

Preterm Delivery and Pattern of Presentation of Spontaneous Preterm Labour at a Tertiary Centre in Benin City

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ABSTRACT

Background: Preterm delivery is the birth of the foetus before 37 completed weeks of gestation. It can occur following spontaneous preterm labour or iatrogenic preterm delivery. Prematurity is a significant cause of perinatal morbidity and mortality with attendant enormous psychological and financial burdens on the patient, her family, the health system and society. **Objectives:** to review the prevalence of preterm delivery and the pattern of presentation in spontaneous preterm labour. **Methods:** It is a five-year descriptive retrospective study of parturients presenting with spontaneous preterm labour and preterm premature rupture of membranes who progressed to preterm delivery at the University of Benin Teaching Hospital, Benin City, South-South, Nigeria. The delivery register for the period was reviewed. **Results:** A Total of 1,394 (13.82%) of the total deliveries (10,087) occurred in the preterm period. Spontaneous preterm labour or preterm premature rupture of membranes accounted for 60.84% of the total preterm deliveries. Spontaneous preterm labour was more common among the unbooked and nulliparous women. The mean age at presentation was 31.5 years, and the mean gestational age at presentation was 31.7 weeks. At least one risk factor was found in about 85.5% of parturients who presented with spontaneous preterm labour. The most common risk factor identified was preterm premature rupture of membranes, followed by maternal infections and infestations. Other factors found among the parturients include multiple gestation, previous preterm delivery, antepartum haemorrhage, hypertensive diseases in pregnancy, uterine fibroid, cervical incompetence and polyhydramnios. **Conclusion:** Specific strategies to control modifiable risk factors will help reduce the burden of preterm delivery.

Key words: Preterm Delivery, Preterm Labour, Preterm Premature Rupture of Membranes

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Received: 18th November 2025

Accepted: 10th March 2026

Published online: 30th June 2026

Introduction

Preterm labour refers to the commencement of the processes that culminate in the expulsion of the foetus and products of conception before 37 weeks of gestational age. Prematurity is a significant cause of perinatal morbidity and mortality with attendant enormous psychological and financial burdens on the patient, her family, health system and society.^{1,2} About 15 million babies are born preterm every year, accounting for about 5 to 25% of total deliveries worldwide, with the highest rate in developing countries.^{1,3,6} In the past 20 years, there has been a global increase in the frequency of preterm deliveries.⁶ In Africa, the prevalence of preterm birth is about 7.4%, with 68.2% occurring spontaneously.⁶ In Nigeria, the incidence of preterm deliveries was 11.8%, 9.5%, 16.8%, and 16%, respectively.^{7,8,10,11} Prematurity accounts for about 27.8% of admissions to the Special Care Baby Unit (SCBU) of the University of Benin Teaching Hospital.⁴

Access this article online

QuickResponse Code



website: www.bornomedicaljournal.com

DOI: 10.31173/bomj.bomj_2531_23



Despite improvement in neonatal care, prematurity remains the most significant single cause of death and long-term disability among children under five worldwide. About 1 million children die of prematurity every year globally, with 90% occurring in low- and middle-income countries.⁵ In Nigeria, preterm babies account for about 270,000 neonatal deaths annually.⁶ This comprises about 40 - 60% of all perinatal deaths.⁶ The actual cause of preterm labour and preterm birth is not known. However, there are some significant risk factors associated with preterm labour.^{1,2} Risk factors for preterm labour include low socio-economic class, urinary tract infection, genital tract infection, malaria infestation, previous preterm labour and delivery, maternal medical conditions including hypertensive disorders in pregnancy and diabetes mellitus, maternal obesity, smoking, alcohol intake, uterine fibroids, multiple gestations, polyhydramnios and foetal congenital anomalies.^{1,2,3,9}

