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Original Research Article

A five-year review of perinatal and maternal outcomes and their predisposing socio-demographic factors in a tertiary hospital in South-South Nigeria

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ABSTRACT

Background: With a 'Very High' maternal mortality ratio (MMR) of 814 per 100,000 live births, Nigeria contributes the largest proportion of 19% to the global burden of maternal mortality. The causes of maternal and perinatal mortality in Nigeria are linked to the three levels of delay in accessing maternal healthcare. The objective of the study was to identify the sociodemographic contributors to adverse maternal and perinatal outcomes and mortalities in the facility and make appropriate recommendations that would improve maternal and perinatal outcomes/mortalities.
Methods: This research was a retrospective study. It was conducted between January, 2016 and December, 2020. Relevant data was retrieved, entered into a pre-designed proforma, and analysed using Statistical Product and Service Solutions for windows® version 25, SPSS Inc.; Chicago, USA.
Results: Age of the women (X^2=12.94; p-0.005), marital status (X^2=66.86; p-0.001), level of education (X^2=8.77; p-0.033) and occupation of participants (X^2=26.30; p-0.001) were sociodemographic characteristics that are significantly associated with the outcome of pregnancies in this centre. perinatal mortality was also associated with age of the women (X^2=15.52; p-0.001), their marital status (X^2=105.48; p-0.001), level of education (X^2=223.15; p-0.005) and occupation (X^2=229.6; p-0.001).
Conclusions: Our study revealed that socio-demographic factors of the patients to a large extent contributes to maternal and perinatal morbidity and mortality, and not just the three delays.

Keywords: Maternal, Perinatal, Outcome, Morbidity, Mortality

INTRODUCTION

Maternal and perinatal mortality in Nigeria remains high.[1,2] With a 'Very High' maternal mortality ratio (MMR) of 814 per 100,000 live births, Nigeria contributes the largest proportion of 19% to the global burden of maternal mortality, despite constituting only 2% of the world population.[3,4] According to the WHO, 99% of all maternal deaths globally, occur in developing countries, with sub-Saharan Africa (SSA) accounting for two-thirds (66%) of these deaths.[5] Nigeria contributes 29% of the total maternal mortality burden in SSA.[4] With a lifetime risk of dying in pregnancy of 1:22, compared to the lifetime risk in developing countries, estimated at 1:5,400.[5]

Nigerian women are over 200 times more likely to die during pregnancy and childbirth compared to their counterparts in the developed nations of the world. With these statistics, Nigeria was classified as having made 'No Progress' with regards to achieving the Millennium Development Goal (MDG) 5 target of reducing MMR by three-quarters, between 1990 and 2015.[1]

The main causes of direct maternal deaths in Nigeria, as in other sub-Saharan African countries, include obstetric haemorrhage, unsafe abortion, hypertensive disorders of pregnancy, obstructed labour and sepsis.[6–8] Indirect causes of maternal mortality include HIV, malaria, and pre-existing medical conditions, which account for 28.5% of maternal deaths in SSA.[9] Nigeria accounts for 6% of the global burden of neonatal mortality, and her perinatal mortality rate of 76/1,000 live births is amongst the highest in Africa.[10] These neonatal deaths are the result of a lack of skilled or poorly trained birth attendants, poor maternal, emergency obstetric and pediatric care.[2,11]

The causes of maternal and perinatal mortality in Nigeria are linked to the three levels of delay in accessing maternal healthcare, as outlined by Thaddeus and Maine, viz: delays in recognizing an obstetric emergency and deciding to seek care, delays in locating and reaching an adequate healthcare facility, and delays in receiving adequate care when the woman gets to the healthcare facility.[12] Factors contributing to these delays include widespread poverty, ignorance, illiteracy, poor road networks and high cost of transportation, poorly equipped healthcare facilities lacking medical supplies, inadequate, poorly trained and motivated healthcare personnel, and inefficient referral systems.[7,8]

There is an urgent need for evidence-based interventions, policies, guidelines, and programmes to tackle the causes of maternal and perinatal mortality in Nigeria. These would however depend on reliable facility-based, regional and national data, which are lacking in Nigeria, owing to an almost non-existent civic registration and national health information system in the country.[1,2] This study, a five-year retrospective review of maternal and perinatal outcomes at the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria, aimed to identify the sociodemographic contributors to adverse maternal and perinatal outcomes and mortalities in the facility and make appropriate recommendations that would improve maternal and perinatal outcomes/mortalities.

