those who had multiple gestation, our study relied wholly on the clinical gestational age assessment based on SFH. It is likely that our approach overestimated the prevalence of PTB while that of Olugbenga et al. may have underestimated the same.

## Conclusions

Preterm birth among women delivering at Ad-Din Women's Medical College and Hospital is a significant problem. Prolonged PROM, PIH and APH are independent determinants of preterm birth. Better management of these obstetric complications and research to elucidate the mechanisms by which they cause preterm birth, offers a practical approach of reducing the high preterm birth rates.

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