Demographic Predictors of Gestational Age at Delivery among Women of Ijaw Tribe in Bayelsa State, in the Niger Delta Region in Nigeria

ABSTRACT

Background

Though most pregnant women tend to deliver around their expected date of confinement, quite a significant number deliver preterm and postterm. The variation of delivery timing can result from obstetrics complications, genetic or demographic factors.

Objective

The objective of this study is to determine the influence of demographic factors of pregnant Ijaw women on gestational age at delivery, like: maternal age, parity, occupation, educational level, gestational age at booking, maternal height, and body mass index, on gestational age at delivery. It also intends to determine the effects of birth weight and fetal sex.

Materials and methods

It was an observational cross-sectional study of 1484 booked pregnant women of Ijaw ethnic group, who delivered in the labour ward of the Niger Delta University Teaching Hospital. Their case notes were retrieved and relevant information such maternal age, parity, educational level, and occupation was obtained. Others include maternal height and weight at booking, gestational age at booking, gestational age at delivery and birth weight. Body mass index was calculated from height and weight and categorized. Data was analyzed with Chi square, Pearson's correlation coefficient, simple linear regression, and multivariate analysis

Results

The prevalence of preterm birth (PTB) among Ijaw women was 9.7%, and the prevalence of PTB was significantly associated with underweight, Odd ratio = 7.79[3.12, 19.50], low educational level, Odd ratio =2.27[1.40, 3.68], and late booking for antenatal care P = 0.004. Delivery postterm was significantly associated with class 1 obesity, Odd ratio =16.0[4, 59, 55.8], and delivery of male babies Odds ratio = 6.76[2.41, 18.96].

Demographic factors from multivariate analysis could only account for 15.9% of the factors responsible for gestational age at delivery, of which the most important were birth weight, educational level and maternal height at booking.

Conclusion

Though maternal and fetal demographic factors significantly affects birth weight, the bulk of the determinants (84.1%) are outside these factors, and it could be from obstetrics, genetic, or other factors.

Key words: D*emographic factors, Ijaw women, gestational age at delivery*.

Introduction

The average duration of pregnancy in humans is 280 days or 40 weeks from the last menstrual period (LMP), or 266 days from the date of ovulation, [1] and this is the foundation where application of Naegele's rule to calculate the expected date of confinement (EDC) was based. [2] Accurate determination of the EDC is important, as it is paramount in taking some key management decisions in obstetrics, and for birth plan. [3, 4] Labour in humans could be preterm (from fetal viability to 36 weeks gestation), term delivery (from 37 to 42 weeks), and postterm; after 42 weeks. However the interval between 40 – 42 weeks is regarded as postdate.

Preterm birth (PTB) is quite common, and it obviously shortens the length of gestation in humans, when compared to term delivery. In a study in Lagos, Nigeria, the rate was 16.8%, of which 4.7% were early preterm, 4.5% were moderate, and late preterm was 7.7%. [5] Other centers prevalence were: 8.8% in Nnewi in Nigeria, [6] 13.3% in Tigray Ethiopia, [7] and 4.7% in Sudan. [8] The internationally accepted classification of PTB is based on the age at delivery. Studies done in USA revealed that extreme prematurity (GA < 28 weeks) constitutes 5% of preterm births. Severe prematurity (28 – 31weeks) constitutes 15%, moderate prematurity (32 – 33 weeks) was 20%, and near term (34 – 36 weeks) constituted 60 – 70% of premature deliveries. [9]

A study in IIorin in Nigeria, significant determinants of PTB were previous preterm delivery, Odds ratio = 3.55[1.71, 7.30] [10] and premature rupture of the membranes, Odds ratio = 6.48[4.33, 9.67]. In many centers globally, the predominant etiological factors for PTB are obstetrics complications in pregnancy, warranting emergency caesarean section or induction of labour, such as severe preeclampsia and antepartum hemorrhage. However, there is overwhelming evidence that quite a significant number of PTB occur spontaneously. In USA, 40 – 45% of the PTB followed preterm labour. [9] In Sudan, majority of the PTB were reported to occur spontaneously, and 88% of these were delivered between 34 - 36 weeks gestation. [8]