METHODS

This retrospective survey was carried out at the Obstetric Unit of the Federal Medical Centre, Yenagoa, Bayelsa State, South-South, Nigeria, between January, 2016, and December, 2020.

Federal Medical Centre, Yenagoa is one of the two tertiary health institutions in Bayelsa State, which provides service, training and research, and serves as a referral centre for hospitals in Bayelsa State and the neighbouring Rivers and Delta States.

All the obstetric patients managed in our facility during the period under review were included in this study. All gynaecological patients were excluded from the study.

Relevant data were extracted from the case records of the women using a pre-designed proforma. These data included sociodemographic characteristics, clinical characteristics and management, maternal and perinatal outcomes.

Retrieved data were analysed using Statistical Package for the Social Sciences (SPSS) version 25.0. Results were presented in frequencies and percentages for categorical variables; mean and standard deviation for continuous variables; and Chi-square for associations. $P<0.05$ was taken as being statistically significant.

RESULTS

Sociodemographic characteristics of the women

A total of 4,571 obstetric patients were managed in our Centre between 2016 and 2020. The highest (1,173, 25.7%) number of deliveries was seen in 2016, and since then, the number of deliveries gradually reduced (Table 1).

Table 1: Sociodemographic characteristics of the women.

Characteristics	Year – Frequency (%)					Total N=4571 (%)
	2016 N=1173	2017 N=1135	2018 N=704	2019 N=839	2020 N=720	
Age of participants (years)						
<20	31 (2.6)	30 (2.6)	21 (3.0)	23 (2.7)	21 (2.9)	126 (2.8)
20-29	475 (40.5)	461 (40.6)	244 (34.7)	311 (37.1)	259 (36.0)	1750 (38.3)
30-39	617 (52.6)	594 (52.3)	432 (61.4)	474 (56.5)	411 (57.1)	2528 (55.3)
>40	50 (4.3)	50 (4.4)	7 (1.0)	31 (3.7)	29 (4.0)	167 (3.7)
Mean age (SD) in years	30.4 (5.3)	30.4 (5.3)	30.6 (5.4)	30.7 (5.4)	30.8 (5.4)	30.6 (5.4)
Marital status						
Single	118 (10.1)	113 (10.0)	75 (10.7)	88 (10.5)	78 (10.8)	472 (10.3)
Married	1053 (89.8)	1020 (89.9)	629 (89.3)	748 (89.2)	640 (88.9)	4090 (89.5)

Continued.

Characteristics	Year – Frequency (%)					Total N=4571 (%)
	2016 N=1173	2017 N=1135	2018 N=704	2019 N=839	2020 N=720	
Widowed	2 (0.2)	2 (0.2)	0 (0.0)	3 (0.4)	2 (0.3)	9 (0.2)
Religion						
Christianity	1163 (99.1)	1125 (99.1)	703 (99.9)	831 (99.0)	715 (99.3)	4537 (99.3)
Others	10 (0.9)	10 (0.9)	1 (0.1)	8 (1.0)	5 (0.7)	34 (0.7)
Level of education						
None	0 (0.0)	0 (0.0)	10 (1.4)	14 (1.7)	14 (1.9)	38 (0.8)
Primary	132 (11.3)	126 (11.1)	94 (13.4)	102 (12.2)	96 (13.3)	550 (12.0)
Secondary	554 (47.2)	537 (47.3)	316 (44.9)	353 (42.1)	294 (40.8)	2054 (44.9)
Tertiary	487 (41.5)	472 (41.6)	284 (40.3)	370 (44.1)	316 (43.9)	1929 (42.2)
Occupation						
Civil servant	236 (20.1)	232 (20.4)	137 (19.5)	157 (18.7)	132 (18.3)	894 (19.6)
Trader	321 (27.4)	312 (27.5)	201 (28.6)	207 (24.7)	180 (25.0)	1221 (26.7)
Professional	206 (17.6)	196 (17.3)	119 (16.9)	158 (18.8)	134 (18.6)	813 (17.8)
Farmer	53 (4.5)	49 (4.3)	27 (3.8)	43 (5.1)	36 (5.0)	208 (4.6)
Artisan	92 (7.8)	92 (8.1)	47 (6.7)	57 (6.8)	46 (6.4)	334 (7.3)
Healthcare worker	45 (3.8)	44 (3.9)	27 (3.8)	35 (4.2)	30 (4.2)	181 (4.0)
Unemployed	220 (18.8)	210 (18.5)	146 (20.7)	182 (21.7)	162 (22.5)	920 (20.1)
Residence						
Bayelsa	1138 (97.0)	1107 (97.5)	685 (97.3)	813 (96.9)	694 (96.4)	4437 (97.1)
Outside Bayelsa	35 (3.0)	28 (2.5)	19 (2.7)	26 (3.1)	26 (3.6)	134 (2.9)

