

Biosocial Characteristics and Mode of Delivery at Term of Women Monitored in a Voluntary Agency Hospital

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ABSTRACT

Background: Many deliveries and maternal deaths occur in peripheral facilities and are usually attended to by General Practitioners (GPs). Maternal features that could help the GP predict whether a pregnancy will end in normal delivery or whether skilled assistance will be required to deliver the woman at term would be useful guides for early referrals or interventions.

Methods: This was a prospective study of 400 mothers with singleton pregnancies monitored at the Sacred Heart Hospital, Lantoro, Abeokuta, from February to July 1999. Records of maternal age, height, parity, occupation, educational level, weight-gain during pregnancy, the regularity of antenatal visits and delivery were analyzed.

Results: Mothers shorter than 1.55m, those who recorded large weight-gains during pregnancy, and those who booked late were more likely to experience difficult deliveries at term. Highly educated mothers and those in the upper socio-economic class were also more likely to have difficult delivery and require skilled assistance before birth at term.

Conclusion: Some maternal biological and social characteristics can be used ante-natally by GPs to predict the type of delivery a woman will undergo at term. GPs should routinely look for such features in pregnant mothers.

KEYWORDS: Biosocial characteristics; Mode of delivery; General practitioners.

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INTRODUCTION

Studies on maternal morbidity and mortality originating mainly from Teaching and Specialist Hospitals in Nigeria has consistently shown that most of the affected mothers were unbooked at the centers where they died¹⁻³. But there is reason to believe that many of those unfortunate women were actually late referrals from peripheral facilities since most deliveries take place outside tertiary institutions⁴. Such facilities are frequently manned by general practitioners (GPs) and other health-care providers supervised by them. As a frontline doctor in a developing country, the

Nigerian general practitioner often has to take decisions on pregnant women when problems arise either during pregnancy or in labour⁵. It is imperative that he should be able to predict with some accuracy, what problems he may encounter based on certain readily observable characteristics of the women. He could thereby take adequate precautions (such as referring her early) to avoid disasters. In emergencies, he may have to carry out some obstetric procedures to assist labour. As such procedures are prone to complications, maternal and fetal morbidity and mortality may further be inadvertently increased, except he is familiar with them.

Although there is abundant literature as regards maternal morbidity and mortality, and factors influencing them in Nigeria, enough consideration has not yet been given to the role general practitioners must play in the crusade for reduction of maternal mortality. In particular, features that may help the practitioners who assist women during delivery identify potentially problematic labour and delivery in the community has not been discussed adequately. The main objective of this study therefore, was to highlight the role of certain maternal biosocial characteristics in serving as guides to GPs who sometimes supervise the delivery of many Nigerian women at term.

SUBJECTS AND METHODS

This is a prospective study conducted in Nigeria's oldest hospital, the Sacred Heart Hospital (SHH)⁶, Abeokuta.

Only consenting pregnant mothers who satisfied the criteria for inclusion were recruited for the study. The criteria were prior registration in the antenatal clinic and delivery in the labour ward of SHH. Exclusion criteria included multiple pregnancies, termination of pregnancy before term or after 42 weeks of gestation and maternal deaths prior to questionnaire administration. Hence, information was collected from mothers whose singleton pregnancies were registered at the antenatal clinic of SHH, and who were delivered in the hospital's labour ward or theatre between February and July 1999, inclusive. The final data for the study was obtained by extraction of relevant information such as age, parity, gestational age at booking, number of

antenatal visits, occupation, maternal height and weight gain, indications for interventions and mode of delivery from the antenatal, obstetrical, medical and neonatal records of the subjects; and by direct interview of the mothers for their annual income and educational status (information not usually indicated on the antenatal records). The information collected was analyzed using EPI INFO statistical package. Chi-squared (χ^2) was the major statistic used to determine the relationship between variables and mode of delivery.

RESULTS

A total of 400 mothers were studied. There were 1,622 deliveries during the study period. The youngest was 15 years and the oldest was 45 years while the mean maternal age was 26.5 ± 5.5 years. The distribution of the mothers by age group is shown in Table I. The majority (63.6%) were in the age group 20-29 years. Thirty one (7.8%) were teenagers while 41 (10.3%) were 35 years and above. In Table I, the educational level of the mothers is shown. Most (87%) of mothers had formal education while 52 (13%) did not have formal education. Table II shows the occupations of the patients. Thirty-three were unemployed while ten mothers were students. Statistical analysis showed that maternal occupation had a significant influence on mode of delivery ($\chi^2 = 17.32$; $df=5$; $p<0.05$). Mothers with occupations requiring professional qualification were associated with assisted delivery.

