

Prevalence and Factors Associated with Spontaneous Preterm Birth at the University Teaching Hospital, Lusaka Zambia

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ABSTRACT

Objectives: To investigate the prevalence, socio-demographic and maternal factors associated with spontaneous preterm birth in women delivering at the University Teaching Hospital, Lusaka.

Methods: This was a cross-sectional study on postnatal women delivering at UTH Lusaka. Between 1st February 2018 and 31st August 2018, a structured questionnaire was used to collect data on socio-demographic, past and present medical and obstetric history. Babies were physically examined to assess for gestational age using the Finnstrom scoring. A sample size of 210 women was collected out of which 105 had preterm and 105 term deliveries. The risk of spontaneous preterm birth was estimated with OR and 95%CI for several predictors. A logistic regression analysis was then performed to identify independently associated factors.

Results: The mean gestation age was 33.1 weeks and 39.4 weeks respectively for preterm and term pregnancies. Of the preterm births, 48 (45.7%) were ranged between 34+0 and 36+6 weeks. Four babies were born with a weight 1000gr and 58 (52.3%) with weight between 1500-2499gr. The prevalence of spontaneous preterm birth was 7.7%. On multivariate analysis, age was not associated with preterm birth (p=0.06). Single status was (OR :2.65,

p=0.001), low education level (OR:3.85, p=0.03), low family income (OR: 7.75, p=0.025) and 549 alcohol intake (OR:2, P=0.006) were significantly associated with preterm birth. For the maternal factors, Parity was not associated with preterm birth (p=0.878). However, gestational age of less than 20 weeks at booking was protective (OR: 0.485, P=0.013). A few antenatal visits were significantly associated with preterm birth (OR: 8.06, P<0.001).

Conclusion: Spontaneous preterm birth remains a major problem at UTH Lusaka with the prevalence of 7.7%. Being single, low education level, low family income, occasional alcohol drinking and fewer antenatal visits were significantly associated with preterm birth. However, early booking at less than 20 weeks was protective.

INTRODUCTION

Preterm birth is defined by the World Health Organisation (WHO) as all births before 37 completed weeks of gestation or fewer than 259 days since the first day of a woman's last menstrual periods.¹ The etiology is often multifactorial and in about 50%, the cause is unknown. The factors associated with preterm are classified into maternal, fetal and placental. Preterm birth can be spontaneous or medically induced. In 2010, the WHO estimated that 15 million babies out of 135 million were born preterm with a prevalence of 11.1% and this number is rising.¹ Preterm birth is the leading cause of neonatal morbidity and mortality and the

Key words: Prevalence, Spontaneous preterm birth, factors associated.

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leading cause of death among children under 5 years responsible of nearly 1 million of deaths in 2010.¹ Many survivors face a life time of disability including learning disabilities and visual and hearing problems.

Globally, many studies have been done on the factors associated with preterm birth. In a study of 315 preterm babies done in India, the findings were that a previous history of preterm delivery and recurrent Urinary Tract Infection (UTI) were significantly associated with preterm birth while Pregnancy Induced Hypertension (PIH) and Antepartum Hemorrhage (APH) were not. In the same study, 36.8% of cases were idiopathic.² A study done in Pakistan found that 61% of preterm birth were associated with Premature Rupture of Membranes (PROM), 30% had a previous preterm birth and 36% APH.³

In Africa, few studies have been done on the factors associated with preterm birth. In a study done in Kenya, the prevalence of preterm birth was 18.3%. In the same study, parity of 4 or more, previous preterm birth, multiple gestation, Preterm Premature Rupture of Membranes (PPROM) and PIH were all significantly associated with preterm birth.⁴ In a retrospective study done in Burkina Faso of 115 participants with preterm birth, the prevalence was 6.1% and the associated factors were advanced age (more than 30 years), previous history of intentional abortion, high stress, too few prenatal care visits, fever during pregnancy, PROM, UTI and previous preterm delivery.⁵

In Zambia, no study on the factors associated with spontaneous preterm birth has been done.

This study endeavored to explore the common factors associated with spontaneous preterm birth at the UTH in Lusaka, identify the preventable causes and propose strategies for prevention.

