Pattern and Socio-demographic Determinants of Gestational Age at Antenatal Booking at the Rivers State University Teaching Hospital, Nigeria: A Two-Year Review

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Authors' contributions

This work was carried out in collaboration among all authors. Author PAA designed the study, performed the statistical analyses and wrote the first draft of the manuscript. Authors DAM and NJK assisted in data collection managed the analyses of the study and literature searches. All authors read and approved the final manuscript.

Article Information

Original Research Article

ABSTRACT

Background: Antenatal care is one of the pillars of the SAFE Motherhood Initiative aimed at preventing adverse pregnancy outcome. Early initiation provides an opportunity for optimum utilization of this care with improved maternal and fetal outcomes.
Objective: To determine the pattern and Socio-demographic determinants of gestational age at antenatal booking at the Rivers State University Teaching Hospital (RSUTH) over a two-year period.
Methodology: A retrospective review of hospital records of all pregnant women booked for antenatal care (ANC) at RSUTH in a two-year period, from 1ST May 2017 to 30TH April 2019, was carried out. Data on patients' age, parity and educational level, and gestational age at booking were retrieved using structured pro-forma and analyzed using Epi Info Version 7. Test for significance using Chi-square was set at significant level of *P*<0.05.

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Results: There were 3560 cases, with a mean age of 31.5±4.7 years and a mean gestational age at booking of 22.1±6.8 weeks. Majority of the women (53.9%) booked in the second trimester. Only about a quarter (26.5%) booked early, with 73.5% booking late. Majority of the women (62.2%) fall within the 30-39 age group, are Multiparous (65.3%) and had tertiary education (72.5%). There was no statistically significant relationship between their ages and gestational age at booking ($x2 = 3.372$, p-value=0.761). However, parity ($x2 = 50.015$, p-value=0.000) and educational qualification ($x2 = 18.358$, p-value=0.001) were statistically significant.
Conclusion: The majority of ANC attendees booked late for antenatal care in this study, and only about a quarter booked early. There was a statistically significant difference in parity and educational status as determinants of gestational age at booking, with the nullipara and primary education group booking earlier.

1. INTRODUCTION

Maternal and child health (MCH) are central to achieving the Sustainable Development Goal 3, related to maternal and neonatal outcomes of pregnancy [1]. This is part of the global strategy to reduce the risk of stillbirth and maternal complications, the World Health Organization (WHO) aims to improve the quality of antenatal care by increasing the number of recommended visits (from four to eight), and advocating for the first ANC visit (also known as the booking visit) before 12 weeks of gestation. Early provision of ANC has been found crucial for ensuring optimal care and good maternal and fetal outcome [2].

This form of care enables women attain and maintain a state of good health throughout pregnancy and ensures good outcomes for mother and child [3,4,5]. It exposes pregnant women to health education and counselling regarding the physiological changes that occur and risk factors to adverse pregnancy outcome. It affords opportunity for dietary counselling, immunization against tetanus and malaria chemoprophylaxis, and preexisting medical conditions are also detected early, with plans of management determined early. It is important for women to book early to fully benefit from these interventions [6,7].

The WHO recommended that booking visits should be initiated at ≤12 weeks in the focused antenatal care and <14 weeks in the traditional antenatal care [8]. While this recommendation has been adopted by the national guidelines in developed countries like the United Kingdom and the USA, hardly any such national guidelines can be seen in most developing countries including Nigeria. However, based on the WHO recommendation, commencement of ANC within the first 14 weeks of gestation is widely accepted as early booking, and late if commenced after this period [9,10,11].

Inspite of the documented benefits of early ANC booking and subsequent care, late booking is still common problems in Sub-Sahara Africa, making it difficult to achieve the WHO recommended schedule [10,11,12]. The minimum ANC visits recommended by WHO was possible only for less than about a third of the pregnant women in some SSA countries like Niger (15%), Ethiopia (19%), Chad (23%), Burundi (33%) and Rwanda (35%) [13]. Previous studies have reported the prevalence of late booking in Nigeria to be between 70.9% to 86% [3,14,15], with regional variation in the mean gestational age at booking ranging from 24.3 weeks in Abakaliki [5], 21.8 weeks in Ibadan [9], 23.6 weeks in Niger-Delta [10] and 23.6 weeks in Sokoto [16].