Two hundred and fifty (62.5%) mothers had spontaneous vertex (normal) delivery, while 88 (22.00%) had caesarean delivery. Thirty-six (9.0%) mothers were delivered using vacuum while 26 (6.5%) had assisted breech delivery. Of all the 312 vaginal deliveries, 140 (44.87%) had episiotomies.

In Table III, the indications for intervention (Caesarean section, vacuum and breech deliveries) during labour are shown. Cephalopelvic disproportion (CPD) was the indication in 41% of cases. Prolonged labour due to various reasons accounted for 32% of the interventions while repeat caesarean section was the indication in 8 (5%) cases.

Table III also shows the parity profile of the patients. About a third (31%) were primigravidae while 24 (6.0%) of the women were grandmultiparae.

The heights of the mothers were arranged into 3 major groups as shown in Table IV; 155cm; 155-164cm and 165cm. The mean height of the 400 mothers was 157.9 ± 6.7 cm. Among the subjects whose heights were in the range 155-164cm, 153 (68.0%) had normal deliveries while 72 (32.0%) had assisted deliveries. Thirty-nine (58.2%) mothers who were 165cm or

greater in height had normal delivery while 28 (41.8%) required assistance. The difference in mode of delivery due to maternal height was statistically significant ($\chi^2=7$; $df=2$; $p<0.05$), as women less 1.55m and above 1.65m in height had more assisted deliveries. Height of the shortest mother with normal delivery was 140cm while the shortest mother who required assistance was 117cm. Height of tallest mother with normal delivery was 177cm while the tallest mother who required assistance was 175cm.

The mean weight-gain of the 400 mothers from the time of booking until delivery was 6.0 ± 2.93 kg. The mean weight-gain among mothers who delivered normally was 5.6 ± 3.10 kg while it was 6.6 ± 2.51 kg among mothers who had assisted deliveries. The difference in the mean weight-gain between the two groups was statistically significant ($t=16.07$; $p<0.01$).

The relationship between maternal income per annum and mode of delivery was statistically significant ($\chi^2=11.10$; $df=4$; $p<0.05$), and is illustrated in Table IV. The 150 mothers who had assisted delivery booked later than the 250 mothers who were normally delivered and there was a statistically significant relationship between the mean gestational age at booking and the mode of delivery at term ($t=16.07$; $p<0.0001$). Further, as shown in Table 5, 28 mothers booked at less than 15 weeks gestation, 280 at between 15-28 and 92 at above 28 weeks. The proportion of mothers who had normal deliveries was higher among those who booked early ($\chi^2=28.85$; $df=2$; $p<0.0001$).

Table V, shows that 122 mothers made 1 to 3 antenatal visits; 158 made 4 to 6 visits and 81, 7 to 9 visits. Ten or more visits were made by 39 of 400 mothers. There was a statistically significant relationship between the amount of antenatal attendance and mode of delivery ($\chi^2=27.71$; $df=3$; $p<0.0001$). Mothers with higher number of antenatal visits had fewer assisted deliveries.

Table I. Age and educational distribution of 400 mothers who delivered at term

Age range (years)	No of mothers	Percent (%)
15-19	31	7.8
20-24	119	29.6
25-29	136	34.0
30-34	73	18.3
?35	41	10.3
Total	400	100.0
Educational Level		
No formal education	52	13.0
Primary school	148	37.0
Secondary uncompleted	81	20.25
Secondary completed	93	23.25
Tertiary	26	6.50
Total	400	100.0

Table II. Occupation of 400 mothers delivered at term

* Occupation of mother	Mode of Delivery		Total
	Normal	Assisted	
Unemployed	19(57.6%)	14(42.4%)	33 (8.25%)
Unskilled Worker (e.g. cleaner, food vendor)	147(67.1)	72(32.9%)	219(54.75%)
Semi-skilled (e.g. typist, clerk)	66(57.1%)	49(42.6%)	115 (28.75%)
Professional not requiring University degree	6(37.5%)	10(62.5%)	16 (4.00%)
Professional requiring University degree	2(28.6%)	5(71.4%)	7 (1.75%)
Student	10(100.0%)	0(0.0%)	10 (2.25%)
Total	250(62.5%)	150(37.5%)	400(100.00%)