The impact of demographic risk factors on preterm labour has not been widely studied; publications are scanty. However, in a study in Lagos Nigeria, preterm labour was commoner in women with advanced maternal age, (≥35 years) [Odds ratio = 1.41]. [5] In another study in Québec, Canada, maternal age of 40 years and above was identified as a strong risk factor for preterm labour 1.20 [1.06, 1.36]. [11] In Ethiopia, PTB was significantly higher among rural dwellers, adjusted Odd ratio = 2.13[1.07, 4. 22]. [12] Findings from a study among women without health insurance in the US revealed that PTB was more frequent among women who were unemployed. [13]

The ideal gestational age for delivery, when perinatal morbidity and mortality is lowest, is from 37 completed weeks to 41 weeks gestation. [14] What causes the onset of normal labour at term remains unknown, but several theories have been postulated to trigger the onset of labour. These include: Increase in production of cortisol by the fetal adrenal gland, which leads to increased oxytocin secretion and uterine contraction. Increase in free estrogen and estrogen receptors, increased synthesis of prostaglandin PGF2α, which causes strong uterine contractions. There is also the theory of progesterone withdrawal around the time of labour (progesterone naturally inhibits uterine contractions). [15, 16]

Postterm pregnancy is defined as pregnancy that has exceeded 42 weeks gestation or 294 days, or the EDC plus 14 days. [17, 18] Reported prevalence rates are 1.16% in china, [19] 8.94% in Stockholm, Sweden, [20] and 8-10% in Nigeria [21]. In a study in Sweden it was observed that nulliparity, advanced maternal age and obesity were the strongest risk factors for postterm pregnancy. [20] In a follow-up study in Norway among parents who participated in the Nord-Trøndelag Health Study (HUNT 2), it was observed that women whose height was shorter than 163cm had shorter pregnancy length, higher risk of preterm births, and lower risk of postterm births. [22]

Previous studies have reported an association between obesity and delivery preterm and postdate. [23, 24] A similar result was obtained from a study in Shariati Hospital in Bandar Abbas where duration of pregnancy was significantly higher among women with high BMI during the first trimester ($p < 0.00006$). [24]

From the evidence presented above, it’s very clear that maternal and fetal demographic factors exert significant influence on duration of pregnancy and birth weight. This study intends to determine whether similar results would be obtained among Ijaw women in the Niger Delta region in Nigeria. At present, there is dearth of information and publications on the subject matter in Ijaw land.

Objective

The objective of this study is to determine the effects of demographic factors of pregnant Ijaw women on gestational age at delivery. Specifically, it would determine the effects of maternal age, parity, occupation, educational level, gestational age at booking, maternal height, and body mass index on gestational age at delivery. It wound also determine the effects of birth weight and sex of the new born.

MATERIALS AND METHODS

Study site

The study was carried out at the labour ward, and antenatal clinic of the department of Obstetrics and Gynaecology, Niger Delta University Teaching Hospital (NDUTH). The hospital is in Yenagoa, the capital of Bayelsa state in the Niger Delta Region in Nigeria. It serves as a referral center; it receives patients from all parts of Bayelsa State, and parts of the neighboring states, such as Rivers, Delta, Edo, and Abia states. The major ethnic group in Nigeria that utilizes this facility is Ijaw, which is the predominant tribe in the Niger Delta. Other tribes living in Bayelsa State that utilize this facility include Igbo, Hausa, Fulani and Yoruba; these are actually `the major tribes in Nigeria.

The Ijaw tribe and Ijaw women

The Ijaw tribe, where the oil rich Niger Delta originates, is a minority ethnic group located in southern Nigeria. It is a collection of people indigenous to the forest region of Bayelsa, Delta, Rivers, Akwa-Ibom, and Edo States, and parts of Ondo State. It has a population of over 10 million people in about 50 loosely affiliated tribes, sharing the same culture and tradition. The Ijaw language is the predominant language, and about 95% of the inhabitants are Christians.