Various reasons for this late booking, as deduced by previous studies, ranges from a belief that there are no advantages for booking in the first trimester, financial constraint and distance from health facility; to busy work schedule, apparently problem-free pregnancy and perceived enemies who may harm the pregnancy [3,5,10,17]. Only few studies were available that have examined the biological or demographic determinants of the gestational age at booking. Onoh RC et al. [5] in their Abakaliki study found that Socio-Biological factors did not significantly contribute to the Gestational age at booking. Aduloju OP et al [18] found that the age, parity and occupation (educational status) of women were significantly associated with early booking, although on further testing with logistic regression only occupation remained significant. Nwagha UI et al. [19] specifically looked at the influence of Parity on gestational age at booking

and found that the average gestational age at booking was significantly lower in Nulliparous women compared to multiparous and grand-multiparous women.

This study therefore, seeks to determine the pattern of gestational age at antenatal booking and possible socio-demographic (Age, Parity, Education) determinants, so as to determine the group of women that will need more targeted health education programmes to change the trend of high late booking in some Sub-Sahara African countries.

2. METHODOLOGY

A retrospective, quantitative study of hospital records of pregnant women booked at the RSUTH for antenatal care in a two years period (1ST May 2017 to 30TH April 2019) was carried out. The study period of two years was chosen as it marked the period of conversion of the former Braithwaite Memorial Specialist Hospital to the RSUTH and is the expected period of child spacing, to limit duplication of cases.

Data on patients' age, parity and educational status and gestational age (GA) at booking were retrieved using structured pro-forma. Two Interns were trained on the structured pro-forma and assisted in the data collection. The GA at booking were categorized into First Trimester (1-13 weeks), Second Trimester (14-26 weeks) and Third Trimester (27-40 weeks). The Age was categorized into ≤19 years, 20-29 years, 30-39 years and ≥40 years. The Parity was categorized into Nullipara (para 0). Multipara (para 1-4) and Grand Multipara (para ≥5).

All pregnant women who registered for antenatal care during the study period, with their gestational age recorded in the records books were included, those with incomplete records were excluded, and a formal sample size was not calculated. There were 3560 cases that met the stated criteria and formed the study population.

Data were analyzed using United States CDC Epi Info Version 7. Data were summarized using

frequencies and proportions for categorical variables; and means, standard deviation, medians and range employed for quantitative variables. The test of significance for the categorical and discrete variables was done using Chi-square at statistically significant level of $P<0.05$.

As the study involved review of existing MCH records, ethical approval, and a waiver for informed consent, was obtained from the Ethics and Research committee of the RSUTH.

The RSUTH is one of two tertiary hospital for referral from all private clinics, maternity homes, primary health centers and secondary health facilities from all the 23 Local government areas of Rivers State, Nigeria. The hospital is funded by the Government and patients are expected to pay directly for services (except few that participate in the National Health Insurance Scheme). The Department of Obstetrics and Gynaecology runs antenatal clinics Mondays through Fridays. It provides emergency obstetric services to women referred from other centers, as well as providing antenatal care and delivery services for low and high-risk pregnant women booked with the hospital. The Hospital attends to about 2000 bookings annually, with over 1500 deliveries per annum. The hospital is well equipped and has availability of qualified team comprising of Obstetricians, Pediatricians and Anaesthetist. There is availability of laboratory and blood bank services in the hospital.

3. RESULTS

A total of 3560 women registered for antenatal care with a mean age of 31.5±4.7 years and a mean gestational age at booking of 22.1±6.8 weeks. The age range was 15-48 years and the modal parity was 3. Majority of the women (53.9%) booked in the second trimester and only about a quarter (26.5%) booked early in the first trimester, with 73.5% booking late. Majority of the women (62.2%) fall within the 30-39 age group, are Multiparous (65.3%) and had tertiary education (72.5%). See Tables 1 and 2.

