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ORIGINAL ARTICLE

Maternal and Neonatal Outcomes of Booked and Un-booked Pregnancies in Benin City, Southern Nigeria: A Comparative Study

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Keywords

Antenatal care; Maternal mortality; Booking status; Perinatal mortality; Southern Nigeria.

ABSTRACT

Background: Nigeria contributes more obstetric, postpartum, and neonatal deaths and stillbirths than any other country globally. Booking and receiving antenatal care (ANC) is a vehicle for multiple interventions and programmes which improve maternal and neonatal outcomes. This study was conducted to assess and compare the maternal and neonatal outcomes of booked and un-booked pregnancies in Benin City, Southern Nigeria.

Methods: A comparative cross-sectional total population study was carried out among booked and un-booked in-patients who had delivered either in a secondary or a tertiary health facility in Benin City. Data was collected using an interviewer-administered questionnaire and patients case notes. Maternal and neonatal outcomes were assessed as favourable and unfavourable and compared with booking status. A p-value <0.05 was considered statistically significant.

Results: A total of 390 (260 booked and 130 un-booked) women, with a mean age (SD) of 30.86 ± 5.77 years (booked) and 28.48 ± 6.22 years (un-booked), participated in the study. A higher proportion, 56 (43.1%) of un-booked women had obstetric complications compared to booked women, 85 (32.7%) (p = 0.044). Fetal morbidity was 9 (3.5%) in booked mothers, compared to 21 (16.2%) of un-booked mothers. (p < 0.001).

Conclusion: Maternal and neonatal outcomes were better in booked pregnancies. Stakeholders should ensure provision of health and hospital policies aimed at improving ANC to prevent poor maternal and neonatal outcomes.

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INTRODUCTION

The World Health Organization (WHO) envisions a world where every pregnant woman and newborn receive quality care throughout the pregnancy, childbirth and postnatal period.[1] Globally, there are 211 maternal deaths per 100,000 live births, and 17 neonatal deaths per

1,000 live births, annually.[2,3] Almost all of the maternal deaths (99%) and child deaths (98%) occur in low- and middle-income countries as a result of complications, most of which are preventable and treatable.[1,4] Nigeria contributes more obstetric, postpartum, neonatal deaths and stillbirths than any other country globally.[5,6] Maternal mortality reduction remains a priority agenda in the sustainable development goals (SDG 3).[7] Within the continuum of reproducetive health care, antenatal care (ANC) provides a platform for important healthcare functions, including health promotion, screening and diagnosis, risk identification, prevention, and management of pregnancy-related or concurrent diseases including malaria, Human Immuno-deficiency Virus (HIV), and Tuberculosis (TB).[1] It has been established that by implementing timely and appropriate evidence-based practices, ANC can prevent maternal and perinatal morbidity and mortality and ensure good health condi-tions.[1,8-11] In addition, ANC also provides an avenue to communicate with pregnant women and families as well as provide social, cultural, emotional and psychological support, in a respectful way. ANC is also an opportunity to promote the use of skilled attendance at birth and healthy behaviours such as breastfeeding, early postnatal care, and planning for optimal pregnancy spacing.

World Health Statistics show that ANC coverage is indirectly correlated with maternal mortality ratio (MMR) worldwide. Evidence documents that countries with low ANC coverage are the countries with very high MMR.[11] For instance, ANC coverage in the United Arab Emirates was 100% with an MMR of 8 per 100,000 and Ukraine had 99% ANC coverage and an MMR of 23. By comparison, in sub-Saharan Africa, Ghana had ANC coverage of 96% and MMR of 380/100000, Chad had 43% ANC coverage and a MMR of 980/100,000, and Nigeria had ANC coverage of 61% and MMR of over 560/100,000. Nigeria's MMR is clearly above the African and global average of 500 and 210 respectively indicating poor ANC utilization.[1]