There is extensive oil exploration in the Niger Delta, and almost all multinational oil companies in the world are present in the region. Yet the region is one of the poorest and most underdeveloped places in the world; largely from exploitation by the dominant tribes in Nigeria, and partly by the multinational oil companies. This has impacted negatively on the socio-economic status of Ijaw women.

Most Ijaw women are not well educated, and their predominantly occupation are farming, petty trading, and fishing. There is a large concentration of rural fishing settlements in the region; this may be one of the reasons why almost all Ijaw towns and villages are located along riverbanks. However, the environmental degradation and pollution posed by extensive oil exploration has exponentially reduced the sources of survival of these women. Despite the high level of oil exploration in the region, a great majority of Ijaw women are unemployed, and the state civil service (with poor salary) is the main source of employment. This is because all the oil companies in Bayelsa State have their headquarters and offices located in other states for political reasons. Ijaw women are very fertile, with low contraceptive use and large family size. This coupled with their low income further aggravates the poverty level.

Study design

It was an observational cross-sectional study of 1484 booked pregnant women of Ijaw ethnic group, who delivered in the labour ward of the Niger Delta University Teaching Hospital, from January 2010 to January 2016.

Inclusion criteria

Those who were included in this study were women of Ijaw tribe, who registered for antenatal care, and delivered vaginally in the NDUTH. Also included were women who were already in labour but developed complications and were delivered by caesarean section.

Exclusion criteria

Those who did not belong to Ijaw tribe and were unbooked, were excluded from this study. Unbooked patients were excluded because of non-availability of information concerning maternal weight and height in their case notes. Women who delivered by elective caesarean section, and those who were not in labour, but had emergency caesarean section secondary to antenatal complications (such as severe antepartum haemorrhage, severe preeclampsia and eclampsia) were also excluded. Those who delivered before 28 weeks gestation were also excluded because fetal viability in Nigeria is 28 weeks and above.

Measurement of maternal height, weight and body mass index (BMI)

Maternal height measurement was carried out in the antenatal clinics using the Leicester height measuring scale. The patients were asked to mount the scale with their shoes off; using the calibrated scale, their respective heights were measured in centimeters and recorded. Women whose heights were below 150cm were assumed to be of short stature.

Maternal weight was measured with an adult weighing scale, and body mass index was calculated for each parturient using the formula: Body mass index (BMI) = weight in kilograms divided by height in meter square (kg /m^2), [23] this was accomplished using transformation on SPSS statistical software. BMI was then categorized as follows [23]:

< 18.5 kg /m^2	under weight
18.5 – 24.9 kg /m.^{2}	normal weight
25.0 – 29.9 kg /m.^{2}	overweight
30.0 – 34.9 kg /m.^{2}	obesity class 1
35.0 – 39.9 kg /m.^{2}	obesity class 2
> 40.0 kg /m^2	obesity class 3

Data collection

Data were retrieved from the delivery registry of the labour ward, and antenatal clinic. The case notes of 1832 women of Ijaw tribe who delivered during the study period were retrieved from the hospital records department. Out of these, a total of 1484 women who fulfilled the inclusion criteria were recruited for this study. Data relevant to this study were obtained; these include maternal age, parity, educational level, and occupation. Other information obtained was maternal height and weight at booking, gestational age at booking and at delivery, birth weight, and sex of the new born.

Data analysis

Data collected from each subject was entered into SPSS version 20 for windows, and EPI info version 7 software. Categorical variables were compared with chi square and odds ratio, and the degree of association for quantitative variables was determined using Pearson's correlation coefficient. Simple linear regression and multivariate analysis were employed to identify the predictor variables, confidence interval was set at 95%, and statistical significance was set at p value of < 0.05.