Table 1. Pattern of gestational age at booking over two years (n = 3560)

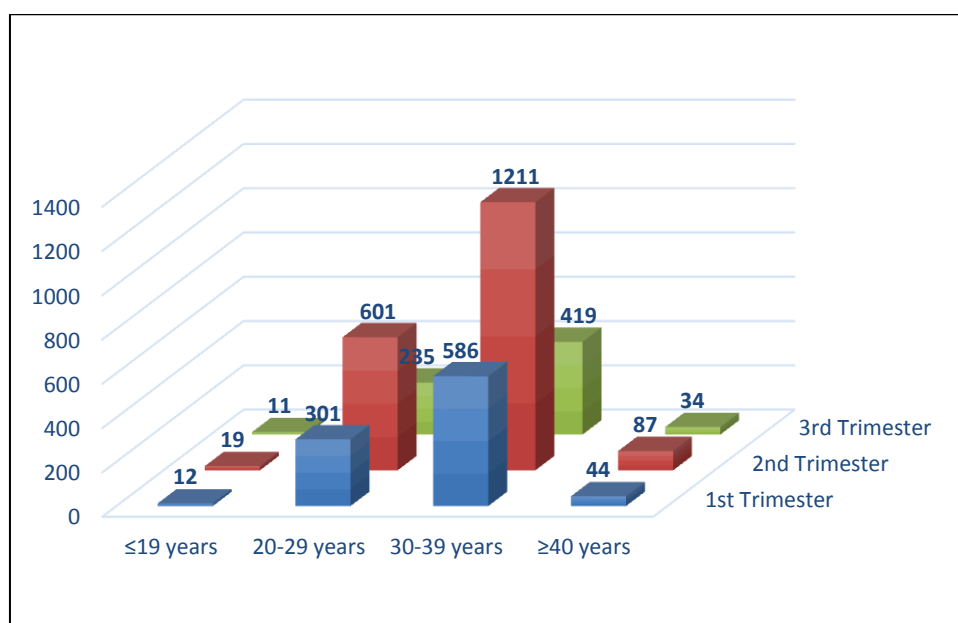| Gestational age	Frequency (N)	Percentage (%)
1st Trimester	943	26.5
2nd Trimester	1918	53.9
3rd Trimester	699	19.6
Total	**3560**	**100.0**

Table 2. Pattern of socio-demographic characteristics for the antenatal clinic attendees (n = 3560)

| Characteristics	Frequency	Percentage
1. Age group		
≤19 years	42	1.2
20-29 years	1137	31.9
30-39 years	2216	62.2
≥40 years	165	4.6
Total	**3560**	**100.0**
2. Parity		
Nullipara	1125	32.4
Multipara	2326	65.3
Grand-multipara	79	2.2
Total	**3560**	**100.0**
3. Educational qualification		
Primary	58	1.6
Secondary	922	25.9
Tertiary	2580	72.5
Total	**3560**	**100.0**

Figs. 1, 2 and 3 show the frequency distribution of the trimester at booking against the age, parity and educational status categories respectively. Majority of the women across the various age categories booked in the second trimester, and so also was for the various categories of parity and educational status.

Table 3 below shows the statistical analysis of the Socio-demographic characteristics and gestational age at booking of antenatal clinic attendees at the RSUTH. There was no statistically significant relationship between their ages and gestational age at booking ($\chi2$ = 3.372, p-value = 0.761). However, parity ($\chi2$ = 50.015, p-value = 0.000) and educational qualification ($\chi2$ = 18.358, p-value = 0.001) were statistically significant. Despite majority of the women across the various parity categories booking in the second trimester, a significant number of the nullipara booked more in the first trimester. So also, a significant number of those with primary education booked early than those with higher education.