WHO previously recommended a minimum of four ANC visits with the first visit occurring before 16 weeks

of gestation.[13] However, recently WHO recommends a minimum of eight contacts (one contact in the first trimester, two contacts in the second trimester and five contacts in the third trimester).[1] This new recommendation increases the opportunity of maternal and fetal assessment to notice complications and get better communication between providers and mothers, thereby reducing maternal and fetal morbidity and mortality.[13] In spite of efforts such as this, to ensure a safe pregnancy and outcome opportuni=ties for ANC continue to be missed, breaking a critical link in the continuum of care, with its attendant consequences evident in the poor statistics of maternal and neonatal morbidity and mortality.[14-16] Studies in northern and western Nigeria have shown that un-booked mothers are more likely to have preterm and/or of low birth weight babies and have a higher perinatal mortality.[17-19] This study seeks to compare maternal and perinatal outcomes among booked and un-booked women in a secondary and tertiary health facility in Benin City, Edo State, Southern Nigeria. Findings from this study would assist health policymakers and other stakeholders in the development of public health policies that will enhance family and social support system for pregnant women.

METHODOLOGY

This comparative cross-sectional study was conducted between December 2019 and February 2020 in Central Hospital (secondary facility) and University of Benin Teaching Hospital (UBTH), a tertiary facility. Both are public facilities, located in Benin City, the capital of Edo State and offering promotive, preventive, curative and rehabilitative services in various sub-specialties.[20, 21] Central Hospital, the state owned hospital located near the city center is a 420-bedded facility rendering primary and secondary care to the entire state. It also serves as a referral centre for other secondary and primary health care facilities. The University of Benin Teaching Hospital (UBTH) is a 900-bedded tertiary facility providing care to Edo State and its environs. The Obstetrics and Gynaecology Department is made up of four units namely; Fertility regulation, Infertility and Endocrinology, Materno-

fetal medicine and Gynaecology and Urogynaecology. Antenatal care and antenatal education pro-grammes, family planning services, imaging and laboratory services, labour, and delivery services, gynaecological cancer treatment and management, as well as fertility counselling are rendered by the Obstetrics and Gynaecology Department in both facilities. The O&G department in Central Hospital has 10 consultants, 6 residents and 15 midwives while UBTH has 16 consultants, 32 residents and over 20 midwives. On the average, 60 and 85 deliveries are taken monthly in Central hospital and UBTH, respectively.

All patients admitted to the maternity ward following a delivery, irrespective of outcome, and gave consent between were included in the study from December 2019 and February 2020. Four research assistants (600L medical students) were recruited and underwent a one-day training on the purpose of the study and their roles during the study period. Data were collected following transfer to the maternity wards after delivery (using an interviewer-administered questionnaire) and at discharge, from the patients' records. Relevant clinical data regarding maternal age, gravida, significant maternal dis-orders, blood pressure monitoring, investigations advised, mode of delivery, obstetric complications, weight and sex of the baby, whether live birth or stillbirth, as well as number of days on admission was obtained. Booking status at delivery was the variable used to assign patients to each comparative group. The filled questionnaires were checked for completeness and consistency by the researcher and thereafter given identification codes before entering into IBM SPSS version 25.0 for analysis.[22] Socio-economic status of the respondents was computed based on the occupation of the respondents' spouses and the education of the respondent.[23]

Maternal outcomes assessed included mode of delivery, presence of obstetric (anaemia, preeclampsia, Pregnancy induced hypertension, preterm rupture of membranes, ante-partum haemorrhage, preges-tational diabetes) and intrapartum complications (haemorrhage, vaginal

tears, retained placenta, uterine rupture, obstructed labour), need for blood transfusion and number of days spent in the hospital (< 5days). Neonatal outcomes assessed included gestational age at delivery and birth weight, neonatal morbidities [e.g., neonatal jaundice, birth asphyxia, seizures, neonatal sepsis, and Meconium aspiration syndrome (MAS)], intrauterine foetal death (IUFD) and early neonatal death. Maternal and neonatal outcomes were graded as favourable and unfavourable. A favourable maternal or neonatal outcome was said to occur if there were no maternal or neonatal complications while an unfavourable maternal or neonatal outcome was said to occur if the mother or neonate experienced at least one complication.