Ethical committee

Approval for this study was granted by the ethical committee of NDUTH

RESULTS

Table 1

Frequency Distribution of the Demographic Factors

Variable	Number (n = 1484)	Percentage
Maternal age		
15.0 - 0.0 (years)	60	4.0
20.1 - 24.9 (years)	192	12.9
25.0 - 29.9 (years)	640	43.1
30.0 - 34.9 (years)	392	26.5
35.0 - 39.0 (years)	176	11.9
≥ 40 (years)	24.0	1.6
Parity		
Para 0	426	19.1
Para 1	373	25.1
Para 2	360	24.3
Para 3	216	14.6
Para 4	108	7.3
≥ 5	144	9.7
Educational level		
Nonformal	4	0.3
Primary	164	11.1
Secondary	712	48.0
Tertiary education	604	47.0
Occupation		
Fishing	247	16.6
Farming	299	20.1
Petty trader	306	20.6
Housewife	152	10.2
Business	165	11.1
Student	112	7.5
Civil servant	203	13.7
Gestational age at booking		

Early booking (< 20 weeks)	568	38.3
Late booking (≥ 20 weeks)	916	61.7
Gestational age at delivery		
Preterm delivery (< 37 weeks)	144	9.7
37 – 40 weeks	1124	75.7
Postdate (above 40 weeks, up to 6 days)	180	12.1
Postterm (42 weeks and above)	8	2.5
Maternal height		
Short stature (< 150cm)	72	4.9
Normal height (150cm and above)	1412	95.1
Body mass index		
Underweight (<18.5 kg /m^2)	24	1.6
Normal weight (18.5 – 24.9 kg /m.^{2})	564	38.0
Over weight (25.0 – 29.9 kg /m.^{2})	584	39.4
Obesity class 1 (30.0 – 34.9 kg /m.^{2})	240	16.2
Obesity class 2 (35.0 – 39.9 kg /m.$^{2)}$	64	4.3
Obesity class 3 (> 40.0 kg /m^2)	8	0.5
Birth weight		
Extreme low birth weight (< 1.00kg)	-	-
Very low birth weight (1.00 – 1.49kg)	22	1.5
Low birth weight (1.50 – 2.49kg)	100	6.7
Normal birth weight (2.5 – 3.9kg)	1298	87.5
Fetal macrosomia (4.0kg and above)	64	4.3
New born sex		
Male	792	53.4
Female	692	46.6

The prevalence of preterm delivery was 9.7%, that for postdate was 21.1%, while only a handful, 2.5% delivered postterm.

The mean maternal age was 28.59 + 5.01 years, the mean parity was 1.95+1.53, and that for gestational age at booking was of 22.57 + 8.37 weeks. The mean gestational age at delivery was 38.65 + 2.38 weeks, with a range of 28 – 43 weeks. The maternal height was 161.01 + 6.52 meters, BMI was 26.53 + 4.55, and that for fetal weight was 3.12 + 0.50 kg.

Majority of the women in this study were 25.0 - 29.9 years old, most of the patients 712(48.0%) attained secondary education, and they were predominant petty trading 306(20.6%). Most of the women 916(61.7%) booked for antenatal care after 20 weeks gestation, and a great majority (75.7%) delivered at term.

Table 2

Demographic Factors and Gestational Age at Delivery

Variable	Preterm	37- 40 weeks	Postdate	Postterm	Total
Maternal age					
15.0 – 20.0	-	44(73.3)	16(26.7)	-	60(100)
20.1 – 24.9 years	24(12.5)	160(83.3)	8(4.2)	-	192(100)
25.0 – 29.9 years	66(10.3)	494(77.2)	68(10.6)	12(1.9)	640(100)
30.0 – 34.9 years	44(11.2)	292(74.3)	52(13.3)	4(1.0)	392(100)
35.0 – 39.9 years	8(4.5)	114(64.8)	36(20.0)	18(10.2)	176(100)
≥ 40 years	2(8.3)	20(83.3)	-	2(8.3)	24(100)
Total	**144(9.7)**	**1124(75.7)**	**180(12.1)**	**36(2.4)**	**1484(100)**
Parity					
Para 0	18(6.3)	226(79.6)	40(14.1)	-	284(100)
Para 1	50(13.4)	270(72.6)	48(12.9)	4(1.1)	372(100)
Para 2	16(4.4)	318(88.3)	16(4.4)	10(2.8)	360(100)
Para 3	24(11.1)	146(67.6)	44(20.4)	2(0.9)	216(100)
Para 4	8(7.4)	92(85.2)	-	8(7.4)	108(100)