Complications of preterm delivery could be immediate or long-term. Some of the immediate complications include intraventricular haemorrhage, periventricular leukomalacia, perinatal asphyxia, hypoxic ischaemic encephalopathy, respiratory distress syndrome, apnoea of prematurity, patent ductus arteriosus, neonatal jaundice, necrotizing enterocolitis, neonatal sepsis, electrolyte imbalance and hypothermia. In contrast, long-term complications include cerebral palsy, vision problems, hearing problems, behavioural problems and impaired cognitive function.^{1,2,3-7}

The salvage rate for preterm births depends on biological maturity and the available technology for neonatal care in a given setting. With the emergence of advanced technology in developed countries, the preterm neonatal salvage rate has shown remarkable improvement.^{2,8,11} This is not the same in low- and middle-income countries. Thus, the most rational way of reducing the impact of preterm deliveries on neonatal mortality is by reducing their incidence. Hence, knowledge of risk factors and patterns of presentation is crucial to help management curb the menace of preterm delivery. Findings from the study will provide relevant, up-to-date information to inform appropriate interventions and strategies to curb the menace of preterm delivery and optimize outcomes of preterm births at the local, regional, and national levels. The study aims to determine the prevalence and pattern of presentation amongst

pregnant women presenting with spontaneous preterm labour at the University of Benin Teaching Hospital.

Methods

This is a descriptive retrospective study of the incidence of preterm delivery and the pattern of presentation of spontaneous preterm labour at the University of Benin Teaching Hospital, Benin City, between 1st January 2017 and 31st December 2021. The study population were all the parturients who presented in spontaneous preterm labour and preterm premature rupture of membranes and subsequently had preterm delivery within the period of review. Patients who had induction of labour or pre-labour Caesarean section in the preterm period were excluded.

Delivery registers for the time stipulated above were reviewed. The names and hospital numbers of parturients who had preterm delivery were extracted. The information was used to retrieve the parturient's case file. Relevant information on the parturients with spontaneous preterm labour or preterm premature rupture of membranes was further extracted for analysis.

The information extracted includes the patient's sociodemographic characteristics and obstetric variables. Sociodemographic characteristics extracted include maternal age, marital status, level of education, parity, and booking status. Obstetrics variables extracted include gestational age at presentation, previous preterm delivery, presence of infections or infestations, preterm premature rupture of membrane, hypertensive disorders in pregnancy, antepartum haemorrhage, multiple gestation and other plausible causes of preterm labour. The collected data were analyzed using IBM SPSS version 25, and the results were presented as simple proportions and percentages in tables.

Results

The total number of deliveries for the study period was 10,087, yielding an average of 2,017.4 deliveries per year. Among these deliveries, 1,394 were preterm, giving a preterm birth rate of 13.82%. One thousand one hundred ninety case notes were retrieved, and data were extracted from the total preterm deliveries. This gives a case note retrieval rate of 85.37%.

Among all preterm deliveries, 724 (60.84%) had spontaneous preterm labour or preterm premature



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rupture of membranes that progressed to preterm delivery.

The mean age and standard deviation were 31.5±3.2 years, the median age was 31, and the modal age was 32. Most participants (290, 40.06%) were aged 30 to 34. Meanwhile, 15 (2.07%) participants were aged 19 years and below.

Unbooked patients constituted almost two-thirds, 440 (60.77%) of the total of parturients who had spontaneous preterm labour during the period of review. More than three-quarters (85%, 622) of the parturients were married, while only 266 (36.74%)

had a tertiary education. Multiparous women (Para 2 to Para 4) contributed the highest number, 291 (40.19%); however, the modal parity was Para 0, 260 (35.91%). The sociodemographic and other obstetric characteristics of the participants with Spontaneous preterm labour is shown in table 1.

