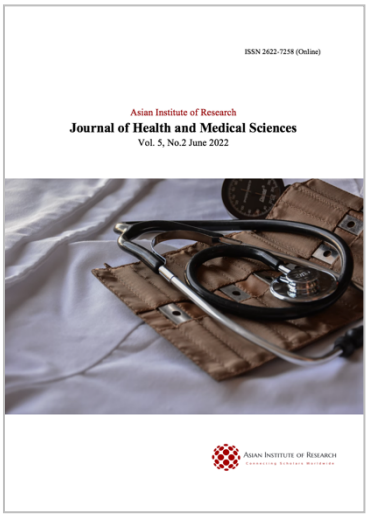

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Trend of Antenatal Bookings in a Teaching Hospital in South Western Nigeria

Olufemi A. Oloyede[1], Peter O. Adefuye[2], Adeniyi K. Akiseku[3]

[1,2,3]Department of Obstetrics and Gynaecology, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria.

Correspondence: Olufemi Oloyede. Fetal-Maternal Medicine Unit, Department of Obstetrics and Gynaecology, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria. Tel: +2348058872319
Email: oloyedeoao@gmail.com

Abstract
Introduction: The age-long practice of late booking is gradually changing towards early pregnancy booking because of the benefits. Implementation of new medical guidelines is however often delayed in developing countries. Aim: The study proposes to observe the trend in antenatal booking in respect of booking gestational age, and the relationship with maternal socio-demographic and obstetric characteristics. Methodology: A retrospective study of antenatal bookings between 2016 and 2020 in Olabisi Onabanjo University Teaching Hospital, Sagamu Ogun State, Nigeria was carried out. Data were collected from pregnant women that had a minimum of 4 clinic attendances and delivered in the hospital. Data analysis was by descriptive statistics and presented in simple frequency tables. Results: Six thousand, eight hundred and ninety-nine pregnancies were booked, with early bookings (< 13 weeks) in 23.9% and late bookings in 64.6% (14-26 weeks) and 11.5% (27-36 weeks). The proportion of early bookings (23.9%) was higher compared with 18.8% reported in 2014 in same centre. Every year, the number of early bookings was initially stable at 20.4%, but rose to 26.7 - 30.8 in the last 2 years of study. Maternal age < 30 years, secondary or tertiary educational level and previous caesarean delivery were the predominant variables among women that booked in early pregnancy. Previous or on-going medical disorders and/or delivery complications were not strongly associated with early booking. Conclusions: The practice of late pregnancy booking is still a major issue, though the proportion of early bookings has continued to increase compared with previous study. Improvement in education, economic empowerment and health education that emphasizes preventive rather than curative role of ANC is advised.

Keywords: Antenatal, Booking, Early and Late Booking, Gestational Age, Developing Countries

1. Introduction

The gestational age at booking have effect on the fetal and maternal outcomes of pregnancy and also determines the number andfrequencies of antenatal visit for clinic-laboratory evaluations of pregnancy and allocation into risk groups**.** The term booking is sometimes used interchangeably with registration and it is regarded as the entry point visit for ANC in an index pregnancy (Aduloju et al., 2016). Longer interval between booking and delivery

GA is believed to be associated with better quality of obstetric performance (Ifenne and Utoo, 2012, Zaman et al., 2019, Okunlola, 2006). Consequently, booking early in pregnancy is advocated in order to allow for more weeks of pregnancy evaluation, and care. Early pregnancy booking has the advantage of establishing the most accurate GA in women with unsure last menstrual period, early diagnosis of fetal structural and chromosomal abnormalities, and ascertainment of baseline health parameters of the woman through urinalysis, packed cell volume, genotype test, retroviral and hepatitis screening and blood group determination (Adegbola and Kuku, 2015, Tolefac et al., 2017, Jice et al., 2018). In addition, common but important medical disorders that contribute to adverse pregnancy outcomes can be predicted through screening tests in early pregnancy, especially in the first trimester (Adegbola and Kuku 2015, Nicolaides 2011). These medical disorders can be prevented and/or the severity significantly reduced by early commencement of preventive measures such as low dose aspirin, thus impacting positively on maternal and perinatal morbidity and mortality (Nicolaides 2011). The World Health Organization (WHO) recommendation on ANC is that first antenatal contact in pregnancy should be within 12 weeks, while other researchers proposed a model in which the first contact should be within13 weeks because of its demonstrated superior advantages in the overall obstetric performance and reduced perinatal and maternal morbidity and mortality (WHO, 2016, Nicolaides, 2011, Ndidi and Oseremen, 2010, Mohammed at al., 2011). This practice should be promoted in developing countries because of resource limitations to manage disorders in pregnancy and prevent morbidity and mortality.