Univariate analysis was carried out to assess the distribution of the variables. Bivariate analysis was done using Chi-squared test and Fisher's exact test (where the expected frequency in more than 20% of the cells is less than 5) to determine the association between maternal and neonatal outcomes in booked and un-booked patients. Means (standard deviation) were compared using the student t-test. The level of significance was set at $p < 0.05$ for all statistical associations. Frequency tables were used to present the results. Ethical approval for this study was obtained from the Ethics and Research Committee of University of Benin Teaching Hospital (ADM/E/22/A/VOL.VII/148240). The hospital management and Departmental Heads of both hospitals also granted permission to conduct the study. Respondents were informed that they had the right to decline participation or to withdraw from the study at any time they wished. Respondents were also informed that there were no penalties or loss of benefits for refusal to participate in the study or withdrawal from it. All data was kept secure and made available to only members of the research team.

RESULTS

A total of 390 patients (260 booked and 130 un-booked) were available in the two health facilities during the period under study. A higher proportion of 90 (34.6%) and 52 (40.0%) of booked and un-booked mothers respectively were within the

age group 20 – 29 years while age group <20 years constituted the least proportion of 3 (1.1%) and 3 (3.2%) for the booked and un-booked patients respectively. The mean age (SD) of booked mothers was 30.9±5.77 compared to 28.48 ± 6.22 years for un-booked mothers and the difference in the mean age was statistically significant (p < 0.001).

More booked respondents 233 (89.6%) were married, compared to un-booked respondents 96 (73.8%). The association between marital status and booking status was statistically significant (p = 0.002). Twenty one (8.1%) of the booked respondents were primipara compared to 27 (20.7%) un-booked respondents. The association between parity and booking status was statistically significant (p < 0.001). Of the booked respondents, 197 (75.8%) belonged to high socio-economic class compared to 80 (61.5%) of un-booked respondents. The association between socio-economic status and booking status was statistically significant (p = 0.004). (Table 1)

Maternal outcomes

A higher proportion, 56 (43.1%) of un-booked women had obstetric complications compared to booked women, 85 (32.7%) the association between booking status and obstetric complications was statistically significant (p = 0.044). A higher proportion of un-booked mothers had preeclampsia 8 (6.2%) and PIH 25 (19.2%) compared to booked mothers [pre-eclampsia 3 (1.2%) and PIH 2 (20.7%)] p=0.005 and p=0.001 respectively.

The highest proportion of obstetric complications observed among booked mothers was anaemia 26 (30.6%) while pregnancy induced hypertension 25 (44.6%) had the highest proportion of obstetric complications among un-booked mothers, (p = 0.033). There was also a significant difference in the proportion of intra-partum complications of un-booked mothers 59 (45.4%) compared with booked mothers 90 (34.6%) p=0.020, with the commonest intrapartum complication being vaginal tears, 56 (53.9%) and 39 (43.3%) in booked and un-booked groups respectively.

