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Average Gestational Age at Spontaneous Onset of Labour for Pregnant Women in a Tertiary Health Institution in South-South, Nigeria: A 5–Year Review

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Authors' contributions

This work was carried out in collaboration among all authors. Author PCO conceptualised and designed the study, managed literature searches, collated data and wrote the first draft of the manuscript. Author DOA wrote the protocol of the study and supervised the entire research. DCB participated in literature searches and wrote the discussion. Author OIO wrote the abstract and participated in literature searches. Author CI wrote the results. Authors EST and MNC participated in literature searches, and writing of the results and discussion. Author GA collected the entire data for the research. All authors read and approved the final manuscript.

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ABSTRACT

Background: The average gestational age at onset of labour which could be spontaneous or induced differs among pregnant women. The gestational age correlates with the maturity of the foetus which in turn plays an important role in the initiation of labour.
Objective: To determine the average gestational age at onset of labour, induction of labour and Caesarean section at the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria.
Materials and Methods: This was a five-year retrospective review amongst patients who

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presented to the labour ward of Federal Medical Centre, Yenagoa in labour between 1st January, 2016 and 31st December, 2020. Data was entered into a pre-designed proforma and analysed using IBM SPSS version 23.0.

Results: There were 4,571 deliveries in the 5-year period under review. More than half (55.3%) of the women were in the fourth decade of life, with median age of 31 years (15 – 52 years), about half (52.3%), of the women were multiparous, while almost a quarter (23.5%) were primiparous.

The modal gestational age for spontaneous onset of labour for all pregnant women was 38 weeks. Two-third (66.0%) of the women were delivered per vaginam, while the other one-third (34.0%) had Caesarean section.

Conclusion: The gestational age at onset of labour and delivery is associated with foetal and maternal outcomes. It is therefore necessary for women to have antennal care and interventions in pregnancy under qualified healthcare providers, as this will in turn reduce the public health burdens of large number of preterm deliveries.

Keywords: Average gestational age; spontaneous onset of labour; foetal and maternal outcomes.

1. INTRODUCTION

The gestational age at onset of labour varies among pregnant women. Onset of labour can either be spontaneous or induced. For gestational age to be accurately calculated, the last menstrual period should be known with certainty. Gestational age is mainly calculated from last menstrual period and first trimester ultrasound scan (especially when a woman is unsure of her last menstrual period). Pregnancy is term if the gestational age is between 37 and 42 weeks. Onset of labour within this period is normal, and associated with better perinatal outcome compared to preterm and post-term deliveries. The accuracy of gestational age is of paramount importance, as this prevents the significant perinatal morbidity and mortality associated with preterm deliveries.

Expected date of delivery (EDD) is 280 days (40 weeks) from the first day of the last menstrual period. The last menstrual period is usually used because no one knows the exact time of ovulation. For women who do not remember their last menstrual periods, early ultrasound scan done before 13 weeks' gestational age is usually used. The gestational age from ultrasound scan is also used when a woman is unsure of her last menstrual period or if the discrepancy in the estimated gestational age between her last menstrual period and early ultrasound scan is more than 10 days. In this situation, the date from the early ultrasound scan is used even if the woman is sure of her last menstrual period [1].

The exact reason for the normal initiation of labour at term is not fully understood. However, there are certain theories that have been used to explain the events that lead to the onset of labour at term. As pregnancy nears term, the concentration of prostaglandins and oxytocin in the blood gradually increases. Prostaglandins stimulate myometrial contractions and cervical softening/ripening. Oxytocin initiates uterine contractions which continues throughout labour and increases in frequency, intensity and duration until the expulsion of the baby. Before term, there is a balance between progesterone and oestrogen with a slight increase in the concentration of progesterone which maintains the quiescence and relaxation of the uterus. Towards term, this balance begins to reverse; oestrogen concentration becomes more than that of progesterone, until labour starts. The uterus is designed to expel its contents when its elastic limit is reached. This is the reason uterine over-distention is a risk factor for pre-term labour. A good example is in multiple gestation where delivery is usually before term. The mature foetus plays an important role in the initiation of labour. The human placenta and adrenal glands convert cortisol to oestrogen. Cortisol also aids the maturation of the foetal lungs [2].

The average gestational age for the onset of labour for pregnant women was reported in a study in the US as 268 days (38 weeks and two days) [3]. It is only four percent of women that go into labour and get delivered of their babies at their EDD, while about 70% go into labour and get delivered of their babies within 10 days of their EDD, even when the date has been accurately calculated [4]. In a study carried out in Australia, there was a downward trend in the gestational age at spontaneous onset of labour to 37 weeks [5]. Delivery of women at earlier gestational ages has been significantly reported

around the world [6]. We therefore carried out this study to determine the average gestational age at onset of labour in our environment, induction of labour and Caesarean section at the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria. This is to provide data and act as baseline for future research.

2. MATERIALS AND METHODS

This study was a five-year retrospective study. It was carried out at the Department of Obstetrics and Gynaecology, Federal Medical Centre (FMC), Yenagoa, Bayelsa State, South-South, Nigeria between 1st January, 2016 and 31st December, 2020.

All the pregnant women (booked and unbooked) that presented to the labour ward of our facility in spontaneous labour during the period under review were included in this study. All the pregnant women that were delivered (vaginal or Caesarean section) in our facility were also included in the study. The obstetric patients that had miscarriages were excluded from the study.