The pattern of antenatal booking is also related to other maternal socio-demographic and obstetric characteristics. Few studies from Nigeria have concurrently focused on the trend in ANC booking and their relationship with maternal socio-demographic and obstetric factors (Ifenne and Utoo, 2012, Zaman et al, 2019, Lamina, 2004). The only study available from Sagamu was published over a decade (Lamina, 2004). The aim of this retrospective study is to observe the trend of antenatal booking in terms of booking GA, using GA < 13 weeks as cut-off between early and late booking and to express booking GA in relationship with maternal socio-demographic and obstetric factors in Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria.

2. Methodology

It is a descriptive retrospective study that was conducted in the Department of Obstetrics and Gynaecology, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State. The case notes of all the pregnant women that were booked between 1st January, 2016 and 31st December, 2020, were retrieved from the Health Information System Department and those with complete records that shows minimum of 4 antenatal clinic attendances and delivery notes were selected for data extraction and analysis, while excluding women who booked after 36 weeks and/or did not attend minimum of 4 antenatal clinics before delivery. The number and frequency distribution of booked antenatal women every year, according to gestational age groups of < 13 weeks, 14-26 weeks and 27-36 weeks were obtained. Additional data about maternal socio-demographic characteristics (maternal age, educational level attained) and obstetric characteristics (parity, previous medical conditions, mode of previous delivery, and complications in previous delivery) were collated. Previous medical conditions involving any systems and complications during delivery were also recorded.

In this study, a booked pregnancy is one that has attended at least four antenatal visits and has had tetanus toxoid (Villar et al., 2001).The booking is considered early, if registration is done before 13 completed weeks of pregnancy and late, if it occurs from the 14th week.

The extracted information was entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0 (SPSS Inc, Chicago, IL). The mean, and range values were determined for gestational ages and other variables and documented in both absolute figures and percentages. Study results are presented as simple frequency tables. Ethical approval for the study was obtained from the Health Research Ethics Committee (OOUTH/HREC/483/2022AP)

3. Results

Six thousand, eight hundred and ninety-nine pregnant women were booked for antenatal during the study period of 5 years, with an average of 1,379.8 booked pregnancies per year.

3.1. Trend of Antenatal Booking

Table 1: Pattern of antenatal booking at different gestational ages

Year	Antenatal Bookings		Booking Gestational Age in Weeks (%)		
	Total (%)	Mean Booking GA	< 13	14-26	27-36
2016	1298 (18.8)	26.5 ± 3.4	312 (20.4)	837 (64.5)	149 (11.5)
2017	1514 (21.9)	19.3 ± 2.5	309 (20.4)	982 (64.8)	223(14.7)
2018	1795 (26.0)	17.4 ± 4.1	361 (20.1)	1213 (67.6)	221 (12.3)
2019	1275 (18.5)	16.6 ± 5.3	393 (30.8)	720 (56.5)	162 (13.7)
2020	1017 (14.7)	17.1 ± 5.5	272 (26.7)	703 (67.2)	42 (4.1)
Total	**6899 (100.0)**	**17.0 + 4.1**	**1647 (23.9%)**	**4455 (64.6%)**	**797 (11.5%)**

The trend of antenatal bookings shows a rise from 1298 (18.8%) in 2016 to its peak of 1795 (26.0%) in 2018 and then declines to its lowest of 1017 (14.7%) in 2020. The majority of pregnancies were booked between 14 and 26 weeks during the study period, with the highest mean booking GA of 26.5 weeks in 2016, the lowest of 16.6 weeks in 2019 which then increased to 17.1 weeks in 2020. The study however also shows that proportionally in each succeeding year, increasing number of pregnancies were booked at GA less than 13 weeks (20.4% in 2016, 20.4% in 2017, 20.1% in 2018, 30.8% in 2019 and 26.7% in 2020), while less numbers were booked at GA of 27-36 weeks (11.5% in 2016, 14.4% in 2017, 12.3% in 2018, 13.7% in 2019 and 4.1% in 2020)