Fig. 1. Age frequency distribution of gestational age at booking of the clinic attendees
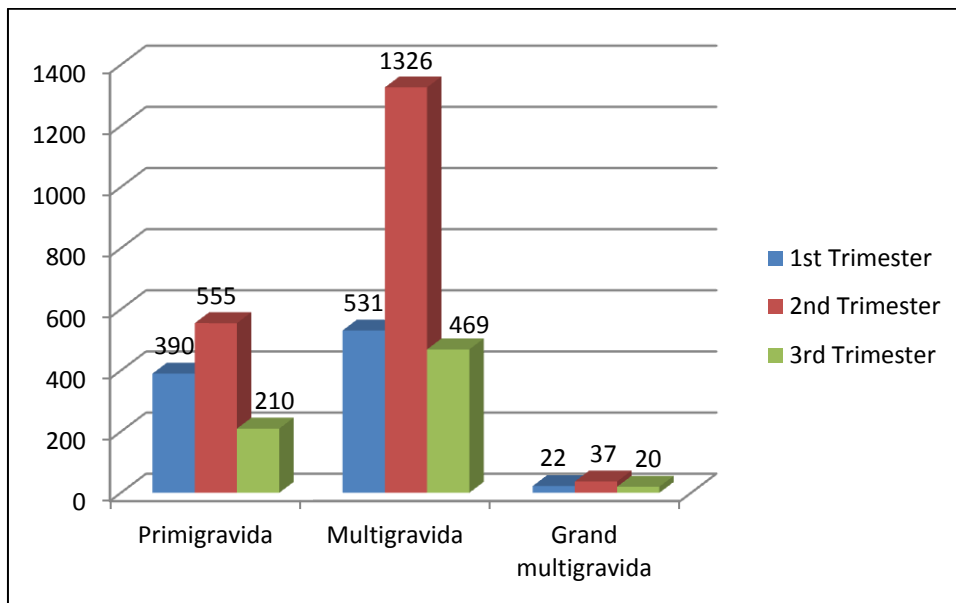
Fig. 2. Parity frequency distribution of gestational age at booking of the clinic attendees
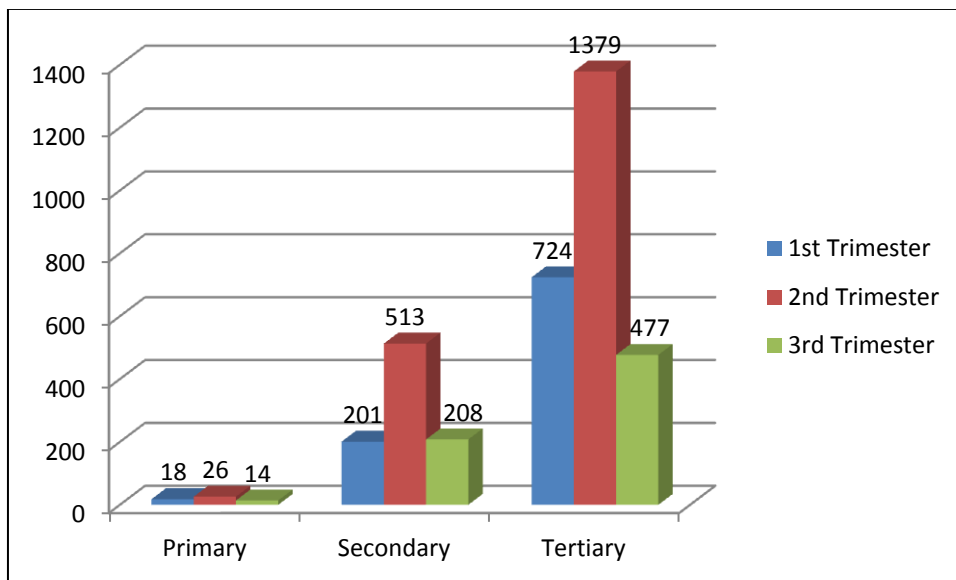
Fig. 3. Educational status frequency distribution of gestational age at booking of the clinic attendees

4. DISCUSSION

This study showed that about a quarter of the study population (26.5%) booked within the WHO recommended time schedule while the rest booked late. The late booking of 73.5% found is however lower than the 77.3% in Ekiti [18], 82.0% in Lagos [15] and 85.9% in Ibadan [9] but higher than the 71.6% in Makurdi [17]. The mean gestational age at booking for ANC in this study was 22.1 weeks which was comparable to 21.1 weeks in Ekiti [18] and 21.8 weeks in Ibadan [9]; slightly higher than 19.1 weeks in Makurdi and 20.3 weeks in Lagos [15]; but lower than 23.5 weeks in Sokoto [16], 23.7 weeks in Benin [10], and 24.3 weeks in Abakaliki [5]. It is interesting to note that despite the documented benefits of early ANC booking and what is obtained in developed and some developing countries, late booking is still predominant in our environment, as shown by this study.