Data were retrieved from the labour ward records, delivery register and patients' folders during the period under review. These records were entered into a pre-designed proforma. These records included age, marital status, level of education, state of residence, occupation, parity, booking status, gestational age at onset of spontaneous labour, maternal outcome and foetal outcome.

Data were analysed using IBM SPSS version 23.0. Results were presented in frequencies and percentages for categorical variables and mean and standard deviation for continuous variables.

3. RESULTS

3.1 Sociodemographic Characteristics of the Women

There were 4,571 deliveries in the Federal Medical Centre, Yenagoa in the 5-year period under review. The year 2016 had the highest number of deliveries, which was 1,173 (25.7%). The annual number of women presenting to the facility decreased by 38.62% between 2016 and 2020 (Table 1).

More than half (55.3%) of the women were in the fourth decade of life, with median age of 31 years (age range from 15 – 52 years). There was a slight increase in the median age from 30 years in 2016 to 31 years in 2020 (Table 1). Majority (89.5%) of the women were married, Christians (99.3%), and 87.1% attained either secondary (44.9%) or tertiary education (42.2%). About a quarter (26.7%) of the women were traders, while a fifth (20.1%) were unemployed. About one-fifth (19.6%) were civil servants, while 17.8% were professionals. Table 1 reveals the sociodemographic characteristics of the women and relative changes in their sociodemographic characteristics from 2016 to 2020.

3.2 Obstetric Features of the Women

As revealed in Table 2, about half (52.3%), of the women were multiparous, while almost a quarter (23.5%) were primiparous. This trend was observed throughout the period under review with the proportion of multiparous women ranging from 50.6% in 2018 to 53.3% in 2019, while that of primiparous women ranged from 21.9% in 2017 to 26.3% in 2018 (Table 2). While there was a 12.56% increase in primiparous women presenting to the Centre between 2016 and 2020 for management, a decrease in the percentage of nulliparous (6.30%), multiparous (0.76%) and grand-multiparous women was observed. About two-third (65.3%) of the women booked for antenatal care in 2018, while slightly less than three-quarter booked in 2019. The average proportion of women who booked for antenatal care in pregnancy in the period under review was 70.4%; this means that 3 in 10 women went through their pregnancies without any form of antenatal care (Table 2). There was 11.55% decrease in the number of unbooked women in the review period.

One hundred and sixty-three pregnancies (3.6%) had multiple gestation (3.2% were twins and 0.4% were triplets). A 35.71% increase was observed in the annual incidence of twinning, while a 40% decrease in triplets was observed. Two-third (66.0%) of the women were delivered per vaginam, while the other one-third (34.0%) had Caesarean section. The Caesarean section rate ranged between 21.6% in 2017 to 47.4% in 2020. Majority of the abdominal deliveries were emergency Caesarean sections accounting for 17.4% and 38.1% of total deliveries in 2017 and 2020 respectively (Table 2).

Table 1. Sociodemographic characteristics of women and relative change

Characteristics	Total N (%)	Year					Relative Change
		2016 N (%)	2017 N (%)	2018 N (%)	2019 N (%)	2020 N (%)	
All parturients	4571	1173	1135	704	839	720	-38.62
Age of participants							
< 20years	126 (2.8)	31 (2.6)	30 (2.6)	21 (3.0)	23 (2.7)	21 (2.9)	11.54
20 - 29years	1750 (38.3)	475 (40.5)	461 (40.6)	244 (34.7)	311 (37.1)	259 (36.0)	-11.11
30 - 39years	2528 (55.3)	617 (52.6)	594 (52.3)	432 (61.4)	474 (56.5)	411 (57.1)	8.56
>40years	167 (3.7)	50 (4.3)	50 (4.4)	7 (1.0)	31 (3.7)	29 (4.0)	-6.98
Median Age (Range)	31 (15–52)	30 (15-44)	30 (15-44)	31(15-52)	31 (15-51)	31(15-51)	
Marital Status							
Single	472 (10.3)	118 (10.1)	113 (10.0)	75 (10.7)	88 (10.5)	78 (10.8)	0.00
Married	4090 (89.5)	1053 (89.8)	1020 (89.9)	629 (89.3)	748 (89.2)	640 (88.9)	-1.00
Widowed	9 (0.2)	2 (0.2)	2 (0.2)	0 (0.0)	3 (0.4)	2 (0.3)	50.00
Religion							
Christianity	4537 (99.3)	1163 (99.1)	1125 (99.1)	703 (99.9)	831 (99.0)	715 (99.3)	0.20
Others	34 (0.7)	10 (0.9)	10 (0.9)	1 (0.1)	8 (1.0)	5 (0.7)	-22.22
Level of Education							
No formal Education	38 (0.8)	0 (0.0)	0 (0.0)	10 (1.4)	14 (1.7)	14 (1.9)	35.71
Primary Education	550 (12.0)	132 (11.3)	126 (11.1)	94 (13.4)	102 (12.2)	96 (13.3)	17.70
Secondary Education	2054 (44.9)	554 (47.2)	537 (47.3)	316 (44.9)	353 (42.1)	294 (40.8)	-13.56
Tertiary Education	1929 (42.2)	487 (41.5)	472 (41.6)	284 (40.3)	370 (44.1)	316 (43.9)	5.78
Occupation							
Civil Servant	894 (19.6)	236 (20.1)	232 (20.4)	137 (19.5)	157 (18.7)	132 (18.3)	-8.96
Trader	1221 (26.7)	321 (27.4)	312 (27.5)	201 (28.6)	207 (24.7)	180 (25.0)	-8.76
Professional	813 (17.8)	206 (17.6)	196 (17.3)	119 (16.9)	158 (18.8)	134 (18.6)	5.68
Farmer	208 (4.6)	53 (4.5)	49 (4.3)	27 (3.8)	43 (5.1)	36 (5.0)	11.11
Artisan	334 (7.3)	92 (7.8)	92 (8.1)	47 (6.7)	57 (6.8)	46 (6.4)	-17.95
HCW	181 (4.0)	45 (3.8)	44 (3.9)	27 (3.8)	35 (4.2)	30 (4.2)	10.53
Unemployed	920 (20.1)	220 (18.8)	210 (18.5)	146 (20.7)	182 (21.7)	162 (22.5)	19.68
Residence							
Bayelsa	4437 (97.1)	1138 (97.0)	1107 (97.5)	685 (97.3)	813 (96.9)	694 (96.4)	-0.62
Outside Bayelsa	134 (2.9)	35 (3.0)	28 (2.5)	19 (2.7)	26 (3.1)	26 (3.6)	20.00