METHODS

A cross-sectional study was conducted at the UTH-Women and Newborn Hospital, Lusaka. A total of 210 patients were recruited out of whom 105 had

preterm and 105 term births. Data was collected using structured questionnaire and analysed using SPSS version 22. Multiple logistic regression was used to control for confounders and to determine factors independently associated with preterm birth. Crude odd ratio was used to analyse associated factors and selection for entry to logistic regression model was considered at p value of ≤ 0.1 . P value of <0.05 at 95% Confidence Interval was considered statistically significant. Results were presented as tables and figures.

RESULTS

Slightly over 6486 deliveries were performed over the period of data collection (February 2018 to august 2018). The general characteristic of the population are shown in table 1 below. The average age was 25 years. Most patients were aged between 20 and 34 years 139 (66.2%). The majority of women were married, 135 (64.3%). Most women had completed secondary school 129 (61.5%). 154 (73.3%) were not employed.

Table 1. Baseline maternal characteristics (N=210)

| Variables | Numbers | Percentage |
|------------------------|---------|------------|
| Age | | |
| < 20 years | 47 | 22.4 |
| 20 – 34 | 139 | 66.2 |
| 35 yrs or more | 24 | 11.4 |
| Marital status | | |
| Single | 75 | 35.7 |
| Married | 135 | 64.3 |
| Education | | |
| None | 6 | 2.9 |
| Primary | 55 | 26.2 |
| Secondary | 129 | 61.4 |
| Tertiary | 20 | 9.4 |
| Occupation | | |
| Formal | 16 | 7.9 |
| Informal | 40 | 19.0 |
| Not employed | 154 | 73.3 |
| Income (kwacha) | | |
| 0 – 1000 | 7 | 4.7 |
| 1001 – 2000 | 47 | 31.8 |
| 2001 – 4500 | 53 | 35.8 |
| >4500 | 41 | 27.7 |
| Residence | | |
| High density | 121 | 57.6 |
| Medium density | 75 | 35.7 |
| Low density | 2 | 1.0 |
| Rural | 12 | 5.7 |

Neonatal characteristics

The mean gestational age was 33.1 weeks and 39.4 weeks for preterm and term respectively. Of the preterm births, 30.4 % were born between 28+0 - 31+6 and 45.7% between 34+0 - 36+6 weeks. Four babies (3.6%) were born with less than 1000 grams and 52.3% were born with a weight between 1500 – 2499 grams. These characteristics are summarized in table 2 below.

Table 2. Characteristics of preterm births

| Variable | Numbers | Percentages |
|--------------------------------|---------|-------------|
| Gestational age (weeks) | | |
| 28+0 - 31+6 | 32 | 30.5 |
| 32+0 – 33+6 | 25 | 23.8 |
| 34+0 – 36+6 | 48 | 45.7 |
| Birth weight (grams) | | |
| < 1000 | 4 | 3.6 |
| 1000 – 1499 | 27 | 24.3 |
| 1500 – 2499 | 58 | 52.3 |
| 2500 or more | 22 | 19.8 |
| Sex of babies | | |
| Males | 59 | 53.2 |
| Females | 52 | 46.8 |

Prevalence of preterm births

The total number of deliveries from February to August 2018 was 6486 and the total number of preterm births was 730. Out of the preterm births, the number of spontaneous preterm births was 503. The prevalence of spontaneous preterm birth was 7.7%. More details are illustrated in figure 1 below.

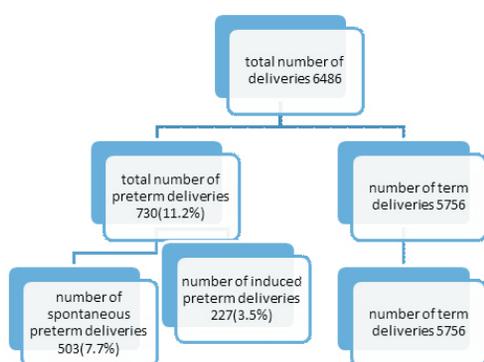


Figure 1: Prevalence of preterm births

Socio-demographic factors

In this study, preterm delivery was more prevalent in women aged less than 20 years. Thirty women (28.6%) had preterm, 11 (10.5%) had term delivery. Comparatively for women of 35 year and older, 15 (14.29%) had preterm delivery and 16 (15.3%) had term delivery. For the age group between 20 and 34 years, 60 (57.1%) and 78 (74.3%) had preterm and term delivery respectively. Being single was a contributing factor to preterm delivery, 49 (46.7%) and 26 (24.8%) single women respectively had preterm and term delivery. For married women, 56(53.3 %) and 79 (75.2%) had respectively preterm and term delivery. The rest of the characteristics are summarized in table 2 below.