Table 1: Socio-demographic characteristics of respondents

Variable	Booking status		p – value
	Booked (n = 260) Frequency (%)	Un-booked (n = 130) Frequency (%)	
Age group (years)			<0.001
<20	3 (1.1)	3 (2.3)	
20 – 24	25 (9.6)	29 (22.3)	
25 – 29	90 (34.6)	52 (40.0)	
30 – 34	73 (28.1)	23 (17.7)	
35-39	41 (15.8)	14 (10.8)	
≥40	28 (10.8)	9 (6.9)	
Mean ± SD	30.86 ± 5.77	28.48 ± 6.22	
Marital status			0.002
Single	10 (3.9)	14 (10.7)	
Married	233 (89.6)	96 (73.8)	
Divorced	7 2.6)	7 (5.4)	
Separated	5 (1.9)	4 (3.1)	
Widowed	1 (0.4)	1 (0.8)	
Cohabiting	4 (1.6)	8 (6.2)	
Socio-economic status (SES)			0.176
High SES	197 (75.8)	80 (61.5)	
Low SES	63 (24.2)	50 (38.5)	
Average monthly income~~(N)~~			0.103
<18,000	23 (8.9)	20 (15.4)	
18,000-40,999	81 (31.1)	45 (34.6)	
41,000-60,999	75 (28.8)	25 (19.2)	
61,000-80,999	13 (5.0)	4 (3.1)	
81,000-100,999	35 (13.5)	14 (10.8)	
>100,999	33 (12.7)	22 (16.9)	
Parity			**<0.001**
Primipara	21 (8.1)	27 (20.7)	
Multipara	224 (86.2)	96 (73.9)	
Grandmultipara	15 (5.7)	7 (5.4)	
Mean ± SD	2.45 ± 1.38	1.88 ± 1.43	

**multiple response; PIH – Pregnancy induced hypertensionPROM – Premature rupture of membranesAPH - Antepartum haemorrhage GDM – Gestational diabetes*

There was also a significant difference in the proportion of intrapartum complications of un-booked mothers 59 (45.4%) compared with booked mothers 90 (34.6%), p=0.020. (Table 2) Vaginal delivery was the commonest mode of delivery with a proportion of 217 (83.5%) and 103 (79.2%) in both booked and un-booked mothers respectively.

However, the proportion of emergency caesarean section was

Table 2: Prevalence and pattern of obstetric and intra-partum complications

Variable	Booking status		p – value
	Booked Frequency (%) n = 260	Un-booked Frequency (%) n = 130	
Obstetric complications			0.044
Yes	85 (32.7)	56 (43.1)	
No	175 (67.3)	74 (56.9)	
Type of obstetric complications*			
Anaemia			0.316
Yes	26 (10.0)	9 (6.9)	
No	234 (90.0)	121 (93.1)	
Pre-eclampsia			0.005
Yes	3 (1.2)	8 (6.2)	
No	257 (98.8)	122 (93.8)	
PIH			0.001
Yes	20 (7.7)	25 (19.2)	
No	240 (92.3)	105 (80.8)	
PROM			0.336
Yes	11 (4.2)	3 (2.3)	
No	249 (95.8)	127 (97.7)	
APH			0.700
Yes	23 (8.8)	10 (7.7)	
No	237 (91.2)	120 (92.3)	
GDM			0.999
Yes	2 (0.8)	1 (0.8)	
No	258 (99.2)	129 (99.2)	
Intrapartum Complications*			0.020
Yes	90 (34.6)	59 (45.4)	
No	170 (65.4)	71 (54.6)	
Type of Intrapartum Complications*			
Haemorrhage			0.176
Yes	38 (14.6)	26 (20.0)	
No	222 (85.4)	104 (80.0)	
Vaginal Tears			0.066
Yes	56 (21.5)	39 (30.0)	
No	204 (78.5)	91 (70.0)	
Retained Placenta			< 0.001
Yes	6 (2.3)	15 (11.5)	
No	254 (97.7)	115 (88.5)	
Uterine Rupture			0.045
Yes	0 (0.0)	2 (1.5)	
No	260 (100.0)	128 (98.5)	
Obstructed Labour			0.013
Yes	4 (1.5)	8 (6.2)	
No	256 (98.5)	122 (93.8)	

higher among the un-booked respondents 13 (10.0%) compared to the booked respondents 6 (2.3%). The association between mode of

delivery and booking status was statistically significant (p = 0.012). In addition, the proportion of booked women 38 (14.6%) who received blood transfusion amongst the booked women, was lower, compared to un-booked women 24 (18.5%). The association between blood transfusion and booking status was not statistically significant (p=0.378). Forty-six (17.7%) booked and 27 (20.8%) un-booked women spent more than 5 days on admission with a mean duration of 3.81±2.651 and 3.96±2.982 respectively. The difference in the mean length of days spent was however not statistically significant (p=0.232). (Table 3)