HCW – Healthcare worker

Table 2. Obstetric features, delivery outcomes of women and relative change

Characteristics	Total N (%)	Year – Frequency (%)					Relative Change (%)
		2016 N (%)	2017 N (%)	2018 N (%)	2019 N (%)	2020 N (%)	
All parturients	4571	1173	1135	704	839	720	-38.62
Parity							
Nulliparous	567 (12.4)	149 (12.7)	143 (12.6)	90 (12.8)	99 (11.8)	86 (11.9)	-6.30
Primiparous	1076 (23.5)	261 (22.3)	249 (21.9)	185 (26.3)	200 (23.8)	181 (25.1)	12.56
Multiparous	2391 (52.3)	614 (52.3)	600 (52.9)	356 (50.6)	447 (53.3)	374 (51.9)	-0.76
Grand-multiparous	537 (11.7)	149 (12.7)	143 (12.6)	73 (10.4)	93 (11.1)	79 (11.0)	-13.39
Booking status							
Booked	3216 (70.4)	818 (69.7)	796 (70.1)	460 (65.3)	615 (73.3)	527 (73.2)	5.02
Unbooked	1355 (29.6)	355 (30.3)	339 (29.9)	244 (34.7)	224 (26.7)	193 (26.8)	-11.55
Number of Fetus							
Singleton	4408 (96.4)	1134 (96.7)	1097 (96.7)	679 (96.4)	807 (96.2)	691 (96.0)	-0.72
Twins	147 (3.2)	33 (2.8)	32 (2.8)	25 (3.6)	30 (3.6)	27 (3.8)	35.71
Triplets	16 (0.4)	6 (0.5)	6 (0.5)	0 (0.0)	2 (0.2)	2 (0.3)	-40.00
Induction of Labour							
Had Induction	277 (6.1)	69 (5.9)	71 (6.3)	41 (5.8)	53 (6.3)	43 (6.0)	1.69
No Induction	4294 (93.9)	1104 (94.1)	1064 (93.7)	663 (94.2)	786 (93.7)	677 (94.0)	-0.11
Mode of Delivery							
Vaginal	3019 (66.0)	823 (70.2)	890 (78.4)	419 (59.5)	508 (60.5)	379 (52.6)	-25.07
Elective	310 (6.8)	70 (6.0)	48 (4.2)	59 (8.3)	66 (7.9)	67 (9.3)	55.00
Emergency	1242 (27.2)	280 (23.8)	197 (17.4)	227 (32.2)	265 (31.6)	274 (38.1)	60.08
Fetal Maturity							
Preterm	441 (9.6)	93 (7.9)	93 (8.2)	81 (11.5)	90 (10.7)	84 (11.7)	48.10
Term	4103 (89.8)	1076 (91.7)	1038 (91.5)	610 (86.6)	746 (88.9)	633 (87.9)	-4.14
Post term	27 (0.6)	4 (0.3)	4 (0.4)	13 (1.8)	3 (0.4)	3 (0.3)	0.00
Maternal Outcome							
Alive	4560 (99.8)	1173 (100)	1134 (99.9)	702 (99.7)	835 (99.5)	716 (99.4)	-0.60
Died	11 (0.2)	0 (0.0)	1 (0.1)	2 (0.3)	4 (0.5)	4 (0.6)	500.0
Fetal Outcome							
All Babies	4750	1218	1179	729	873	751	-38.34
Alive	4450 (93.7)	1129 (92.6)	1095 (92.8)	685 (93.9)	824 (94.4)	717 (95.5)	3.13
Died	300 (6.3)	89 (7.4)	84 (7.2)	44 (6.1)	49 (5.6)	34 (4.5)	-39.19