3.2. Maternal Socio-demographic and Obstetric Variables among booked Pregnancies

Table 2: Frequency Distributions of Socio-demographic and Obstetric variables among Booked Pregnancies

Characteristics	Antenatal Bookings (N=6899)	Frequency Distribution (Weeks) < 13 (n=1647)	14-26 (n=4455)	27-36 (n=797)
Maternal Age (years)				
< 20	519 (8.2)	311 (18.8)	180 (4.0)	28 (3.5)
21 – 30	3170 (54.9)	1002 (60.8)	1885 (42.3)	283 (35.5)
31 – 40	2692 (29.1)	240 (14.6)	2063 (46.3)	389 (48.8)
41 – 50	451 (7.1)	73 (4.4)	283 (6.4)	95 (11.9)
>51	68 (0.8)	21 (1.3)	44 (0.9)	3 (0.4)
Education				
No Formal Education	445 (8.0)	8 (0.5)	404 (9.1)	33 (4.1)
Primary	1155 (12.0)	165 (10.0)	749 (16.8)	241 (30.2)
Secondary	3372 (53.1)	667 (40.5)	2267 (50.8)	438 (54.9)
Tertiary	1927 (29.9)	807 (48.9)	1035 (23.2)	85 (10.7)
Parity				
0	2337 (33.9)	378 (22.9)	1698 (38.1)	261 (32.7)
1-2	2352 (34.1)	1167 (70.9)	903 (20.3)	282 (35.3)
3-4	1908 (27.6)	81 (4.9)	1636 (36.7)	191 (23.9)
≥ 5	302 (4.4)	21 (1.3)	218 (4.9)	63 (7.9)
Pre-Existing Medical Disorder				
Present	847 (12.3)	199 (12.1)	623 (13.9)	25 (3.1)
None	6052 (87.7)	1448 (87.9)	3832 (86.1)	772 (96.9)
Mode of Previous Delivery				
Vaginal	5773 (83.7)	1054 (63.9)	3977 (89.3)	742 (93.1)
Cesarean Section	1126 (16.3)	593 (36.1)	478 (10.7)	55 (6.9)
Complications in Previous Delivery				
Present	1041 (15.1)	271 (16.5)	674 (15.1)	96 (12.1)
Absent	5858 (84.9)	1376 (83.5)	3781 (84.9)	701 (87.9)

Table 2 presents the analysis of frequency distribution of some maternal socio-demographic and obstetric variables at different gestational age intervals in the study population.

Generally in all gestational age groups, more pregnancies (63.1%) were booked in women below 30 years compared with women above 30 years (37.0%). The majority of bookings at GA below 13 weeks were in women below 30 years (77.6%), compared with bookings in women above 30 years (20.3%). The maternal age range with the highest number of bookings below 13 weeks is 21-30 years (60.8%). Most of the antenatal bookings between 14 and 26 weeks and after 27 weeks were in women above 30 years of age (53.6% and 61.1% respectively). The maternal age range with highest number of bookings was 31-40 years (46.3%) at 14-26 weeks and 31-40 years (48.8%) at GA between 27 and 36 weeks. Only eight percent of the booked women had no formal education and twelve percent had primary education. Most of the women received either secondary (53.1%) or tertiary (29.9%) education. Women with secondary and tertiary levels of education constituted the majority of bookings in all trimesters.

The bulk (68.0%) of booked women had low parity ($\leq$ 2), while para 3-4 constituted 27.6% and grand multiparity was only 4.4%. Low parity constituted the majority of pregnancies booked in all trimesters. It is however most prominent (93.8%) in those booked at < 13 weeks of pregnancy, compared with 58.4% in 14-26 weeks and 68.0% in > 27 weeks. The majority (87.7%) of booked women did not have any pre-existing medical disorder. The numbers of booked pregnancies without pre-existing medical disorders are similar at < 13 weeks (12.1%) and at 14-26 weeks (13.9%), but lower in those booked at 27-36 weeks (3.1%). Previous caesarean section was the mode of previous delivery in 16.3% of pregnancies. Proportionally, there were more women that had previous caesarean section among bookings at <13 weeks (36.1%), than among women that booked at 14-26 weeks (10.7%) and at 27-36 weeks (6.9%). Previously complicated deliveries occurred in 84.9% of pregnancies booked. The proportion of deliveries that were complicated was similar in all the gestational age groups (83.5% in < 13 weeks, 84.9% in 14-26 weeks and 87.9% in 27-36 weeks).