Overall 218 (83.8%) of booked mothers had a favourable maternal outcome compared to 101 (77.7%) of unbooked mothers who had favourable maternal outcome, the association between booking status and maternal outcome was not statistically significant (p = 0.138)

Neonatal outcomes

Most, 239 (91.9%) and 112 (86.2%) of booked and un-booked women respectively delivered at term with a mean gestational age of 37.97±0.80 weeks and 37.83 ± 1.12 weeks respectively. However a higher proportion of un-booked mothers 18 (13.8%) had pre-term deliveries, compared to booked mothers 21 (8.1%) and the difference in the gestational age at delivery among the two groups was statistically signifycant (p = 0.004). Although most babies born to booked 226 (86.9%) and un-booked 102 (78.4%) mothers had normal birth weight with mean of 3.29±0.49 kg and 3.23±0.48kg respectively, a higher proportion of low birth weight [11 (8.5%) vs 11 (4.2%)] and macrosomic babies [17 (13.1%) vs 23 (8.9)] were seen amongst the un-booked mothers, compared to the booked mothers respectively. The difference in birth weight between both groups was not statistically significant (p=0.291). The proportion of IUFD in neonates born to un-booked mothers was higher compared to booked mothers. [5 (3.8%) and 2 (0.8%)] respectively. (p =0.031) Fetal morbidity was 9 (3.5%) in booked mothers, compared to 21 (16.2%) of un-booked mothers.

Table 3: Maternal outcome of respondents

Variable	Booking status		p – value
	Booked n = 260 Frequency (%)	Un-booked n = 130 Frequency (%)	
Mode of delivery			**0.012**
Vaginal	217 (83.5)	103 (79.2)	
Elective CS	30 (11.5)	11 (8.5)	
Emergency CS	6 (2.3)	13 (10.0)	
Instrumental vaginal delivery	7 (2.7)	3 (2.3)	
Blood transfusion			0.378
Yes	38 (14.6)	24 (18.5)	
No	222 (85.4)	106 (81.5)	
Hospital duration			0.605
≤5days	214 (82.3)	103 (79.2)	
>5days	46 (17.7)	27 (20.8)	
Mean ± SD	3.81 ± 2.651	3.96 ± 2.982	
Maternal Outcome			0.138
Favourable	218 (83.8)	101 (77.7)	
Unfavourable	42 (16.2)	29 (22.3)	

CS= aesarean section

The association between fetal morbidity and booking status was statistically significant (p<0.001). (Table 4) Overall, 383 (98.2%) neonates who had good outcomes compared with 7 (1.8%) neonates with poor neonatal outcomes. Among the neonates who had a satisfactory outcome, 257 (98.8%) were born to mothers who had booked their pregnancies while 126 (96.9%) were born to mothers whose pregnancies were un-booked, (p = 0.178). (Table 4)

DISCUSSION

This study assessed and compared maternal and perinatal outcomes among the booked and un-booked women in a secondary and tertiary health facility in Benin City, Edo State. Findings revealed that un-booked mothers were significantly younger in age compared to booked mothers and this is similar to observed findings in a study done in 2008 in Ilesa, Osun State Nigeria[24]and in 2015 in India.[25] This