CS – Caesarean section, GA – Gestational age, SD – Standard deviation

Table 3. Gestational age at delivery for all women

GA in	2016		2017		2018		2019		2020		Total	
weeks	N=1173	(%)	N=1135	(%)	N=704	(%)	N=839	(%)	N=720	(%)	N=4571	(%)
28	1	0.1	1	0.1	12	1.7	12	1.4	12	1.7	38	0.8
29	2	0.2	2	0.2	11	1.6	3	0.4	3	0.4	21	0.5
30	4	0.3	4	0.4	17	2.4	3	0.4	3	0.4	31	0.7
31	6	0.5	6	0.5	4	0.6	4	0.5	4	0.6	24	0.5
32	19	1.6	19	1.7	7	1.0	17	2.0	15	2.1	77	1.7
33	8	0.7	8	0.7	6	0.9	5	0.6	5	0.7	32	0.7
34	16	1.4	16	1.4	6	0.9	16	1.9	15	2.1	69	1.5
35	11	0.9	11	1.0	0	0.0	4	0.5	4	0.6	30	0.7
36	26	2.2	26	2.3	18	2.6	26	3.1	23	3.2	119	2.6
37	111	9.5	111	9.8	24	3.4	50	6.0	41	5.7	337	7.4
38	767	65.4	730	64.3	467	66.3	544	64.8	455	63.2	2963	64.8
39	107	9.1	107	9.4	38	5.4	69	8.2	61	8.5	382	8.4
40	56	4.8	56	4.9	64	9.1	62	7.4	55	7.6	293	6.4
41	35	3.0	34	3.0	17	2.4	21	2.5	21	2.9	128	2.8
42	0	0.0	0	0.0	6	0.9	2	0.2	2	0.3	10	0.2
43	2	0.2	2	0.2	7	1.0	0	0.0	0	0.0	11	0.2
44	2	0.2	2	0.2	0	0.0	1	0.1	1	0.1	6	0.1

Table 4. Spontaneous labour, induction of labour and elective Caesarean section for singleton and multiple gestation

Onset of Labour	2016		2017		2018		2019		2020	
	N=1134	(%)	N=1097	(%)	N=679	(%)	N=807	(%)	N=692	(%)
Singleton Pregnancy										
Spontaneous	1008	88.9	990	90.3	590	86.9	694	86.0	586	84.7
Induction	60	5.3	63	5.7	34	5.0	50	6.2	42	6.1
Elective CS	66	5.8	44	4.0	55	8.1	63	7.8	64	9.2
Multiple pregnancy										
	N=39	**(%)**	**N=38**	**(%)**	**N=25**	**(%)**	**N=32**	**(%)**	**N=29**	**(%)**
Spontaneous	35	89.7	34	89.5	21	84.0	27	84.4	24	82.8
Induction	0	0.0	0	0.0	0	0.0	2	6.3	2	6.9
Elective CS	4	10.3	4	10.5	4	16.0	3	9.3	3	10.3

Table 5. Gestational age at spontaneous onset of labour for singleton gestation

GA in	2016		2017		2018		2019		2020		Total	
weeks	N=1008	(%)	N=990	(%)	N=590	(%)	N=694	(%)	N=586	(%)	N=3868	(%)
28	1	.1	1	.1	10	1.7	11	1.6	11	1.9	34	.9
29	2	.2	2	.2	10	1.7	3	.4	3	.5	20	.5
30	4	.4	4	.4	11	1.9	2	.3	2	.3	23	.6
31	4	.4	4	.4	4	.7	2	.3	2	.3	16	.4
32	8	.8	9	.9	7	1.2	12	1.7	10	1.7	46	1.2
33	6	.6	6	.6	6	1.0	5	.7	5	.9	28	.7
34	13	1.3	12	1.2	5	.8	9	1.3	8	1.4	47	1.2
35	7	.7	7	.7			1	.1	1	.2	16	.4
36	20	2.0	20	2.0	12	2.0	23	3.3	20	3.4	95	2.5
37	92	9.1	93	9.4	19	3.2	42	6.1	33	5.6	279	7.2
38	714	70.8	691	69.8	418	70.8	482	69.5	401	68.4	2706	70.0
39	85	8.4	87	8.8	28	4.7	53	7.6	46	7.8	299	7.7
40	45	4.5	46	4.6	54	9.2	46	6.6	41	7.0	232	6.0
41	4	.4	4	.4	0	0.0	0	0.0	0	0.0	8	.2
42	0	0.0	0	0.0	3	.5	2	.3	2	.3	7	.2
43	1	.1	2	.2	3	.5	0	0.0	0	0.0	6	.2
44	2	.2	2	.2	0	0.0	1	.1	1	.2	6	.2

Table 6. Gestational age at induction of labour in singleton gestation

GA in	2016		2017		2018		2019		2020		Total	
weeks	N=60	(%)	N=63	(%)	N = 34	(%)	N=50	(%)	N=41	(%)	N=248	(%)
34	1	1.7	2	3.2	0	0.0	1	2.0	1	2.4	5	2.0
35	2	3.3	2	3.2	0	0.0	0	0.0	0	0.0	4	1.6
36	4	6.7	4	6.3	1	2.9	1	2.0	1	2.4	11	4.4
37	9	15.0	10	15.9	1	2.9	3	6.0	3	7.3	26	10.5
38	3	5.0	3	4.8	5	14.7	10	20.0	4	9.8	25	10.1
39	8	13.3	8	12.7	1	2.9	5	10.0	4	9.8	26	10.5
40	6	10.0	6	9.5	4	11.8	9	18.0	7	17.1	32	12.9
41	27	45.0	28	44.4	16	47.1	21	42.0	21	51.2	113	45.6
42	0	0.0	0	0.0	3	8.8	0	0.0	0	0.0	3	1.2
43	0	0.0	0	0.0	3	8.8	0	0.0	0	0.0	3	1.2