Table 1. Sociodemographic And Obstetric Characteristics of Parturients with Spontaneous Preterm Labour

Variable	Frequency (n = 724)	Percentage
Age group (years)		
≤ 19	15	2.1
20 – 24	74	10.2
25 – 29	175	24.1
30 – 34	290	40.1
≥ 35	170	23.5
Mean ± SD	31.5 ± 3.2	
Marital status		
Married	622	85.9
Single	102	14.1
Level of education		
Primary	23	3.2
Secondary	435	60.1
Tertiary	266	36.7
Booking status		
Booked	284	39.2
Unbooked	440	60.8
Gestational age (weeks)		
24 – <28	128	17.7
28 – <32	263	36.3
32 – <37	333	46.0
Mean ± SD	31.6 ± 2.3	
Parity		
0	260	35.9
1	140	19.3
2 – 4	291	40.2
≥5	33	4.6

The mean gestation age for this women category during the review period was 31.65±2.3 weeks, while the median gestational age was 30 weeks. However, most parturients

presented in the late preterm period (32 – <37 weeks of gestation), with a modal gestational age of 33 weeks. The



fewest cases, 128 (17.68%), were presented in the extreme preterm (24 to <28 weeks) period.

In more than three-quarters of cases (619, 85.5%), an identifiable risk factor(s) was associated. In contrast, no risk factor was found among the remaining 14.5%. Among those with risk factor(s), 58 (9.37%) had more than one risk factor. Some of the risk factors found for

spontaneous preterm labour include previous preterm labour, preterm premature rupture of membranes, maternal infections and infestations, hypertensive disease in pregnancy, antepartum haemorrhage, multiple gestation, polyhydramnios, co-existing uterine fibroid and cervical incompetence.

TABLE 2: OBSTETRIC RISK FACTORS IDENTIFIED AMONG PARTURIENTS WITH SPONTANEOUS PRETERM LABOUR

Variable	Frequency (n = 724)	Percentage
Risk factors*		
PROM	254	35.1
Infections/infestations	183	25.3
Multiple gestations	118	16.3
Previous preterm delivery	92	12.7
Antepartum haemorrhage	66	9.1
Hypertensive disease in pregnancy	47	6.5
Uterine fibroid	17	2.4
Cervical incompetence	12	1.6
Polyhydramnios	5	0.7

Key: *multiple risks applied. PPRM: Preterm premature rupture of membranes

Preterm premature rupture of membranes was associated with 254 (35%) cases. This was the highest among all risk factors, followed by maternal infections and infestations (183, 25.30%), while the least was polyhydramnios (5, 0.7%). (Table 2)

Discussions

Preterm delivery is the birth of the foetus after the age of viability, before 37 completed weeks. According to the study, preterm births accounted for 13.82% of deliveries during the review period. This was within the worldwide incidence range of 5-25%.⁶ However, it is less than the 16.0% reported in Warri and Oghara (South-South) and higher than the 5.7% and 8.8% reported in Ile-Ife (South-West) and Nnewi (South-East), respectively.^{11,13,15} It was also noted to be higher than the mean incidence of 12.6% among six low- and middle-income countries, though lower than the 18.3% and 21.8% reported in DR Congo and Pakistan, respectively, in the same study.¹⁶ This might be due to the differences in the various regions where the studies were carried out, as preterm labour has been shown to vary among participants in the different regions.⁶

Most (60.84%) of the preterm deliveries presented in spontaneous preterm labour or preterm premature rupture of membranes. This was close to the 68% reported worldwide but is much higher than the 25.17% reported in Nnewi, South-Eastern Nigeria.^{6,15} The differences might be due to geopolitical zones and study design. This was a 5-year retrospective descriptive study, in contrast to the 6-month prospective analytical study conducted in Nnewi, South-Eastern Nigeria.¹⁵

The mean age and standard deviation of parturients in this study were 31.5±3.2 years, and those aged 30 to 34 constituted the highest percentage (40.06%). This is similar to the findings in the South-East, which reported a mean age of 30.02±2.3 years and 30.2% of parturients aged 30 to 34 years, the highest percentage.¹⁵ Parturients aged <20 years contributed