Table III. Indications for intervention during labour at term and parity of mothers

Indications	No of cases	%
Cephalopelvic		
Disproportion (CPD)	62	41
Prolonged labour	48	32
Others (e.g pregnancy induced hypertension, precious baby, and elderly primip)	19	13
Major antepartum haemorrhage	13	9
Previous caesarean section	8	5
Total	150	100.0
Parity	No of mothers	%
0	124	31.00
1	97	24.25
2	73	18.25
3	48	12.00
4	34	8.50
≥5	24	6.00
Total	400	100

Table IV. Relationship between maternal height, annual income and mode of delivery at term

Mode of Delivery	Maternal height (cm)			Total
	<155	155-164	≥165	
Normal	58 (53.7%)	153 (68.0%)	39 (58.2%)	250
Assisted	50 (46.3%)	72 (32%)	28 (41.8%)	150
Total	108	225	67	400
Mothers income level	Est. annual income N/year	Mode of delivery		Total
		Normal	Assisted	
1.	< 18,000.00	61 (64.2%)	34 (35.8%)	95
2.	18,000-35,999.97	(62.2%)	59 (37.8%)	156
3.	36,000-53,999.84	(66.7%)	42 (33.3%)	126
4.	54,000-71,999.8	(42.1%)	11 (57.9%)	19
5.	72,000-89,999.0	(0.0%)	4 (100.0%)	4
Total	250 (62.5%)	150 (37.5%)	400 (100.0)	

$\chi^2 = 11.10; df=4; p, 0.05$

Table V. Gestational age-at-booking, number of antenatal visits and mode of delivery of 400 mothers at term

Mode of Delivery	Gestational age at booking (weeks)			Total
	≤ 15	15-28	≥ 28	
Normal	17 (60.7%)	197 (70.4%)	36 (39.1%)	250
Assisted	11 (39.3%)	83 (29.9%)	56 (60.9%)	150
Total	28 (7.0%)	280 (70.0%)	92 (23.0%)	400 (100.0%)

$(\chi^2=28.85; df=2; p<0.0001)$

Mode of Delivery	Amount of Antenatal visits				Total
	1-3	4-6	7-9	≥10	
Normal	53(43.4%)	110(69.6%)	60(74.1%)	27(69.2%)	250(62.5%)
Assisted	69 (56.6%)	48(30.4%)	21(25.9%)	12(30.8%)	150(37.5%)
Total	122	158	81	39	400

DISCUSSION

This study has shown that certain biological and

social characteristics in pregnant women can be used by a general practitioner to determine whether or not they will require skilled assistance at delivery, especially if the pregnancies get to term. It has also shown that surgical intervention is a frequent form of assistance the GP would need to apply to relieve difficult labour. This latter observation had been made earlier by Marinho⁵.

As previously reported⁷, cephalopelvic disproportion (CPD) was the commonest reason for surgical intervention in this study. This is still surprising since most of the women in the present study were products of the "oil boom" era, and should have been relatively bigger than the women in the earlier study. However, it is possible that babies in the present study are relatively bigger than their predecessors. Big babies may cause CPD in normal sized women⁷.

Women shorter than 1.55m were more likely to require assistance at birth when compared to those in the height range of 1.55m to 1.64m, an observation similar to that made earlier by Akingba⁸ in Lagos. He had noted that women shorter than 1.50m were more likely to require caesarean operation at birth. Interestingly, mothers in this study who were taller than 1.65m also had a higher rate of skilled intervention, implying that there is an optimum range of height for the best reproductive outcome. Short women are at increased risk of contracted pelvis while those who are extremely tall are more likely to have bigger babies; both situations may result in CPD and prolonged labour⁸. Hence, due caution must be exercised in inferring a direct relationship between maternal height and mode of delivery. The final outcome depends on the relative sizes of both the mother's pelvis and the fetal presenting part⁸. A clinical pelvic assessment at term would help the GP take a decision.