Table 2: Obstetric features and delivery outcomes of the women.

Characteristics	Year – Frequency (%)					Total N=4571 (%)
	2016 N=1173	2017 N=1135	2018 N=704	2019 N=839	2020 N=720	
Parity						
Nulliparous	149 (12.7)	143 (12.6)	90 (12.8)	99 (11.8)	86 (11.9)	567 (12.4)
Primiparous	261 (22.3)	249 (21.9)	185 (26.3)	200 (23.8)	181 (25.1)	1076 (23.5)
Multiparous	614 (52.3)	600 (52.9)	356 (50.6)	447 (53.3)	374 (51.9)	2391 (52.3)
Grand-multiparous	149 (12.7)	143 (12.6)	73 (10.4)	93 (11.1)	79 (11.0)	537 (11.7)
Median parity (Range)	2 (0-11)	2 (0-11)	2 (0-9)	2 (0-9)	2 (0-9)	2 (0-11)
Booking status						
Booked	818 (69.7)	796 (70.1)	460 (65.3)	615 (73.3)	527 (73.2)	3216 (70.4)
Unbooked	355 (30.3)	339 (29.9)	244 (34.7)	224 (26.7)	193 (26.8)	1355 (29.6)
Number of foetuses						
Singleton	1134 (96.7)	1097 (96.7)	679 (96.4)	807 (96.2)	691 (96.0)	4408 (96.4)
Twins	33 (2.8)	32 (2.8)	25 (3.6)	30 (3.6)	27 (3.8)	147 (3.2)
Triplets	6 (0.5)	6 (0.5)	0 (0.0)	2 (0.2)	2 (0.3)	16 (0.4)
Induction of labour						
Yes	69 (5.9)	71 (6.3)	41 (5.8)	53 (6.3)	43 (6.0)	277 (6.1)
No	1104 (94.1)	1064 (93.7)	663 (94.2)	786 (93.7)	677 (94.0)	4294 (93.9)
Mode of delivery						
Vaginal delivery	823 (70.2)	890 (78.4)	419 (59.5)	508 (60.5)	379 (52.6)	3019 (66.0)
Caesarean section	350 (29.8)	245 (21.6)	285 (40.5)	331 (39.5)	341 (47.4)	1552 (34.0)
Type of Caesarean section						
Elective	70 (6.0)	48 (4.2)	59 (8.4)	66 (7.9)	67 (9.3)	310 (6.7)
Emergency	280 (23.9)	197 (17.4)	227 (32.2)	265 (31.6)	274 (38.1)	1242 (27.2)
Foetal maturity						
Preterm	93 (7.9)	93 (8.2)	81 (11.5)	90 (10.7)	84 (11.7)	441 (9.6)
Term	1076 (91.7)	1038 (91.5)	610 (86.6)	746 (88.9)	633 (87.9)	4103 (89.8)
Post term	4 (0.3)	4 (0.4)	13 (1.8)	3 (0.4)	3 (0.3)	27 (0.6)
Mean GA (SD) in weeks	37.9 (1.6)	37.8 (1.6)	37.6 (2.5)	37.7 (2.1)	37.7 (2.2)	37.8 (1.9)

Continued.