≥ Para 5	28(19.4)	72(50.0)	32(22.2)	12(8.3)	144(100)
Total	**144(9.7)**	**1124(75.7)**	**180(12.1)**	**36(2.4)**	**1484(100)**
Educational level					
Non formal	-	4(100)	-	-	4(100)
Primary	28(17.1)	112(68.3)	24(14.6)	-	164(100)
Secondary	72(10. 1)	532(74.7)	88(12.4)	20(2.8)	712(100)
Tertiary	44(7.3)	476(78.8)	68(11.3)	16(2.6)	604(100)
Total	**144(9.7)**	**1124(75.7)**	**180(12.1)**	**36(2.4)**	**1484(100)**
Occupation					
Fishing	26(10.5)	184(74.5)	31(12.6)	6(2.4)	247(100)
Farming	33(11.0)	229(76.6)	30(10.0)	7(2.3)	299(100)
Petty trader	27(8.8)	234(76.5)	36(11.8)	9(2.9)	306(100)
Housewife	19(12.5)	108(71.1)	21(13.8)	4(2.6)	152(100)
Business	10(6.1)	129(78.2)	19(11.5)	7(4.2)	165(100)
Student	8(7.1)	87(77.7)	17(15.2)	-	112(100)
Civil servant	21(10.3)	153(75.4)	26(12.8)	3(1.5)	203(100)
Total	**144(9.7)**	**1124(75.7)**	**180(12.1)**	**36(2.4)**	**1484(100)**
Gestational age at booking					
Early booking	50(8.4)	438(77.1)	72(12.7)	8(1.4)	568(100)
Late booking	94(10.4)	686(74.9)	108(11.8)	28(3.1)	916(100)
Total	**144(9.7)**	**1124(75.7)**	**180(12.1)**	**36(2.4)**	**1484(100)**
Maternal height					
Short stature	72(100)	-	-	-	70(100)
Normal height	72(10.2)	1124(100)	180(12.7)	36(2.5)	1412(100)
Total	**144(9.7)**	**1124(75.7)**	**180(12.1)**	**36(2.4)**	**1484(100)**

Body mass index					
Under weight	8(33.3)	14(58.10	-	2(8.3)	24(100)
Normal weight	34(6.0)	450(79.8)	76(13.5)	4(0.7)	564(100)
Overweight	82(14.0)	438(75.6)	60(10.3)	4(0.7)	580(100)
Obesity class 1	12(5.0)	176(73.3)	28(11.7)	24(10.0)	240(100)
Obesity class 2	8(12.5)	46(71.9)	8(12.5)	2(3.1)	64(100)
Obesity class 3	-	-	8(10.0)	-	8(100)
Total	**144(9.7)**	**1124(75.7)**	**180(12.1)**	**36(2.4)**	**1484(100)**
Birth weight					
Very low birth weight	22(100)	-	-	-	22(100)
Low birth weight	56(56.0)	42(42.0)	-	2(2.0)	100(100)
Normal birth weight	58(4.5)	1036(79.8)	172(13.3)	32(2.5)	1298(100)
Fetal macrosomia	8(12.5)	46(71.9)	8(12.5)	2(3.1)	46(100)
Fetal sex					
Male	90(11.4)	596(75.6)	76(9.6)	26(3.3)	788(100)
Female	54(7.8)	528(76.3)	100(14.5)	10(14.5)	692(100)
Total	**144(9.7)**	**1124(75.7)**	**180(12.1)**	**36(2.4)**	**1484(100)**

Most of the preterm deliveries 66(10.3%) were from women aged 25.0 – 29.9 years, while postterm deliveries were predominantly from women with advanced maternal age 35.0 – 39.9 years.

With respect to BMI, the rate of preterm delivery among women who were underweight was 8(33.3%), when compared to women with normal weight 36(6.0%). The difference was statistically significant, Odds ratio = 7.79[3.12, 19.50] P = 0.0001. However, there was no significant difference in BMI among those who delivered at term, $X^2 = 0.27$, P = 0.60. Regarding postterm delivery, 4(0.7%) of women with normal BMI delivered postterm, and the rate in class 1 obesity was 24(10.0%). The difference was significant, Odds ratio = 16.0[4.59, 55.8]

It was observed that preterm delivery was more common in women with secondary education 72(10.1 %) than those with tertiary education 44(7.3 %). The difference was statistically significant, Odds ratio = 2.27[1.40, 3.68], X^2 = 11.32, P = 0.0001.