Table 7. Gestational age at pre-labour Caesarean section for singleton gestation

GA in	2016		2017		2018		2019		2020		Total	
weeks	N=66	(%)	N=44	(%)	N=55	(%)	N=63	(%)	N=64	(%)	N=292	(%)
30	0	0.0	0	0.0	1	1.8	0	0.0	0	0.0	1	.3
31	2	3.0	2	4.5	0	0.0	2	3.2	2	3.1	8	2.7
32	3	4.5	2	4.5	0	0.0	2	3.2	2	3.1	9	3.1
33	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	.0
34	0	0.0	0	0.0	0	0.0	4	6.3	4	6.3	8	2.7
35	2	3.0	2	4.5	0	0.0	2	3.2	2	3.1	8	2.7
36	0	0.0	0	0.0	3	5.5	0	0.0	0	0.0	3	1.0
37	6	9.1	4	9.1	2	3.6	2	3.2	2	3.1	16	5.5
38	34	51.5	20	45.5	32	58.2	34	54.0	35	54.7	155	53.1
39	10	15.2	8	18.2	9	16.4	10	15.9	10	15.6	47	16.1
40	5	7.6	4	9.1	6	10.9	7	11.1	7	10.9	29	9.9
41	3	4.5	2	4.5	1	1.8	0	0.0	0	0.0	6	2.1
42	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	.0
43	1	1.5	0	0.0	1	1.8	0	0.0	0	0.0	2	.7

Table 8. Gestational age at spontaneous onset of labour for multiple gestation

GA in	2016		2017		2018		2019		2020		Total	
weeks	N=35	(%)	N=34	(%)	N=21	(%)	N=27	(%)	N=24	(%)	N=141	(%)
28	0	0.0	0	0.0	1	9.5	0	0.0	0	0.0	1	.7
29	0	0.0	0	0.0	1	9.5	1	3.7	1	4.2	3	2.2
30	0	0.0	0	0.0	1	4.8	0	0.0	0	0.0	1	.7
31	0	0.0	0	0.0	5	23.8	1	3.7	1	4.2	7	5.0
32	0	0.0	0	0.0	1	4.8	1	3.7	1	4.2	3	2.2
33	2	5.7	2	5.9	0	0.0	0	0.0	0	0.0	4	2.8
34	0	0.0	0	0.0	1	4.8	2	7.4	2	8.3	5	3.5
35	8	22.9	8	23.5	0	0.0	3	11.1	3	12.5	22	15.6
36	14	40.0	14	41.2	9	42.9	16	59.3	13	54.2	66	46.8
37	4	11.4	4	11.8	2	9.5	2	7.4	2	8.3	14	9.9
38	4	11.4	4	11.8	0	0.0	1	3.7	1	4.2	10	7.1
39	1	2.9	1	3.0	0	0.0	0	0.0	0	0.0	2	1.4
40	1	2.9	1	3.0	0	0.0	0	0.0	0	0.0	2	1,4
41	1	2.9	0	0.0	0	0.0	0	0.0	0	0.0	1	.7

Table 9. Gestational age at induction of labour for multiple gestation

GA in weeks	2016		2017		2018		2019		2020		Total	
	N=0	(%)	N=0	(%)	N = 0	(%)	N=2	(%)	N=2	(%)	N=4	(%)
35	0	0.0	0	0.0	0	0.0	1	50.0	1	50.0	2	50.0
37	0	0.0	0	0.0	0	0.0	1	50.0	1	50.0	2	50.0

Table 10. Gestational age at elective Caesarean section for multiple gestation

GA in weeks	2016		2017		2018		2019		2020		Total	
	N=4	(%)	N=4	(%)	N=4	(%)	N=3	(%)	N=3	(%)	N=18	(%)
36	2	50.0	2	50.0	1	25.0	1	33.3	1	33.3	7	38.9
38	2	50.0	2	50.0	3	75.0	2	66.7	2	66.7	11	61.1

3.3 Delivery Outcomes

There were 11 cases of maternal mortality (0.2%) during the period under review, giving a maternal mortality ratio of 241 deaths per 100,000 births. There was a total of 300 perinatal deaths amounting to 63.2 perinatal deaths per 1,000 births. The perinatal deaths consisted of 280 singleton deaths, death of 8 twins and death of one of the twins in 4 twin pregnancies. No death was reported in the 16 triplet pregnancies in the review period. There however was a decreasing trend in perinatal mortality from 73/1000 in 2016 to 45.3/1000 in 2020 respectively. Table 2 elaborates on the delivery outcomes.

3.4 Gestational Age at Delivery of the Women

In the period under review, delivery occurred between 28- and 44-week's gestation, with a modal gestational age of 38 weeks with slight reduction in percentage from 65.4% to 63.2% in 2016 and 2020, respectively (Table 3). Deliveries at 37 weeks gradually reduced from 9.5% in 2016 to 5.7% in 2020, this was compensated by a gradually increased from 4.8% to 7.6% of birth occurring at 40 weeks' gestation in 2016 and 2020, respectively indicating a right shift in foetal maturity.

3.5 Spontaneous Labour, Induction of Labour and Elective Caesarean Section for Singleton and Multiple Gestation

A disaggregation of data into singleton and multiple gestation, showed a decline in the spontaneous onset of labour in both singleton and multiple gestations in the review period (Table 4). This was offset by a gradual increase in the proportion of elective Caesarean section from 2016 (5.2%) to 2020 (9.2%), while induction of labour remained fairly constant among singleton gestations. The decline in spontaneous onset in multiple gestations was however offset by induction of labour while elective Caesarean section remained constant, except showing a peak in 2018 (Table 4).