Table 4: Neonatal outcome of respondents

Variable	Booking status		p- value
	Booked (n = 260) Frequency (%)	Un-booked (n = 130) Frequency (%)	
GA at delivery			0.004
<37weeks	21 (8.1)	18 (13.8)	
≥37weeks	239 (91.9)	112 (86.2)	
Mean ± SD	37.97±0.08	37.83±1.12	
t = 1.365			
Birth weight (kg)			0.278
Low Birth Weight	11 (4.2)	11 (8.5)	
Normal Birth Weight	226 (86.9)	102 (78.4)	
Fetal macrosomia	23 (8.9)	17 (13.1)	
Mean birth weight ± SD	3.29±0.49	3.23±0.48	
IUFD			0.031
No	258 (99.2)	125 (96.2)	
Yes	2 (0.8)	5 (3.8)	
Neonatal morbidity			<0.001
Yes	9 (3.5)	21 (16.2)	
No	251 (96.5)	109 (83.8)	
Neonatal morbidity pattern*			
Neonatal jaundice			0.012
Yes	2 (0.8)	6 (4.6)	
No	258 (99.2)	124 (95.4)	
Birth asphyxia			0.077
Yes	3 (1.2)	5 (3.8)	
No	257 (98.8)	125 (96.2)	
MAS			0.219
Yes	1 (0.4)	2 (1.5)	
No	259 (99.6)	12 8 (98.5)	
Seizures			0.012
Yes	2 (0.8)	6 (4.6)	
No	258 (99.2)	124 (95.4)	
Neonatal sepsis			0.383
Yes	5 (1.9)	1 (0.8)	
No	255 (98.1)	129 (99.2)	
Early neonatal death			0.001
Yes	2 (0.8)	8 (6.4)	
No	256 (99.2)	117 (93.6)	
Neonatal Outcome			0.178
Favourable	257 (98.8)	126 (96.9)	
Unfavourable	3 (1.2)	4 (3.1)	

**multiple response IUFD - Intrauterine fetal death MAS – Meconium aspiration syndrome*

shows that over time younger pregnant mothers are still likely to be un-booked. Being young and pregnant without receiving the services that ANC provides expose the woman to numerous

complications that she might also be encountering for the first time and this predisposes her to risk of morbidity and mortality. Furthermore younger people in a developing economy like Nigeria may likely be poorer on the account of inadequate skills and experience in the face of high national unemployment rates.[26]

The marital status of respondents also revealed that a higher proportion of unmarried/single pregnant women in this study were, largely un-booked. This finding is in consonance with a study conducted in 2016 in UBTH to investigate the effect of booking status and other parturient characteristics on pregnancy outcome.[27] Unmarried mothers are largely associated with unwanted and unplanned pregnancies with an associated high incidence of efforts to conceal the pregnancy and thus, a tendency to avoid prenatal care which predisposes them to undesirable outcomes. Unmarried pregnant women may also lack the social support of partners and others more so in cultures where teenage pregnancy and single motherhood are still largely considered a social stigma.[28] Promoting access to ANC and social support programs for unmarried mothers may be important to reduce adverse pregnancy outcomes.

A significant proportion of the pregnant women who were primiparous were un-booked while a higher proportion of multiparous and grand-multiparous women were booked. This is surprising as one would expect that being pregnant for the first time will excite them and will be a driver to make contact with health care providers. However, this correlates with findings from a study to compare the socio demographical characteristics, obstetrical complications and maternal and fetal outcomes in booked and un-booked mothers done in Pradesh in 2016 where primigravida un-booked cases were more than the booked cases.[29]

It was observed that more women in the low socio-economic status were un-booked while a significant proportion of the high socio-economic status were booked. This finding was expected and agrees with a study done in 2008 in Ilesa, Osun State Nigeria.[24] This is because low socio-economic status reduces financial access to use of health preventive

and promotive services, such as ANC, particularly in an environment where the national poverty level is as high as 70%, as in the case in Nigeria. Women may also choose, under these unfavourable economic conditions, to seek for care in substandard facilities because of the perceived cost of treatment in centres with higher standards of care. Several studies in Nigeria have shown a trend of decline in antenatal attendance and hospital delivery rates, as hospital costs have been rising due to macroeconomic policies, which had also not significantly improved the economic situation of the population.[17, 25, 30]