A significant relationship was found between maternal occupation and mode of delivery in this study. The trend was such that the more skill required for the job and the higher the certificate for securing it, the greater the need for assisted delivery. The reason for this is not obvious but it is probably because the higher the level of education and income, the easier it was to convince the mothers to accept surgical intervention. Education helped them to quickly see why they needed intervention while high income enabled them to afford the cost of intervention. It has previously been shown that those occupations requiring high level of education and attracting high incomes tend to be associated with larger babies and fewer perinatal deaths for the same reason¹⁰⁻¹¹. The unemployed mothers in this study were probably housewives whose educated husbands were rich enough to keep them at home; with adequate rest

and nutrition during pregnancy their babies were probably big. Hence a sizeable number of them, 14 (42%) required assistance before delivery. That all the student mothers had SVD is difficult to explain but probably there was no absolute indication for intervention in any of them, and being conscious of the cost, they rejected the offers for intervention. It is desirable to know the perinatal outcome of their pregnancies.

The average maternal weight-gain during pregnancy significantly influenced the mode of delivery in this study. Furthermore, the average maternal weight gain was much higher in mothers who had assisted delivery than in those with SVDs. If, as previously suggested¹²⁻¹⁴, weight gain was due mainly to fetal weight, then the fetuses in the assisted delivery group must have been relatively bigger babies. They were more likely to have caused CPD and prolonged labour, and therefore needed surgical intervention. In a related study, Lawoyin¹² in Ibadan showed that weight-gain during pregnancy correlated more with fetal size at birth than maternal pre-pregnancy weight. Contrary to most previous reports^{14,15}, maternal age had no significant influence on mode of delivery in the present study. This discrepancy may be due to the small proportion of teenagers and those above 35 years in the study population as the peculiar problems of women in these extremes of reproductive age is usually responsible for the influence of age on their reproductive performance. Also all the pregnancies in this study reached term unlike in those previous studies which included preterm pregnancies.

The relationship between gestational age at booking and mode of delivery was such that 61% of those who booked very late (after 28 weeks of gestation) required assistance before birth when compared to those who booked between 15-28 weeks of which only 30% needed assistance. Since late booking was the general habit of these patients, those who booked earlier than 15 weeks were high risk patients with medical and obstetrical problems. Hence, they too had a higher incidence of intervention at birth (39.3%). Factors militating against early registration include some traditional beliefs and cost of antenatal care (ANC)¹⁸. Many believe that pregnancy should not be made "public" until late when the fetus would have been too big for "witches" to tamper with¹⁹. Some others thought that frequent ANC visit is a waste of money unless there was a problem. Mothers need to be further educated on the need for early booking to achieve optimal obstetric outcome.

From this study the number of visits to antenatal clinic

had a significant influence on mode of delivery such that as the number of antenatal visits increased, the proportion of mothers who needed skilled intervention decreased progressively. An earlier study by Okonofua, Makinde and Ayangbade showed that poor use of ANC facilities was a contributory factor to the high rate of Caesarean section among mothers in Ile-Ife, Nigeria²⁰. Similarly, Fawcus *et al*²¹ showed that unbooked mothers were more likely to have operative delivery at Harare Maternity Hospital in Zimbabwe. Early booking allows for conservative management of certain conditions (e.g. preeclampsia) during ANC that would have to be treated surgically if the patient presents late in pregnancy or for the first time during labour.

Very late booking and poor ANC attendance (1-3 visits) had similar effects on mode of delivery in this study implying that those who booked late had only one to three attendances before delivery. They were probably forced to book by the appearance of features of complications. The need to further encourage women to book early for ANC and come for regular clinics during pregnancy is obvious. The need may be met through improving the general level of education of women, addressing the belief systems during health education and subsidizing the overall cost of antenatal care.

CONCLUSION

Among mothers who register and deliver at term in a peripheral health facility, a significant number will require skilled assistance at birth. A mother at term is more likely to require assistance at delivery if she is short statured (height < 155cm), gained more weight during pregnancy and booked late for antenatal care. Highly educated mothers and those in the high socio-economic class are also more likely to be assisted. Practitioners who care for pregnant women should always look out for those maternal features highlighted, and when present, make early arrangements for possible referral. Such practitioners may need to acquire competence in carrying out the appropriate procedures to relieve prolonged labour, as these frequently present as emergencies and when referrals may be ineffective due to logistic problems.

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