4. Discussions

Using an upper limit of 13 completed weeks as cut-off for classification into early and late booking, as previously used in the same institution and reportedly used in several other studies allows for more scientifically acceptable data comparison (Lamina 2004, Ndidi and Oseremen 2010). Additional reason for the this choice of cut-off GA is the fact that recommended upper limit for screening and invasive fetal procedures is 13^{+6} weeks, while early ultrasound scan diagnosis of major congenital abnormalities and safe terminations of affected fetuses, are best performed before the 14^{th} week (Nicolaides 2011).Majority of spontaneous miscarriages are expected to have occurred before 13 weeks, leaving behind the apparently healthy fetuses. The other group of studies is those that used 17 weeks as cut-off based on an earlier WHO model of focused antenatal care recommendation (Ifenne and Utoo 2012, Ndidi and Oseremen, 2010).

Although most pregnancies were booked during 14-26 weeks, there was an observable increase in the proportion of pregnancies booked early (23.9%) in this study, compared with the 18.8% reported by Lamina in 2014. Another important finding is that the relative yearly proportion of pregnancies booked in first trimester witnessed a dramatic rise in the last 2 years of the study from its stable frequency in the first 3 years of study. The study therefore confirms the persistence of the tradition of late antenatal booking within the study population, which was also reported in Awka, Nigeria (65%), and Malaysia (56.2%) (Namani et al., 2022, Aung et al., 2016). Our study mean booking GA is 17.0 + 4.1 weeks, while in Lagos, South western Nigeria, it was 19.1 +/- 7.8 (Ifenne and Utoo. 2012), and in Nnewi, Eastern Nigeria, it was 17.58 ± 7.91 weeks (Namani et al., 2022).

This trend of pregnancy booking demonstrates the relationship of maternal age and educational level with booking as previously reported (Ifenne and Utoo, 2012, Adegbola and Kuku, 2015). Specifically, younger women and those who have attained secondary and/or tertiary education are more likely book their pregnancies earlier. The older women tend to book late because they rely on ‘experience’, and ‘would book only when an obvious or potentially catastrophic complication is anticipated’ (Adegbola and Kuku, 2015). The study finding that most women who booked in early pregnancy attained secondary and tertiary educational level agrees with

previously reported research conclusions, and also emphasizes the importance of the girl education towards improving better reproductive outcomes (Ifenne and Utoo, 2012).

Our study findings demonstrate the predominance of low parity (para 0-2) among women that booked early. This pattern could be attributed to the 'fear of the unknown' and lack of experience among this group of women, as previously explained in a study (Okunlola et al., 2006). Those who are of higher parity are believed not to be 'enthusiastic to visit the hospital early to book, probably because of past experience as long as there was nothing unusual with their current pregnancy' (Namani et al., 2022).

Previous or on-going medical disorder and/or delivery complications was not a strong indicator of early booking, as evidenced in this study where only small proportions of women affected by these factors book in early pregnancy, while the majority booked after 14 weeks. A similar observation was made by Ndidi and Oseremen, who reported that majority (73%) of the women booked late because they did not have any serious problem (Ndidi and Oseremen, 2010). Traditionally, women who considered themselves sick constituted the bulk of late bookers (Ifenne and Utoo, 2012). The above practice can be easily reversed through health education emphasis on the preventive rather than curative role of antenatal care, as currently believed by most women (Ndidi and Oseremen, 2010).

5. Conclusion

The practice of late pregnancy booking is still predominant. Concurrently however, the proportion of women that book in early pregnancy is higher than reported in 2004 and increased further in the last 2 years of study. This trend of early pregnancy booking can be sustained through improvement in education, economic empowerment and health education that emphasizes preventive rather than curative role of ANC.

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Ethical approval
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Competing interests
None to declare

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