Table 3. Socio-demographic factors of preterm birth.

| | Term | | Gestational age preterm | | statistics p |
|------------------------|------|------|-------------------------|------|--------------|
| | N | % | n | % | |
| Age (years) | | | | | |
| < 20 | 13 | 12.4 | 34 | 32.4 | 0.002 |
| 20-34 | 80 | 76.2 | 59 | 56.2 | |
| 35 or more | 12 | 11.4 | 12 | 11.4 | |
| Marital status | | | | | |
| Single | 26 | 24.8 | 49 | 46.7 | 0.002 |
| Married | 79 | 75.2 | 56 | 53.3 | |
| Alcohol use | | | | | |
| Yes occasionally | 33 | 31.4 | 16 | 15.2 | 0.009 |
| No | 72 | 68 | 89 | 84.8 | |
| Smoking in home | | | | | |
| None smokes | 94 | 89.5 | 91 | 86.7 | 0.424 |
| Wife smokes | 1 | 1.0 | 0 | 0.0 | |
| Husband smokes | 10 | 9.5 | 14 | 13.3 | |
| Education | | | | | |
| None | 2 | 1.9 | 4 | 3.8 | 0.032 |
| Primary | 28 | 26.7 | 27 | 25.7 | |
| Secondary | 59 | 56.2 | 70 | 66.7 | |
| Tertiary | 16 | 15.2 | 4 | 3.8 | |
| Occupation | | | | | |
| Formal | 11 | 10.5 | 5 | 4.8 | 0.011 |
| Informal | 20 | 19.0 | 20 | 19.0 | |
| Not employed | 74 | 70.5 | 80 | 76.2 | |
| Income (kwacha) | | | | | |
| 0 – 1000 | 2 | 2.4 | 5 | 7.9 | 0.011 |
| 1001 – 2000 | 21 | 24.7 | 26 | 41.3 | |
| 2001 – 4500 | 31 | 36.5 | 22 | 34.9 | |
| > 4500 | 31 | 36.5 | 10 | 15.9 | |
| Residence | | | | | |
| High density | 58 | 55.2 | 63 | 60.0 | 0.050 |
| Medium | 44 | 41.9 | 31 | 29.5 | |
| Low density | 1 | 1.0 | 1 | 1.0 | |
| Rural | 2 | 1.9 | 10 | 9.5 | |

Maternal factors associated with preterm birth.

Nulliparity was significantly associated with preterm delivery in this study with a p value of 0.01; 49 (46.7%) nulliparous has preterm delivery and 32 (30.4%) has term delivery. Early antenatal booking was significantly associated with reduction in preterm delivery; 47 (45.0%) and 30 (28.6%) participants who booked after 20 weeks had preterm and term deliveries respectively. Less antenatal visits are significantly associated with preterm delivery; 60 (56.7%) and 12 (11.4%) of participants who had less than 3 antenatal visits had preterm and term respectively with p value of <0.001. The rest of the parameters are illustrated in the table below.

Table 4. Maternal factors associated with preterm birth

| | Gestational age | | | | statistic P |
|---------------------------------------|-----------------|-------|---------|-------|-------------|
| | Term | | preterm | | |
| | N | % | N | % | |
| Parity | | | | | 0.011 |
| Nulliparous | 32 | 30.4 | 49 | 46.7 | |
| 1-4 | 66 | 62.7 | 44 | 41.9 | |
| 5 or more | 7 | 6.9 | 12 | 11.4 | |
| HIV status | | | | | 0.708 |
| Reactive | 21 | 20.2 | 24 | 23.3 | |
| Non-reactive | 82 | 78.8 | 78 | 75.5 | |
| Unknown | 1 | 1.0 | 1 | 1.0 | |
| Gestational age at booking | | | | | 0.019 |
| 20 weeks or less | 75 | 71.4 | 57 | 54.0 | |
| More than 20 weeks | 30 | 28.6 | 47 | 45.0 | |
| Unbooked | 0 | 0 | 1 | 1.0 | |
| Number of times attended ANC | | | | | <0.001 |
| Less than 3 times | 12 | 11.4 | 60 | 56.7 | |
| 3 times and more | 93 | 88.6 | 45 | 43.3 | |
| Previous preterm delivery | | | | | 0.211 |
| Yes | 20 | 24.7 | 16 | 17.0 | |
| No | 61 | 75.3 | 78 | 83.0 | |
| Had a cerclage | | | | | 1.00 |
| Yes | 1 | 1 | 1 | 1 | |
| No | 104 | 99 | 104 | 99 | |
| Interpregnancy interval | | | | | 0.842 |
| Less than 24 months | 5 | 6.85 | 10 | 18.87 | |
| 24 months or more | 68 | 93.15 | 43 | 81.13 | |
| Previous caesarian section | | | | | 0.147 |
| Yes | 11 | 10.5 | 7 | 6.7 | |
| No | 94 | 89.5 | 98 | 93.3 | |
| Pregnancy induced Hypertension | | | | | 0.460 |
| Yes | 11 | 10.5 | 7 | 6.7 | |
| No | 94 | 89.5 | 98 | 93.3 | |
| Booking Hb (g/dl) | | | | | 0.526 |
| Less than 11 | 8 | 16 | 11 | 28.20 | |
| 11 or more | 42 | 84 | 28 | 71.80 | |