Characteristics	Year – Frequency (%)					Total N=4571 (%)
	2016 N=1173	2017 N=1135	2018 N=704	2019 N=839	2020 N=720	
Mean GA (SD) in days	264.9 (11.2)	265.0 (11.3)	263.4 (17.9)	266.0 (14.3)	263.8 (15.2)	266.0 (13.7)
Maternal outcome						
Alive	1173 (100)	1134 (99.9)	702 (99.7)	835 (99.5)	716 (99.4)	4560 (99.8)
Died	0 (0.0)	1 (0.1)	2 (0.3)	4 (0.5)	4 (0.6)	11 (0.2)
Foetal outcome	**N=1218**	**N=1179**	**N=729**	**N=873**	**N=751**	**N=4750**
Alive	1129 (92.6)	1095 (92.8)	685 (93.9)	824 (94.4)	717 (95.5)	4450 (93.7)
Died	89 (7.4)	84 (7.2)	44 (6.1)	49 (5.6)	34 (4.5)	300 (6.3)

GA – Gestational age, SD – Standard deviation

Table 3: Association between maternal outcome and sociodemographic characteristics of the women.

Characteristics	Total	Maternal Outcome		Chi-square	df	P value
	N=4571	Alive N=4560	Died N=11			
Age of participants (years)						
<20	126	126 (100.0)	0 (0.0)	12.94	3	0.005*
20-29	1750	1740 (99.4)	10 (0.6)			
30-39	2528	2527 (99.9)	1 (0.1)			
>40	167	167 (100.0)	0 (0.0)			
Marital status						
Single	472	463 (98.1)	9 (1.9)	66.86	2	0.001*
Married	4090	4088 (99.9)	2 (0.1)			
Widowed	9	9 (100.0)	0 (0.0)			
Religion						
Christianity	4537	4526 (99.8)	11 (0.2)	0.08	1	0.774
Others	34	34 (100.0)	0 (0.0			
Level of education						
None	38	38 (100.0)	0 (0.0)	8.77	3	0.033*
Primary	550	547 (99.5)	3 (0.5)			
Secondary	2054	2046 (99.6)	8 (0.4)			
Tertiary	1929	1229 (100.)	0 (0.0)			
Occupation						
Civil servant	894	894 (100.0)	0 (0.0)	26.30	6	0.001*
Trader	1221	1220 (99.9)	1 (0.1)			
Professional	813	813 (100.0)	0 (0.0)			
Farmer	208	206 (99.0)	2 (1.0)			
Artisan	334	334 (100.0)	0 (0.0)			
HCW	181	181 (100.0)	0 (0.0)			
Unemployed	920	912 (99.1)	8 (0.9)			
Residence						
Bayelsa	4437	4427 (99.8)	10 (0.2)	1.47	1	0.225
Outside Bayelsa	134	133 (99.3)	1 (0.7)			

*Statistically significant, HCW – Healthcare workers

Table 4: Association between Maternal Outcome and obstetric features of the women.

Characteristics	Total	Maternal Outcome		Chi-square	df	P value
	N=4571	Alive N=4560	Died N=11			
Parity						
Nulliparous	567	567 (100.0)	0 (0.0)	4.25	3	0.236
Primiparous	1076	1075 (99.9)	1 (0.1)			

Continued.