3.6 Gestational Age at Spontaneous Onset of Labour, Induction of Labour and Pre-labour Caesarean Section for Singleton Gestation

With singleton gestations, the modal gestational age for spontaneous onset of labour remained at 38 weeks' gestation (Table 5). The right shift towards foetal maturity, where a gradual decrease was observed in spontaneous onset at 37 weeks' gestation (9.1% to 5.6%) and compensated by an increase at 40 weeks gestation (4.5% to 7.0%). Modal gestation age for induction of labour among singleton gestations is 41 weeks (Table 6). However, 62 – 78% of induction of labour is done between 39 – 41 weeks. Modal gestational age for elective Caesarean section among singleton gestations was 38 weeks and elective section are done between 38 and 40 weeks (Table 7).

3.7 Gestational Age at Spontaneous Onset of Labour, Induction of Labour and pre-Labour Caesarean Section for Multiple Gestation

The modal gestational age for spontaneous onset of labour among multiple pregnancies was 36 weeks (Table 8). Induction of labour only occurred in 4 cases of multiple gestation in 2 years between 35 and 37 weeks of gestation in the review period (Table 9). Table 10 revealed that elective Caesarean section occurred more at the 36th and 38th week of gestation among women with multiple gestation.

4. DISCUSSION

In this study, the average gestational age for spontaneous onset of labour among pregnant women was 38 weeks (266 days). Our findings are similar to a study conducted in the US [3] which reported that the average gestational age for spontaneous onset of labour among pregnant women was 38 weeks and 2 days (268 days) but differed from previous studies done in different parts of Nigeria by Omigbodun et al, [7] in Ibadan (274.8 days) and Okeke et al, [8] in Enugu (280 days) whose findings were similar to reports from a UK-based study that included 122,415 nulliparous women with singleton live foetuses that revealed gestational age for spontaneous onset of labour to be 39 weeks (273 days) in Blacks and Asian, but 40 weeks (280 days) in Whites [9]. Although, the reasons for these variations are not very clear, our finding could likely be due to differences in inclusion criteria of these women and the fact that a sizeable proportion of the women in our study were multiparous and more advanced in age. Previous studies have suggested the possibility of shorter average gestational lengths among Black African women to be due to earlier maturation of the

foetoplacental unit with resultant higher rates of preterm deliveries [7,9]. In this study, however, among women who had spontaneous singleton and multiple deliveries this appeared not to be the case.

It was found in this study, that the average gestational age at spontaneous onset of labour for singleton and multiple gestation was 38 weeks and 36 weeks respectively. This corresponds to what is already known about multiple gestation where spontaneous onset of labour is earlier when compared to singleton gestation. There appeared to be no notable change in trends in the average gestational age for pre-labour Caesarean sections in our facility. However, there was a decrease in proportion of women who had a spontaneous onset of labour for both singleton and multiple gestation, and an increasing trend in proportion of women with singleton gestation who were delivered through pre-labour Caesarean from 5.8% in 2016 to 9.2% in 2020. This was probably because of the gradual increase in planned births especially pre-labour Caesarean sections within the study period. In consonance with the seeming increase in obstetric interventions, we observed that there was a 38% reduction in perinatal deaths from 2016 to 2020. This may be due to improved perinatal services such as planned births and availability of both essential and advanced newborn care services and equipments with attendance of Paediatricians at delivery for neonatal resuscitation and provision of any needed post-resuscitation care. Our findings contrasted that of an Australian study [5] which reported a declining trend towards the spontaneous onset of labour with early-term births defined as 37 – 38 weeks' gestation occurring more frequently from an earlier onset of 40 to 39 weeks. Interesting also, was the finding that for both singleton and multiple pregnancies in our study, there was a right shift towards foetal maturity. The exact reason for this is not readily explainable. Our results albeit, varied from studies from other parts of the world.

The annual number of women presenting to our facility decreased by 38.62% between 2016 and 2020. This is explained by the fact that new antenatal care fees were introduced, universal insurance for all civil servants in the state was commenced with inclusion of private health facilities with close proximity to the people. Earlier studies have demonstrated a minute decrease in risk of perinatal death and meconium aspiration syndrome when Induction of Labour (IOL) is conducted after 41 weeks of gestation [10]. Our study revealed that the average gestational age for IOL among singleton pregnancies was 41 weeks. These IOL were mostly done to prevent prolonged pregnancy. Other reasons for IOL before 41weeks and 3 days in our Centre, were hypertensive diseases in pregnancy, premature rupture of foetal membranes and other conditions that require scheduled delivery, as has been reported in other Nigerian studies [11–14]. Our findings may also be a reflection of the shared conundrum that IOL should be strongly considered for post-date pregnancy, when it is plausible that other possibilities such as errors of misdating – discrepancies between menstrual and scan dates, [15] maternal requests or other social factors may be implicated, as similarly reported in other studies [12,16].

This study also showed that the average gestational age for pre-labour Caesarean section among singleton pregnancies was 38 weeks and planned births were routinely done between 38 and 40 weeks. Since beyond 38 weeks, there is associated increasing placental insufficiency and foetal hypoxia, [10] our findings reflect preference for planned births at or around this gestation. Findings that highlight an increase in the rate of planned births over the 5 years under review, with no significant change in the gestational age at which pre-labour Caesarean sections were conducted buttresses the aforementioned reason. There is a growing concern as evidence suggests a relationship between planned births, gestational age, and foetal and maternal outcomes. Findings from studies involving late preterm infants and planned births have been inconsistent, with regards to either decreased [17,18] or increased perinatal survival; [19,20] and early term births less than 40 weeks gestation have been associated with increased infant and maternal morbidity and mortality [21,22]. The finding we report contrasts earlier studies where a decreasing gestation was observed with higher rates of planned births [6].