Logistic regression analysis for Age, Marital Status, Education, Employment, Income, Residence, Alcohol Use in Pregnancy, Parity, had delivered by Caesarian section, Gestation Age at Booking, Times Attended ANC.

The risk preterm birth was significantly increased with single status by 2.6 times; with no education by 8 times and with family income of less than 1000 kwacha by 7.7 times. Booking at less than 20 weeks gestation age was associated with reduced risk of preterm birth by 51.5%. The higher the number of antenatal visits the lower the risk of preterm birth, antenatal visits once and twice were associated with 20.6 times and 8.0 times increased risk of preterm birth respectively. However, parity was not associated with preterm birth. The rest is summarised in table 6

Table 5. Logistic regression analysis.

| | OR | 95%CI | | p | AOR | 95%CI | | pAdj |
|------------------------|-------|-------|--------|-------|-------|-------|----------|-------|
| | | Lower | Upper | | | Lower | Upper | |
| Age | | | | | | | | |
| < 20 | 2.615 | 0.939 | 7.283 | 0.066 | 0.762 | 0.066 | 8.848 | 0.828 |
| 20 - 35 | 0.738 | 0.310 | 1.757 | 0.492 | 0.535 | 0.138 | 2.070 | 0.365 |
| > 35 (Ref) | | | | | | | | |
| Marital status | | | | | | | | |
| Single | 2.659 | 1.480 | 4.777 | 0.001 | 2.739 | 0.444 | 16.893 | 0.278 |
| Married (Ref) | | | | | | | | |
| Education | | | | | | | | |
| None | 8.000 | 1.061 | 60.324 | 0.044 | 0.773 | 0.001 | 403.945 | 0.936 |
| Primary | 3.857 | 1.143 | 13.020 | 0.030 | 0.949 | 0.067 | 13.431 | 0.969 |
| Secondary | 4.746 | 1.504 | 14.975 | 0.008 | 2.674 | 0.262 | 27.253 | 0.406 |
| Tertiary (Ref) | | | | | | | | |
| Employment | | | | | | | | |
| Formal | 0.420 | 0.139 | 1.267 | 0.124 | 0.594 | 0.069 | 5.101 | 0.635 |
| Informal | 0.925 | 0.461 | 1.855 | 0.826 | 1.007 | 0.324 | 3.126 | 0.991 |
| Not employed (Ref) | | | | | | | | |
| Income (Kwacha) | | | | | | | | |
| 0 - 1000 | 7.750 | 1.296 | 46.327 | 0.025 | 4.649 | 0.018 | 1205.795 | 0.588 |
| 1001 - 2000 | 3.838 | 1.536 | 9.591 | 0.004 | 3.044 | 0.827 | 11.196 | 0.094 |
| 2001 - 4500 | 2.200 | 0.896 | 5.401 | 0.085 | 1.809 | 0.504 | 6.486 | 0.363 |
| >4500 (Ref) | | | | | | | | |
| Residence | | | | | | | | |