Table 3. Socio-demographic determinants of gestational age at booking of the attendees (n = 3560)

Characteristics	Gestational age			Total	Chi-square	df	p-value
	1st Trimester (n/%)	2nd Trimester (n/%)	3rd Trimester (n/%)				
1. Age group					3.372	6	0.761
≤19 years	12 (28.6)	19 (45.2)	11 (26.2)	42			
20-29 years	301 (26.5)	601 (52.9)	235 (20.7)	1137			
30-39 years	586 (26.4)	1211 (54.6)	419 (18.9)	2216			
≥40 years	44 (26.7)	87 (52.7)	34 (20.6)	165			
2. Parity					50.015	4	0.000*
Nullipara	390 (33.8)	555 (48.1)	210 (18.2)	1155			
Multipara[R]	531 (22.8)	1326 (57.0)	469 (20.2)	2326			
Grand-multipara	22 (27.8)	37 (46.8)	20 (25.3)	79			
3. Educational qualification					18.358	4	0.001*
Primary	18 (31.0)	26 (44.8)	14 (24.1)	58			
Secondary[R]	201 (21.8)	513 (55.6)	208 (22.6)	922			
Tertiary	724 (28.1)	1379 (53.4)	477 (18.5)	2580			

p-value is significant

Our study showed that primigravidae (Nulliparous) women were more likely to book early for ANC than the multipara and this was similar to the findings of previous studies by Okunlola et al. [9], Gharoro and Igbafe [12], Aduloju et al. [18] and Nwagha et al. [19]. The higher the parity, the more likely pregnant women may feel experienced enough as not to book early, which is actually contrary to the fact that they are more likely to be at risk of complications associated with high parity and advanced maternal age.

The educational level of women has been shown by some previous studies to significantly affect the timing of ANC booking. Higher education of women was found to affect early booking in the studies by Adekanle and Isawunmi [15], Ekele and Audu [16] and Aduloju et al. [18]. The argument has been that higher educational level and occupation of the women encouraged early booking because they are well informed of the benefits of ANC and are financially empowered, since majority of them have good source of income. Contrary to the above reasoning, our study found a statistically significant association of lower educational status and early booking. This may be explainable from the fact that It is common practice in our environment for well-educated and financially empowered women to have multiple booking as they can afford it, booking early in private clinics which provide better comfort and privacy than Government owned hospital for antenatal care; and booking later in the Government hospitals close to their

delivery for specialist obstetrician care. This multiple booking may also stern from the fact that services in the government hospitals are frequently interrupted by frequent industrial strike actions. The poorly educated and supposedly less empowered cannot afford multiple booking and hence come early and straight to the government hospital for booking.

Contrary to the findings in our study and others, that parity [9,12,18,19] and education [15,16,18] significantly affected early booking for ANC, this was at variance with the findings of Onoh et al [5] who reported that all the sociodemographic characteristics did not have any significant influence on the timing of antenatal care initiation. This may be due to the differences in the sample size and study populations.

5. CONCLUSION

The majority of ANC attendees booked late for antenatal care in this study, and only about a quarter booked early. There was a statistically significant difference in parity and educational status as determinants of gestational age at booking, with the nullipara and primary education group booking earlier. A community-based study is advocated for; as this will help determine the actual determinants of antenatal booking peculiar to the pregnant women within and around the state.

Women should be adequately educated and informed about the concept of early antenatal registration and its benefits, since no pregnancy

is the same as the other and unexpected adverse outcome may occur despite previous uncomplicated pregnancies. This should be done not only at the antenatal clinics but following discharge after delivery particularly for those who booked late or unbooked in that pregnancy.

6. LIMITATIONS OF STUDY

This study may be limited by the fact that it is a retrospective study and there might be inaccuracies in the documented data such as gestational age. The study is also hospital based and may not reflect what happens in the general population in the state, as some pregnant women do not access the tertiary institutional services.

CONSENT AND ETHICAL APPROVAL

As the study involved review of existing MCH records, ethical approval, and a waiver for informed consent, was obtained from the Ethics and Research committee of the RSUTH.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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