Regarding booking for antenatal care, late booking was significantly associated with preterm delivery, X^2 = 4.13, P = 0.04, when compared to delivery at term.

Predominantly more male babies were delivered postterm than female babies, Odds ratio = 6.76[2.41, 18.96].

Table 3

Correlation between Demographic Factors and Gestational Age at Delivery

Demographic Factor	Pearson's correlation coefficient
Maternal age	0.012
Parity	0.008
Educational level	0.108
Occupation	0.230
Gestational age at booking	0.044
Maternal height	0.080
Body mass index	0.007
Birth weight	0.394
Fetal sex	- 0.003

The association between most of the demographic factors and gestational age at delivery was relatively weak, except for birth weight.

Table 4

Simple linear regression of the Demographic factors

Predictor variable	**r^2 (%)**	**F-ratio**	**P value**
Maternal age	0.00	0.203	0.652
Parity	0.00	0.099	0.753
Educational level	1.20	17.583	0.000
Occupation	0.10	0.764	0.382
Gestational age at booking	0.20	2.889	0.89
Maternal height	0.60	9.602	0.002
Body mass index	0.00	0.076	0.786
Birth weight	15.0	271.84	0.000
Fetal sex	0.00	0.012	0.911

Birth weight, educational level and maternal height were the strongest predictors of gestational age at delivery, accounting for 15.0%, 1.2%, and 0.6% respectively.

Table 5

Stepwise Multivariate Analysis of Demographic Factors and Gestational Age at Delivery

Predictor variable	**Step 1**	**Step 2**	**Step 3**
Birth weight	0.394	0.394	0.394
Educational level		0.399	0.399
Maternal height			0.399
Constant	32.82	32.42	31.71
r^2	15.0	15.9	15.9
F-ratio	271.838	139.94	443.67
P value	0.000	0.000	0.000

Fifteen point nine (15.9%) of the variation in gestational age at delivery was accounted for by variation in the demographic factors (birth weight, educational level and maternal height).

Ethical committee approval

Approval to proceed with this study was granted by the ethical committee of NDUTH

Discussion

As a result of the perinatal and maternal complications associated with preterm and postterm delivery, obstetricians and pregnant women prefer to deliver at term, between 37 – 41 weeks gestation; delivery after 41 weeks is considered high risk. The factors that make women to deliver at term are not clearly understood, however theories have been postulated to explain the onset of labour, and some of these have been enumerated above. On the contrary, preterm, postdate and postterm delivery have been widely studied, and in many instances, the associated risk factors are identified. However, there are situations where no risk or etiological factors could be pinpointed (idiopathic); genetic factors could be responsible for some of these cases.

The prevalence of PTB among Ijaw women in this study was 9.7%, this is much lower than the 16.8% reported from a previous study in Nigeria, [5] and the 13.3% reported in Ethiopia. [7] The difference may be due to disparity in the study population, as only an ethnic group was used in this study. Several demographic factors like maternal age, maternal height, body mass index, and parity have been reported by various studies to have significant influence on the rate of PTB. [5, 7, 10]

Advanced maternal age did not seem to have significant influence in the rate of PTB in Ijaw women, as most of the preterm births were from young women aged 25.0 – 29.9 years. This is at variance with findings from a study in Lagos, Nigeria where majority of the women were ≥ 35 years old. [5] In other centers, the maternal age was even higher; ≥ 40 years in Québec, Canada [12] and in IIorin Nigeria [10] respectively.

The relationship between maternal height and PTB has been reported by various studies. In Norway, women of short stature were reported to have higher rate of preterm birth than women of normal height. [22] In Sweden, women of short stature (height ≤ 155cm) had more preterm birth (OR = 1.65) than tall women (height ≥ 179cm). [25] In this study, we did not find a significant association between height and preterm delivery. The discrepancy may be due to the fact that we used a lower cut off points (< 150cm) for short stature.