Our study revealed that over the 5-year period, the overall perinatal mortality rate was 63 per 1000 live births. Although our report was considerably high, it compared favourably to perinatal mortality rates ranging from 77 per 1000 to 129.5 per 1000 live births reported in other studies done in Nigeria [23–25]. It was also worthy of note that there was a decreasing trend in perinatal mortality from 73/1000 in 2016 to

45.3/1000 in 2020 respectively in our facility. Although analysis by gestational age groups was not done in this study the notable decline was probably due to improving perinatal services in the hospital. The perinatal mortality rate noted in this study was probably due to the fact that a good proportion of the women had emergency Caesarean section for high-risk pregnancies and about a third were also unbooked patients that presented with high-risk pregnancies of which some resulted in the reported maternal deaths. The Caesarean section rate in a recent study in this Centre is 42.4% which was mainly due to unbooked patients referred to our Centre from traditional birth attendants and private clinics [26]. In our Centre, unbooked status has consistently been shown to be associated with poor perinatal and maternal outcomes [27,28,29]. There were 11 maternal deaths in the period under review. All of them were unbooked, and four were brought in dead from traditional birth attendants where they had abdominal massage and insertion of herbs into the vagina to control bleeding. This is a common practice in this environment [30]. Studies in Nigeria have also reported unbooked status, advanced maternal age and lack of antenatal care as significant risk factors for perinatal and maternal morbidity and mortality [23–25].

5. CONCLUSION

The gestational age at onset of labour and birth affects foetal and maternal outcomes, as these outcomes show improvement when gestation is term. This review has added to the existing body of knowledge regarding the gestational age and onset of labour. It has exposed the reality on ground regarding this subject area and further highlighted the necessity for interventions to address the need for women to have antennal care under qualified healthcare providers. This will in turn reduce the public health burdens of large number of preterm births. It has revealed a trend in our environment, where there is reduction in antenatal clinic patronage in public Health facilities, increasing Caesarean section rates largely from unbooked patients referred from several TBAs and private facilities in the state.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The research work was examined and approved by the hospital research and ethics committee.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Evaluation of gestation: Combining menstrual and ultrasonographic dates. Medscape; 2021.
Available:https://emedicine.medscape.com/article/259269-overview#a5
Accessed July 28, 2021.
2. Hillman NH, Kallapur SG, Jobe AH. Physiology of transition from intrauterine to extrauterine life. Clin Perinatol. 2012;39(4):769-783.
DOI: 10.1016/j.clp.2012.09.009
3. Jukic AM, Baird DD, Weinberg CR, McConnaughey DR, Wilcox AJ. Length of human pregnancy and contributors to its natural variation. Hum Reprod. 2013;28(10):2848-2855.
DOI: 10.1093/humrep/det297
4. Mongelli M, Wilcox M, Gardosi J. Estimating the date of confinement: Ultrasonographic biometry versus certain menstrual dates. Am J Obstet Gynecol. 1996;174(1):278-281.
DOI: 10.1016/S0002-9378(96)70408-8
5. Nassar N, Schiff M, Roberts CL. Trends in the distribution of gestational age and contribution of planned births in new south Wales, Australia. Thorne C, ed. PLoS ONE. 2013;8(2):e56238.
DOI: 10.1371/journal.pone.0056238
6. Joseph KS, Demissie K, Kramer MS. Obstetric intervention, stillbirth, and preterm birth. Semin Perinatol. 2002;26(4):250-259.
DOI: 10.1053/sper.2002.34769
7. Omigbodun AO, Adewuyi A. Duration of human singleton pregnancies in Ibadan,