| | | | | | | | | |
|---|--------|-------|--------|--------|--------|-------|---------|--------|
| Residence | | | | | | | | |
| High Density | 0.217 | 0.046 | 1.033 | 0.055 | 0.384 | 0.025 | 5.810 | 0.490 |
| Medium Density | 0.141 | 0.029 | 0.688 | 0.15 | 0.353 | 0.022 | 5.737 | 0.464 |
| Rural (Ref) | | | | | | | | |
| Alcohol use in Pregnancy | | | | | | | | |
| Yes, but Occasionally | 2.549 | 1.301 | 4.998 | 0.006 | 2.900 | 0.846 | 9.943 | 0.040 |
| No (Ref) | | | | | | | | |
| Parity | | | | | | | | |
| Never | 0.922 | 0.328 | 2.596 | 0.878 | 1.008 | 0.140 | 7.244 | 0.994 |
| 1 - 4 | 0.401 | 0.146 | 1.099 | 0.076 | 0.317 | 0.060 | 1.685 | 0.178 |
| ≥ 5 (Ref) | | | | | | | | |
| Had had delivered by caesarean section | | | | | | | | |
| Yes | 0.394 | 0.132 | 1.180 | 0.096 | 0.848 | 0.180 | 4.001 | 0.835 |
| No (Ref) | | | | | | | | |
| Gestational age at booking | | | | | | | | |
| < 20 Weeks | 0.485 | 0.274 | 0.860 | 0.013 | 1.703 | 0.567 | 5.116 | 0.343 |
| ≥ 20 Weeks (Ref) | | | | | | | | |
| Times Attended ANC | | | | | | | | |
| Once | 20.667 | 4.628 | 92.297 | <0.001 | 21.399 | 2.896 | 158.140 | 0.003 |
| Twice | 8.060 | 3.693 | 17.593 | <0.001 | 14.298 | 3.804 | 53.737 | <0.001 |
| ≥Thrice (Ref) | | | | | | | | |

DISCUSSION

The study showed the factors associated with spontaneous preterm birth at UTH/ Women and Newborn Hospital, Lusaka. Analysis of the results showed that the prevalence of spontaneous preterm birth was 7.7%. Neither maternal age of less than 20 years nor more than 35 years were significantly associated with preterm birth ($p=0.066$). Being single was 2.6 times significantly associated with preterm birth ($p=0.001$). The study found that the higher the education level the lower the risk of spontaneous preterm birth and the higher the family income the lower the risk of spontaneous preterm birth. Occasional alcohol intake was 2.5 times associated with spontaneous preterm birth ($p=0.006$). Antenatal booking at less than 20 weeks was protective from preterm birth (OR: 0.48; 95%CI; 0.274-0.860; $p=0.0013$). The higher the number of antenatal visits the lower the risk of spontaneous preterm birth. There was no association between parity and preterm birth ($p=0.87$).

The important features of this study on preterm pregnancy were that a total of 210 women participated, 105 had preterm deliveries and 105 term deliveries. The mean age of the participants was 24.77 years \pm 6.929 and 27 years \pm 6.403 for preterm and term respectively. 75 (35.1%) women were single and 129 (61.4%) had gone to secondary school. The mean gestation age was 33.1 weeks and 39.4 weeks for preterm and term respectively. Of the preterm births, 48 (45.7%) were ranged between 34+0 – 36+6 weeks. Four (3.6%) babies were born with less than 1000grs and 58 (52.3%) were born with a weight between 1500-2499grs.

The total prevalence of preterm birth in this study was 11.2% and the one of spontaneous preterm birth was 7.7%. This total prevalence of preterm birth was same as the global prevalence estimated at 11.3% by WHO and other studies.^{1,6} However, the total prevalence of preterm birth was lower compared to other studies.^{2,4} Some studies have reported similar prevalence of spontaneous preterm birth.^{6,7}, however, higher than in other studies.⁵ The average prevalence of both total and spontaneous preterm birth in this study might be due to the exclusion criteria of births less than 28 weeks gestation. The other explanation was the new referral guidelines that allows first level hospitals not to refer healthy mothers at 35 weeks and above to a second or tertiary level hospital. Late preterm deliveries constitute the majority of all preterm births.

In this study, neither maternal age of less than 20 years nor more than 35 years were significantly associated with preterm birth. Other studies have shown conflicting results.⁸⁻¹¹ The conflicting results might be explained by the fact that extreme ages are associated with pregnancy related complications leading to early delivery either by induction of labour or caesarean section. However, in this study we are dealing with spontaneous preterm birth which might not necessarily be associated with pregnancy complications.