Un-booked patients had more maternal complications when compared to booked patients and this was statistically significant. Antenatal complications such as antepartum haemorrhage and PIH were higher among the un-booked patients and are factors that lead to poor outcomes in the infant and the mother. Some of the un-booked patients may have been admitted in labour in substandard facilities within the community only to be referred to the university hospital or Central hospital after a prolonged delay and onset of complications.[31] Several studies in our environment had elucidated various factors, such as aversion for caesarean sections, high hospital bills, religious beliefs, illiteracy, poverty, and environmental and cultural prejudices, as barriers hindering women from utilising prenatal care and hospital delivery.[32-34] Adequate antenatal care and hospital deliveries enable obstetricians to diagnose complications at an early stage when intervention will bring about better results.[35]

Elective CS was higher in booked women, most likely due to early detection of indications and subsequent planning, as part of the ANC process. Conversely, un-booked mothers had a higher incidence of emergency caesarean section rates mainly due to late presentations with complications making emergency surgical intervention inevitable.[36] Emergency caesarian sections, though life-saving may be associated with an increase in maternal and fetal morbidities and mortalities.[36]

Intrapartum complications such as retained placenta, uterine rupture

and obstructed labour were higher in un-booked patients. This is consistent with a study done in Pradesh in 2016 which revealed that un-booked mothers had higher incidence of retained placenta, uterine rupture and obstructed labour.[29] Pregnant women are prone to intrapartum complications whether or not they are booked however ANC, birth preparedness and complication readiness ensure that the rate of severe negative outcomes are reduced.[11]

The higher incidence of obstetric and intrapartum complications in the un-booked patients may lead to the failure of Nigeria to meet up with SDG by 2030. Poor maternal outcome results in low life expectancy for women in the reproductive age, who are the main drivers of sustainable development in any country. In addition, the high incidence and prevalence of maternal morbidity may lead to increased mortality which increases high incidence of single parenthood and orphaned children which is a threat to sustainable development.[37] There is, therefore, a need to intensify strategies to improve access to maternal health services such as ANC

Longer hospital duration (>5days) was higher in un-booked patients. Longer hospital duration is due to obstetric complications and emergency interventions seen in the un-booked group and may predispose patients to Health Care Associated Infections as well as impede mother-to-child bonding.

Preterm and low birth weight babies were higher among the un-booked mothers than the booked mothers in this study. Health education on adequate nutrition at ANC, routine use of anti-malarial and haematinics, early treatment of urinary tract infection, and other febrile illness in booked patients help to reduce the incidence of preterm delivery and prevent low birth weight.[11]

Neonatal morbidity such as jaundice, birth asphyxia, Meconium Aspiration Syndrome (MAS) and, convulsion was higher in un-booked patients. Neonatal morbidity predisposes the baby to problems such as delayed developmental milestones as well as higher mortality rate, [35] all of which could have been prevented

through ANC, booking and risk assessment. Efforts at promoting registration of pregnant women for ANC is therefore, vital.

The finding that neonatal mortality among un-booked mothers was higher than in their booked counterparts is probably due to the pregnancy complications and morbidity with which the un-booked women presented with including preterm labour, severe intra-uterine growth restriction, severe pregnancy induced hypertension, preeclampsia /eclampsia and obstructed labour. Neonatal death leads to unachievable sustainable development goals.[37,38] There is, thus, a need to intensify strategies to improve access to maternal health services in order to monitor neonatal outcome as well as provide prompt interventions to prevent neonatal deaths. It must be noted here that both facilities used for the study are referral centers where manpower and facilities for emergency obstetric services are available to avert to the barest minimum, unfavourable outcomes. This may explain the unmarked difference in outcome of booked and unbooked mothers. A limitation of this study is that maternal deaths were not accounted for, since data utilised were collected in the maternity wards and not labour wards/theatres after delivery.

Conclusion: Maternal and neonatal outcomes was poorer among the un-booked mothers, compared to booked mothers.

Stakeholders need to intensify the implementation of policies, programmes and services on a sustainable basis through behavior change communication on the benefits of receiving antenatal care and supervised delivery by skilled attendants which will have a significant impact on improving pregnancy outcomes and achieving SDG 3 goals.

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