the least (2.07%) to those who developed spontaneous preterm labour in this study. Though this was comparable to the study conducted in Nnewi, which reported 1.4%, it was lower than the 14.1% reported among six Low- and middle-income countries.^{15,16} More than three-quarters (85.91%) of the parturients in this study were married. Similar to the reported finding in Nnewi.¹⁵ The majority (60.08%) of parturients had a secondary level of education as their highest level. This was comparable to the result of the study conducted among six low- and middle-income countries.¹⁶ However, participants with tertiary levels of education were reported to be the majority of the survey done in South-Eastern Nigerians and Nepal.^{15,17} Unbooked status was a significant factor in preterm delivery in South-West Nigeria, and 74.1% of reported parturients with preterm delivery were unbooked.^{13,15} A similar result was obtained in this study, with over half (60.77%) of the mothers being unbooked. The University of Benin Teaching Hospital is a referral centre with trained personnel and a fully equipped neonatal facility. Most cases of preterm labour and preterm premature rupture of membranes managed in UBTH were referred cases, as intrauterine transfer to access a neonatal facility. This could explain why the unbooked parturients constituted a higher proportion in this study. Though multiparous women (Para 2 to Para 4) constituted the majority (40.19%) of parturients with spontaneous preterm labour, nulliparity was the modal parity (35.91%) in Warri and Oghara (South-South Nigeria), Nnewi (South-Eastern Nigeria), and among six low- and middle-income countries. Preterm delivery was commoner among the nulliparous women, and the reason remained unclear.^{11,15,16} The majority (45.99%) of cases occurred in the late preterm period (32 - < 37 weeks), which is comparable to a study conducted in South-Eastern Nigeria, which reported 45.3% in the late preterm period.¹⁵ Though similar reports were seen in the study done in Delta state, South-South, Nigeria and Nepal, the percentages (85.3% and 81.9%, respectively) were higher than in this study.^{11,17} The last cases were noted during the extreme preterm period (24-<28 weeks), similar to what was reported in Warri and Oghara, Nnewi, and Nepal.^{11,15,17} Though the exact cause of preterm labour is still obscure, more than three-quarters (85.50%) of the cases seen in this study were identified with at least one plausible risk factor. This was higher than the 70% reported in the United States.¹⁹ Among the identifiable risk factors,

preterm premature rupture of membranes was the leading associated factor. This is corroborated by other studies.^{11,13-16} Though maternal infections were reported as the leading factor associated with preterm labour in the United States.^{12,19} Preterm premature rupture of membranes accounted for 35.08% of the total cases in this study. This was comparable to the 32.8% and 35.0% reported in Warri and Oghara (South-South) and Ile-Ife (South-West), respectively.^{11,13} However, it exceeded the 28% reported in Nnewi (South-East).¹⁵

Besides preterm premature rupture of membranes, other associated factors identified among the parturients in this study are previous preterm delivery, maternal infections and infestations, hypertensive disease in pregnancy, antepartum haemorrhage, multiple gestation, polyhydramnios, uterine fibroid and cervical incompetence. These associated factors have been identified in previous analytical studies.^{7-9,11-13,15,18-20} The second leading factor was maternal infections and infestations, associated with 25.3% of all cases. Similar to reported findings in Warri and Oghara (19.0%) and Ile-Ife (20.4%).^{11,13}

Conclusion

Preterm birth still complicates a significant percentage of pregnancies in our practice, with more than half occurring following spontaneous preterm labour or preterm premature rupture of membranes. Spontaneous preterm labour is commoner among unbooked patients than among booked patients. About a third of spontaneous preterm labour is found among nulliparous women, while more than a third is present in the late preterm period. Preterm premature rupture of membranes is still the leading cause of preterm delivery in our environment. Together with maternal infections and infestations, preterm premature rupture of membranes is associated with more than half of total spontaneous preterm labour and delivery. Specific measures and strategies addressing potentially modifiable risk factors for preterm delivery will help reduce its incidence and burden and improve perinatal outcomes.

Limitation Of the Study

This was a hospital-based study, and the findings may not reflect the larger society. A multicentre study with a larger population is needed to establish the burden of preterm labour.



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Cite this Article as: Osazee K, Ogwah. Preterm Delivery and Pattern of Presentation of Spontaneous Preterm Labour at a Tertiary Centre in Benin City. **Bo Med J** 2026; 23 (1):39-44 **Source of Support:** Nil, **Conflict of Interest:** None declared