Characteristics	Total	Maternal Outcome			df	P value
	N=4571	Alive N=4560	Died N=11	Chi-square		
Multiparous	2391	2382 (99.6)	9 (0.4)			
Grand-multiparous	537	536 (99.8)	1 (0.2)			
Booking status						
Booked	3216	3216 (100.0)	0 (0.0)	26.17	1	0.001*
Unbooked	1355	1344 (99.2)	11 (0.8)			
Number of foetuses						
Singleton	4408	4397 (99.8)	11 (0.2)	0.41	2	0.816
Twins	147	147 (100.0)	0 (0.0)			
Triplets	16	16 (0.4)	0 (0.0)			
Induction of labour						
Yes	277	277 (100.0)	0 (0.0)	0.71	1	0.399
No	4294	4283 (99.7)	11 (0.3)			
Mode of delivery						
Vaginal delivery	3019	3015 (99.9)	4 (0.1)	4.33	1	0.037*
Caesarean section	1552	1545 (99.5)	7 (0.5)			
Type of CS						
Elective	310	310 (100.0)	0 (0.0)	1.75	1	0.774
Emergency	1242	1235 (99.4)	7 (0.6)			
Foetal maturity						
Preterm	441	440 (99.8)	1 (0.2)	0.07	2	0.965
Term	4103	4093 (99.8)	10 (0.2)			
Post term	27	27 (100.0)	0 (0.0)			

*Statistically significant, CS – Caesarean section

Table 5: Factors related to maternal mortality among the women.

Characteristics	B-coefficient	OR	95%CI		P value
			Min	Max	
Age of participants (20-29 years)					
30-39 years	2.67	14.52	1.86	113.55	0.011*
Marital status (Married)					
Single	3.68	39.99	8.55	199.05	0.001*
Level of education (Primary)					
Secondary education	-0.34	0.71	0.19	2.69	0.618
Occupation (Traders)					
Farmer	2.47	11.84	1.07	131.22	0.044*
Unemployed	2.37	10.70	1.34	85.72	0.026*
Booking status (Booked)					
Unbooked	3.27	26.32	3.39	204.08	0.001*
Mode of delivery (Vaginal)					
Caesarean section	1.23	3.41	1.08	11.68	0.045*

*Statistically significant

Table 6: Association between perinatal mortality and sociodemographic characteristics of the women.

Characteristics	Total	Perinatal outcome			df	P value
	N=4750	Alive N=4450	Died N=300	Chi-square		
Age of participants (years)						
<20	126	108 (85.7)	18 (14.3)	15.52	3	0.001*
20-29	1837	1717 (93.5)	120 (6.5)			
30-39	2605	2451 (94.1)	154 (5.9)			
>40	182	174 (95.6)	8 (4.4)			

Continued.

Characteristics	Total	Perinatal outcome		Chi-square	df	P value
	N=4750	Alive N=4450	Died N=300			
Marital status						
Single	488	405 (82.9)	83 (17.1)	105.48	2	0.001*
Married	4253	4036 (94.9)	217 (5.1)			
Widowed	9	9 (100.0)	0 (0.0)			
Religion						
Christianity	4708	4408 (93.6)	300 (6.4)	2.85	1	0.091
Others	42	42 (100.0)	0 (0.0)			
Level of education						
None	38	38 (100.0)	0 (0.0)	223.15	3	0.001*
Primary	568	488 (85.9)	80 (14.1)			
Secondary	2136	1925 (90.1)	211 (9.9)			
Tertiary	2008	1999 (99.5)	9 (0.5)			
Occupation						
Civil servant	931	919 (98.7)	12 (1.3)	229.63	3	0.001*
Trader	1275	1195 (93.7)	80 (6.3)			
Professional	840	836 (99.5)	4 (0.5)			
Farmer	216	183 (84.7)	33 (15.3)			
Artisan	357	324 (90.8)	33 (9.2)			
HCW	187	185 (98.9)	2 (1.1)			
Unemployed	944	808 (85.6)	136 (14.4)			
Residence						
Bayelsa	4601	4308 (93.6)	293 (6.4)	0.68	1	0.409
Outside Bayelsa	149	142 (95.3)	7 (4.7)			

*Statistically significant, HCW – Healthcare workers

Table 7: Association between perinatal outcome and obstetric features of the women.