Evidence from literature search indicates that the effect of BMI on preterm and postterm births as reported by various studies, yields conflicting results. I strongly believe that meta-analysis may be required to streamline this trend. In a study on the influence of obesity on PTB, it was observed that increased BMI was significantly associated with PTB, Odds ratio = 1.50(1.11, 2.03). [26] Evidence from another study indicated that class 3 obesity was significantly associated with preterm birth, Odds ratio = 2.80[1.31, 5.98]. [27] The reverse was the case in this study; the rate of PTB was significantly higher among underweight women, Odds ratio = 7.79(3.12, 19.50). However a similar finding was obtained from a study in Malawi, where underweight was a strong predictor of PTB [28].

Another demographic factor that has been reported to have significant influence on the rate of preterm delivery is parity. In a study in Enugu in Eastern Nigeria, nulliparity was reported to significantly increase the rate of PTB, Odds ratio = 2.08(1.22, 4. 91). [29] In our study, nulliparity seems to play a little role, as only 18 women (6.3%) who delivered preterm were nulliparous. This was far below the 38% reported in Nnewi in Nigeria, [6] the reason for this wide disparity is not clear and calls for further studies.

In a cohort study in Nigeria, not registering for antenatal care was reported as a strong risk factor for PTB, and the impact tend to be more severe as the gestational age at delivery decreases. Odds ratio = 20.8 for early, 8.68 for moderate, and 2.15 for late preterm birth. [5] We could not validate this fact in our study because we used only booked patient. This is because some of the variables such as maternal height and weight needed to calculate BMI were not recorded in the case notes of the unregistered patients in this hospital. However, among the booked patients in our study, preterm birth was more common in women who registered late for antenatal care, $X^2 = 4.13$, $P = 0.04$. The role of early booking for antenatal care requires further investigation; if validated, it could be exploited as a preventive measure for PTB.

With respect to postterm birth, it was not so frequent among the Ijaw women in this study as the prevalence rate was as low as 2.5%. However, it was similar to the 1.16% obtained in China, but much lower than the 8% obtained in other center in Nigeria. [21] Demographic factors reported in previous studies to frequently influence the rate of postterm birth include parity, advanced maternal age, and obesity. [21, 22] Less frequent factors are fetal sex, and low educational level. [30, 31]

Regarding parity and maternal age as risk factors for postterm birth, a study in Stockholm, Sweden, identified low parity as a risk factor for postterm birth, [20] and in another study in China, the risk of postterm birth was reported to be reduced in primiparous women. [19] From the obstetrician's point of view, it's difficult to explain how parity and maternal age prolonged the length of human gestation. Further investigations may be necessary to determine the mechanism. However, in contrast, the influence of parity and maternal age on postterm pregnancy did not manifest in our study.

Maternal obesity has been reported as one of the strongest risk factors for prolonged pregnancy in many centers globally. [23, 24] Findings from a study in Iran revealed that high level of BMI was associated with increased length of gestation ($p < 0.00006$). [24] In another study in Shanghai, China, women who were obese or overweight had increased length of gestation. [32] In our study, the greatest impact of BMI on postterm pregnancy was on women with class 1 obesity, Odds ratio was 16.0(4.59, 55, 8) when compared to women with normal BMI. As it was with parity and maternal age, the mechanism which obesity prolongs pregnancy is also not clear, however, it remains an associated risk factor.

Unlike preterm and postterm birth, the factors that determine delivery at term, from 37 – 42 weeks have not been given much attention by the research community, though various theories have been put forward to explain what triggers onset of labour. Further studies are recommended.

The regression model employed in this study is designed to explain the factors that predicts the gestational age at delivery, irrespective of the category (preterm, term or post term). Evidence from the regression model indicates that the strongest demographic factor for gestational age at delivery is birth weight, followed by educational level, and maternal height. However, all these factors put together could only explain 15.9%. This implies that the bulk of the factors (almost three quarter) that determines the gestational age at delivery are outside these demographic factors.

Conclusion

Though maternal and fetal demographic factors significantly affects birth weight, the bulk of the determinants (84.1%) are outside these factors, and it could be from obstetrics, genetic, or other factors.

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