Single status was significantly associated with preterm birth by 2.6 times (95%CI, 1.480-4.777,

p=0.001). However, there was no significance after adjustment for confounders (adjusted p=0.278). Other studies have reported similar results^{12, 13, 14} Most of the pregnancies of unmarried women are unplanned and this mostly led to late booking and inadequate antenatal visits which is common among this population. The stress on how to support the pregnancy alone especially if the partner is not involved in the care is another plausible explanation.

Women with no school education were 8 times at risk of preterm birth (95%CI, 1.061-60.324, p=0.044) and those with primary and secondary education level were respectively 3.5 (95%CI, 1.143-13.020, p=0.030) and 4.7 times (95%CI, 1.504-14.975, p=0.008) risk of preterm birth. However, there was no significant association after adjustment for confounding factors (adjusted p value of 0.936, 0.969 and 0.406 respectively for no education, primary and secondary education). There are conflicting results in other studies. Some studies have reported the association of low education level and preterm birth.^{15, 16, 17} Others have reported no association with low level education over time.¹³ The slight increase in preterm birth among women with secondary level compared to primary level might be due to the fact that women with secondary level of education are adolescents, most of the pregnancies are unplanned, high risk of hiding the pregnancy thus late antenatal booking.

This study has found that the higher the family income, the lower the risk of preterm birth. The family income of less than K1000 was 7.7 times associated with preterm birth (95%CI, 1.296-46.327, p=0.025). However, the family income of K 1001-2000 was 3.8 times associated with preterm birth (95%CI, 1.536-9.591, p value 0.004). This means the lower the family income the higher the risk of preterm birth. Other studies have reported similar results.^{2, 11, 16, 18} It's universally known that poverty predisposes to poor nutritional status, infections and other conditions that increase the risk of preterm births.

Occasional alcohol intake was 2.5 times significantly associated with preterm birth (95%CI,

1.301-4.998, p=0.006). Other studies found conflicting results. Some studies have reported the protective effect of alcohol.^{19, 20} However, other studies have reported an increased risk of preterm birth.²¹ No plausible explanation to these findings has been given.

Parity was not associated with preterm birth (p=0.878). There are conflicting results in other studies. In some studies, nulliparity and/or multiparity were associated with preterm birth.^{2, 223} In others parity was not associated with preterm birth.²⁴

Antenatal booking at less than 20 weeks was protective for preterm birth (OR: 0.485, 95%CI, 0.274-0.860, p=0.013). Other studies have found similar results.^{25, 26} The plausible explanation for this study is early booking allows early diagnosis and management of conditions that might predispose to preterm birth (e.g. cervical incompetence, infection, etc.) or women who book early are who are more educated and/or have more wealth.

Attendance of antenatal clinic once and twice had (OR: 20.6, 95%CI, 4.628-92.297, p<0.001) and (OR: 8.06, 95%CI, 3.693-17.593, p<0.001) respectively. This means that the higher the number of visits the lower the risk of preterm birth. Other studies have found similar results^{6, 27} Frequent antenatal visits allow timely detection and management of conditions predisposing to preterm birth.

No association between previous preterm delivery and preterm birth was found. Other studies have found previous preterm delivery to be associated with preterm birth.^{28, 29, 30} In this study, this might be due to insufficient sample, thus further studies are advised.

Short interpregnancy interval was not associated with preterm birth in this study. However other studies have found an association between short interpregnancy interval and preterm birth.^{31, 32, 33} This could be due to insufficient sample size in this study, thus further research is advised.

CONCLUSION

Spontaneous preterm birth remains a major problem at the UTH- Women and Newborn Hospital, Lusaka. The prevalence of spontaneous preterm birth was 7.7%. Being single, low education level, low family income, occasional alcohol drinking and fewer antenatal clinics were significantly associated with preterm birth. However, early booking before 20 weeks was protective.

STUDY LIMITATION

1. This was a hospital based and uni-center oriented study, generalizability of the results to the whole country is limited.
2. This study is a hospital base study done at the biggest hospital in the country where we were expecting a high prevalence of preterm birth. However, the prevalence has reduced due to the new referral policy of referring only laboring women of less than 34 weeks.
3. The sample size for other independent variables was not significant enough to make a proper judgment of the findings.

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RECOMMENDATIONS

1. Women should be advised to stop drinking alcohol as soon as they are pregnant.
2. Hospitals and clinics to adhere to the WHO guideline on the antenatal care.
3. The reproductive health provider should take a thorough history, physical exams to rule out any factor that predisposes to preterm birth and to manage the treatable one as soon as possible.

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