Characteristics	Total	Perinatal outcome		Chi-square	df	P value
	N=4750	Alive N=4450	Died N=300			
Parity						
Nulliparous	576	506 (87.9)	70 (12.1)	76.39	3	0.001*
Primiparous	1132	1087 (96.0)	45 (4.0)			
Multiparous	2472	2356 (95.3)	116 (4.7)			
Grand-multiparous	570	501 (87.9)	69 (12.1)			
Booking status						
Booked	3336	3287 (98.5)	49 (1.5)	444.86	1	0.001*
Unbooked	1414	1163 (82.3)	251 (17.7)			
Number of foetuses						
Singleton	4408	4128 (93.7)	280 (6.3)	3.36	2	0.186
Twins	294	274 (93.2)	20 (6.8)			
Triplets	48	48 (100.0)	0 (0.0)			
Induction of labour						
Yes	281	277	4	12.08	1	0.001*
No	4469	4173	296			
Mode of delivery						
Vaginal delivery	3117	2897 (92.9)	220 (7.1)	8.44	1	0.004*
Caesarean section	1633	1553 (95.1)	80 (4.9)			
Type of CS						
Elective	327	320 (97.9)	7 (2.1)	6.67	1	0.010*
Emergency	1306	1233 (94.4)	73 (5.6)			
Foetal maturity						
Preterm	510	446 (87.5)	64 (12.5)	37.68	2	0.001*

Continued.

Characteristics	Total	Perinatal outcome		Chi-square	df	P value
	N=4750	Alive N=4450	Died N=300			
Term	4213	3978 (94.4)	235 (5.6)			
Post term	27	26 (96.3)	1 (3.7)			

*Statistically significant

Table 8: Association between Perinatal mortality and sociodemographic characteristics of the women.

Characteristics	B-coefficient	OR	95%CI		P value
			Min	Max	
Age of participants (<20 years)					
20-29	-0.82	0.44	0.26	0.75	0.003*
30-39	-1.00	0.37	0.22	0.62	0.001*
>40	-1.20	0.30	0.13	0.72	0.007*
Marital status (Married)					
Single	1.96	4.00	3.03	5.26	0.001*
Level of education (Tertiary)					
Primary	3.58	35.78	17.83	71.83	0.001*
Secondary	3.16	23.52	12.03	46.00	0.001*
Occupation (HCW)					
Civil servant	0.20	1.22	0.27	5.49	0.798
Trader	1.84	6.28	1.53	25.75	0.011*
Professional	-0.82	0.44	0.08	2.44	0.349
Farmer	2.63	13.92	3.27	59.32	0.001*
Artisan	2.21	9.16	2.17	38.72	0.003*
Unemployed	2.73	15.39	3.77	62.76	0.001*
Parity (Grand-multiparity)					
Nulliparous	0.08	1.08	0.75	1.55	0.682
Primiparous	-1.10	0.33	0.22	0.50	0.001*
Multiparous	-0.95	0.39	0.28	0.54	0.001*
Booking status (Booked)					
Unbooked	2.70	14.88	10.81	20.46	0.001*
Induction of labour (No)					
Yes	-1.59	0.20	0.08	0.55	0.002*
Mode of delivery (Caesarean section)					
Vaginal	0.38	1.47	1.12	1.92	0.005*
Type of CS (Elective)					
Emergency	0.95	2.58	1.17	5.68	0.018*
Foetal maturity (Term)					
Preterm	0.92	2.51	1.85	3.41	0.001*
Post term	-0.44	0.64	0.09	4.74	0.661

*Statistically significant, HCW – Healthcare workers

A little above half (55.3%) of the patients were between 30- and 39-year-old. The majority (99.3%) of the women were Christians, married (89.5%) and resided in Bayelsa (97.1%). About two-fifth (42.2%) of the women had a tertiary level of education, while one-fifth (20.1%) were unemployed. Table 1 shows the breakdown of sociodemographic characteristics of all the patients.

Obstetric features and delivery outcomes

About half (2,391, 52.3%) of the patients were multiparous; about two-thirds (70.4%) were booked; 163 (3.6%) had multiple gestations; 441 (9.6%) had preterm deliveries, and 11 (0.2%) and 300 (6.3%) of the women and babies died respectively. Table 2 summarized the obstetric features and delivery outcomes of the women.