Nigeria. J Natl Med Assoc. 1997;89(9):617-621.
8. Okeke TC, Enwereji JO, Ezegwui HU, Aiuku-Brown AC, Adiri CO, Okezie OA. Prospective estimation of duration of pregnancy in women attending antenatal cCare at the University of Nigeria Teaching Hospital, Enugu, Nigeria. Annu Res Rev Biol. 2014;4(14):2274-2282.
9. Patel RR, Steer P, Doyle P, Little MP, Elliott P. Does gestation vary by ethnic group? A London-based study of over 122 000 pregnancies with spontaneous onset of labour. Int J Epidemiol. 2004;33(1):107-113.
DOI: 10.1093/ije/dyg238
10. Gülmezoglu AM, Crowther CA, Middleton P, Heatley E. Induction of labour for improving birth outcomes for women at or beyond term. Cochrane Pregnancy and Childbirth Group, ed. Cochrane Database Syst Rev; 2012.
DOI: 10.1002/14651858.CD004945.pub3
11. Oyebode TA, Toma BO, Shambe IH, Kahansim MI, Embu HY, Daru PH, Sagay AS. Induction of labour at Jos University teaching, hospital, Jos, Nigeria: a four-year review. Int J Res Med Sci. 2015;3(8):1942-1948.
DOI: 10.18203/2320-6012.ijrms20150305
12. Lawani OL, Onyebuchi AK, Iyoke CA, Okafo CN, Ajah LO. Obstetric outcome and significance of labour induction in a health resource poor setting. Obstet Gynecol Int. 2014;2014:e419621.
DOI: 10.1155/2014/419621
13. Fawole B, Nafiou I, Machoki M, Wolomby-Molondo J, Mugerwa K, Neves I, et al. Unmet need for induction of labor in Africa: Secondary analysis from the 2004 - 2005 WHO Global Maternal and Perinatal Health Survey (A cross-sectional survey). BMC Public Health. 2012;12(1):722.
DOI: 10.1186/1471-2458-12-722
14. Burodo AT, Ladan AA, Singh S, Ukwu EA, Hassan M, Nnadi DC, et al. Outcome of induction of labour in a tertiary hospital, North Western Nigeria. Open Access J Gynaecol. 2018;3(4):000167.
15. Doubilet PM. Should a first trimester dating scan be routine for all pregnancies? Semin Perinatol. 2013;37(5):307-309.
DOI: 10.1053/j.semperi.2013.06.006
16. Gardosi J, Vanner T, Francis A. Gestational age and induction of labour for prolonged pregnancy. BJOG Int J Obstet Gynaecol. 1997;104(7):792-797.
DOI: 10.1111/j.1471-0528.1997.tb12022.x
17. Cheng Y, Kaimal A, Bruckner T, Hallaron D, Caughey A. Perinatal morbidity associated with late preterm deliveries compared with deliveries between 37 and 40 weeks of gestation: Later preterm delivery and associated perinatal outcomes. BJOG Int J Obstet Gynaecol. 2011;118(12):1446-1454.
DOI: 10.1111/j.1471-0528.2011.03045.x
18. Leone A, Ersfeld P, Adams M, Meyer Schiffer P, Bucher H, Arlettaz R. Neonatal morbidity in singleton late preterm infants compared with full-term infants: Neonatal morbidity in singleton late preterm infants. Acta Paediatr. 2012;101(1):e6-e10.
DOI: 10.1111/j.1651-2227.2011.02459.x
19. Ananth CV, Vintzileos AM. Trends in cesarean delivery at preterm gestation and association with perinatal mortality. Am J Obstet Gynecol. 2011;204(6):505.e1-505.e8.
DOI: 10.1016/j.ajog.2011.01.062
20. Lisonkova S, Hutcheon JA, Joseph K. Temporal trends in neonatal outcomes following iatrogenic preterm delivery. BMC Pregnancy Childbirth. 2011;11(1):39.
DOI: 10.1186/1471-2393-11-39
21. Morris JM, Algert CS, Falster MO, Ford JB, Kinnear A, Nicholl MC, et al. Trends in planned early birth: a population-based study. Am J Obstet Gynecol. 2012;207(3):186.e1-186.e8.
DOI:10.1016/j.ajog.2012.06.082
22. Clark SL, Miller DD, Belfort MA, Dildy GA, Frye DK, Meyers JA. Neonatal and maternal outcomes associated with elective term delivery. Am J Obstet Gynecol. 2009;200(2):156.e1-156.e4.
DOI: 10.1016/j.ajog.2008.08.068
23. Nwokoro UU, Dahiru T, Olorukooba A, Daam CK, Waziri HS, Adebowale A, et al. Determinants of perinatal mortality in public secondary health facilities, Abuja Municipal Area Council, Federal Capital Territory, Abuja, Nigeria. Pan Afr Med J. 2020;37.
DOI: 10.11604/pamj.2020.37.114.17108
24. Fawole AO, Shah A, Tongo O, Dara K, El-Ladan AM, Umezulike AC, et al. Determinants of perinatal mortality in Nigeria. Int J Gynecol Obstet. 2011;114(1):37-42.
DOI: 10.1016/j.ijgo.2011.01.013.
25. Kuti O, Orji E, Ogunlola I. Analysis of perinatal mortality in a Nigerian teaching

hospital. J Obstet Gynaecol. 2003;23(5):512-514.
DOI: 10.1080/0144361031000153747

26. Allagoa DO, Oriji PC, Tekenah ES, Obagah L, Ohaeri OS, Mbah KM, et al. Caesarean section in a Tertiary Hospital in South-South, Nigeria: A 3-year Review. Eur J Med Health Sci. 2021;3(2):122–127.
DOI: 10.24018/ejmed.2021.3.2.778

27. Allagoa DO, Oriji PC, Wagio TJ, Briggs DC, Oguche IO, Mbooh TR, Atemie G, Eneni B. A 5-year review of uterine rupture in the Federal Medical Centre, Yenagoa, South-South Nigeria. International Journal of Research and Reports in Gynaecology. 2021;4.

28. Oriji PC, Allagoa DO, Briggs DC, Mariere U, Adhuze J, Atemie G. A 5-year review of obstructed labour and it's sequalae in the Federal Medical Centre, Yenagoa, South-South, Nigeria. Int J Clin Obstet Gynaecol. 2021;5.

29. Oriji PC, Allagoa DO, Briggs DC, Adhuze J, Mbooh TR, Atemie G. Multiple gestation and perinatal outcome in the Federal Medical Centre, Yenagoa, South-South, Nigeria: A 5-year review. Magna Scientia Advanced Res Rev. 2021;2.

30. Oriji PC, Allagoa DO, Omietimi JE, Obagah L, Orisabinone IB, Tekenah ES. Abruptio placentae from abdominal massage in a tertiary hospital in South-South, Nigeria: A case series. Yen Med J. 2020;2(3):32–35.

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