Association between sociodemographic characteristics, obstetric features and maternal outcome

Tables 3 and 4 shows the associations between sociodemographic characteristics and maternal outcomes among the women. Age of the women (X^2=12.94; p-0.005), marital status (X^2=66.86; p-0.001), level of education (X^2=8.77; p-0.033) and occupation of participants (X^2=26.30; p-0.001) were sociodemographic

characteristics that are significantly associated with the outcome of pregnancies in this centre (Table 3).

Among obstetric features, only booking status (X^2=26.17; p-0.001) and mode of delivery (X^2=4.33; p-0.005) showed a statistically significant association with maternal outcomes (Table 4).

Factors related to maternal mortality

The results of binary logistic regression exploring factors related to maternal mortality showed that women aged 30 – 39 years had a higher likelihood of poor outcome (death) than their counterparts in the second decade of life (OR: 14.52; p-0.011). The single women (OR: 39.99; p-0.001), unbooked women (OR: 26.32; p-0.001) and women who had Caesarean section (OR: 3.41; p-0.045) all had increased odds of dying when compared to the married, booked and women who had vaginal deliveries, respectively (Table 5).

Association between sociodemographic characteristics, obstetric features and perinatal mortality

From Table 6, perinatal mortality was also associated with age of the parturients (X^2=15.52; p-0.001), their marital status (X^2=105.48; p-0.001), level of education (X^2=223.15; p-0.005) and occupation (X^2=229.6; p-0.001). Perinatal mortality showed a significant association with all the obstetric features of the women except multiple gestations (X^2=3.36; p-0.186). While slightly above a tenth of nulliparous and grand-multiparous women (12.1%) had perinatal mortality, less than 1 in 20 primiparous (4.0%) and multiparous women (4.7%) also had the same experience, showing a statistically significant relationship between parity and perinatal mortality (X^2=76.39; p-0.001). Among unbooked women, 17.7% of babies died, while only 1.5% of babies delivered to booked women died, reflecting a significant association (X^2=444.86; p-0.001) between perinatal mortality and the booking status of the women in the review period (Table 7). Table 7 also showed that other factors with significant association with perinatal mortality included induction of labour (X^2=12.08; p-0.001), mode of delivery (X^2=8.44; p-0.004), type of abdominal delivery (X^2=6.67; p-0.010), and foetal maturity at delivery (X^2=37.68; p-0.001).

Factors related to perinatal mortality

Table 8 showed that there was decreasing odd of perinatal mortality with increasing age of women in the review period (OR - 0.30 - 0.44; p<0.05), and being a single mother had a higher odd of experiencing perinatal mortality when compared to the married counterparts. Women with primary (OR - 35.78; p-0.001) and secondary (OR - 23.52) education have higher odds of perinatal mortality when compared to those with tertiary education (Table 8). Traders (OR - 6.28; p-0.011), farmers (OR - 13.92; p-0.001), artisans (OR - 9.16; p-0.003) and unemployed women (OR - 15.39; p-0.001) were found to have higher odds of suffering perinatal mortality (Table 8).

For parity, the primiparous (OR-0.33; p-0.001) and multiparous (OR-0.39; p-0.001) had reduced odds of perinatal mortality, while the nulliparous and grand-multiparous women did not significantly differ in their odds of having perinatal mortality (p>0.05). As regards the obstetric factors - booking status; the odds of perinatal mortality among unbooked women are 14 times higher when compared to women booked for antenatal care; and mode of delivery, where the odds of having a perinatal death is increased by 47% if delivery was vaginally (OR - 1.47; p-0.005) compared to an abdominal delivery (Table 8).

DISCUSSION

Most maternal deaths can be avoided, as the healthcare interventions to both prevent and manage complications are well recognized. The causes of maternal and perinatal mortality in Nigeria are as earlier alluded to arise mainly from delays in recognizing obstetric emergencies or deciding to seek care, delays in locating and reaching a healthcare facility, and delays in administering adequate care when the woman gets to the healthcare facility. Albeit, several of these factors which are predominantly socio-demographically-related have been reported to underlie the occurrence of these deaths in low-resourced settings. This study assessed the likely predisposing socio-demographic factors associated with the maternal and perinatal deaths that occurred in this facility within the study duration.

It was found that in this study there was an overall maternal mortality rate of 241 per 100,000 live births. The five main causes of maternal death among the 11 out of 4,571 women in this series, already reported in other publications were uterine rupture, obstructed labour, hypertensive disorders of pregnancy, postpartum haemorrhage and puerperal sepsis.[6,8,13-15] Nonetheless, it is worth noting that while some of the major causes of maternal deaths recorded in this study are preventable with early detection, close monitoring and prompt treatment, most of these maternal deaths may plausibly be due to underlying socio-demographic related factors. Our findings, on a closer look, are suggestive of an interplay between maternal socioeconomic position (which includes economic status/income, occupation, gender, and level of education) and individual contexts (which includes biological factors - age, parity, height, weight; underlying health status - anaemia, nutritional status, presence of chronic disease like hypertension of diabetes, history of pregnancy complications; behavioral factors - family planning, harmful traditional practices, emergency obstetric care, illicit abortions; or psychosocial factors - fear of coming to a health facility, previous bad experiences) as aptly put forward in a scoping review on social determinants of maternal health by Hamal et al.[16]

In this study, maternal deaths occurred among women within the 30-39 years age group, those who were unmarried or had a low socio-economic status (either farmers or unemployed) or were unbooked. The latter may have been due to other behavioral factors, as have been previously reported among women in our setting and other parts of Nigeria.[17,18] Whereas the only obstetric risk factor we observed was Caesarean section, which could have been a reflection of the emergency obstetric interventions that had to be performed to mitigate both maternal and foetal wastage.

Our findings buttress the fact that poverty, ignorance and illiteracy remain a vicious cycle and still plays a role in determining maternal access to healthcare and eventual outcomes. Traditional birth Attendants' homes and preference for delivery at homes remains the easy-go-to places or top preferences for most unbooked in our setting, where unsupervised or often incomprehensive care are rendered. Verbal referrals are only considered when obstetric complications arise.

We also report that we had an overall perinatal mortality rate (PMR) of 63.2 per 1000 live births in this study. Our findings were lower than the PMRs ranging from 91 per 1000 to 276 per 1000 reported in other studies in Nigeria.[19–21] The causes of perinatal deaths were predominantly due to already established causes such as severe perinatal asphyxia, sepsis, prematurity and intrauterine foetal wastage emanating from maternal complications of preterm delivery, uterine rupture, cervical insufficiency, umbilical cord prolapse, puerperal sepsis and postpartum haemorrhage. These perinatal deaths were also observed to be related to maternal sociodemographic factors such as age, marital status, level of education and occupation. For instance, increasing maternal age was associated with decreasing perinatal mortality whereas being a single woman, having educational levels below a tertiary level, and either being employed or increased the odds of experiencing a perinatal compromise. Furthermore, being either primiparous or multiparous, unbooked status, use of induction of labour and vaginal delivery were linked to increasing perinatal deaths. Similar findings have been reported in other studies in Nigeria and other parts of Africa.[23] Our findings highlight the need to identify and address underlying maternal socio-demographic factors which are modifiable within the context of the available but limited resources in Nigeria as these would in turn reduce perinatal deaths.[22]

Undoubtedly, the solution to many of these contributory sociodemographic factors which are linked to maternal and perinatal deaths lies in the implementation of appropriate evidence-based policies in Nigeria – at both Federal and State levels: including universal health care and provision of sustainable funds for middle and small-scale businesses aimed at empowering women. Nevertheless, some of these highlighted factors are beyond the boundaries of the health care facilities.

The limitation of this study lies in the fact that it is retrospective hospital-based. Thus, our findings may not reflect what is present in the general population of women in our subregion.

CONCLUSION

Our study revealed that it is not only the three delays that are associated with poor maternal and perinatal outcomes. The socio-demographic factors of the patients to a large extent also contribute to maternal and perinatal morbidity and mortality. All efforts must be instituted to improve maternal and perinatal outcomes in our subregion.

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