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Retrospective Cohort Study of Antenatal Care and Pregnancy Outcomes in Kadjebi District of Ghana

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Abstract
Antenatal care is essential strategy for improving maternal and pregnancy outcome. We determined the association between antenatal attendance and pregnancy outcome using low birth weight and preterm birth. We conducted retrospective cohort study using data from antenatal and delivery records of all the maternity units in Kadjebi District from October 2012 to January 2013. The study subjects were a cohort of women who delivered in maternity units in the district from 1st January to 31st December 2011.The study participants were 663 pregnant women with mean age of 25.8 years, ranging between 15-45 years. Most of the women, 53.9% were between 20-29 years and 16.2% were teenagers. The mean parity of the women was 2.1. Almost all the pregnant women, 99.2% had at least one antenatal care but only 48.2% of them made the optimum antenatal visits recommended by WHO. About 55.5% of the deliveries were preterm. Pregnant women with height <145cm were most likely to have good antenatal attendance (LR, OR: 0.65, CI: 0.45-0.95, P= 0.0246). Preterm delivery was more among Sickling positive pregnant women (LR, OR: 4.37, CI: 1.55-12.33, P: 0.0052). Low birth weight was most common among the unemployed (OR: 5.17, CI: 1.72-15.60, P: 0.0035). Early antenatal registration was protective against low birth weight (OR: 0.27, CI: 0.07-0.95, P: 0.0415). Analysis of data collected in the antenatal and delivery registers can yield valuable information for public health action. Antenatal attendance was almost universal however, optimum antennal visits was undesirably lower than expected. Early registration for antenatal care would reduce low birth weight and improve pregnancy outcome.
Keywords: Ghana, Antenatal care, Prenatal care, Retrospect cohort study, pregnancy outcome

1. Introduction

Antenatal care is essential strategy for improving maternal and pregnancy outcome. It involves detecting, preventing and treating health problems in pregnancy. Antenatal care provides essential interventions that improve maternal health and that of the expected neonate. It was formulated by World Health Organization (WHO) to ensure that women go through pregnancy and childbirth safely to avoid dreaded outcomes of maternal, perinatal and infant mortality (World Health Organization (1994) 2013)(Bergsjø 2012). In developing countries, where high morbidity and mortality among the reproductive age group are prominent, the antenatal period clearly presents opportunities for reaching pregnant women with a number of interventions that are vital to their health and well-being and that of their infants (Rogo, Oucho, and Mwalali 2006)(World Health Organization and UNICEF 2012).

WHO had recommended at least four antenatal visit during pregnancy (World Health Organization 2013a). Globally, during the period 2005–2010, about 53% of pregnant women had the recommended minimum of four antenatal visits. In low-income countries, only 36% of pregnant women achieved the recommended minimum antenatal visits (World Health Organization 2012b). However, fewer antenatal attendance than the minimum four visits is associated with poor pregnancy outcomes such as preterm deliveries, low birth weight, still births and neonatal deaths (Krueger and Scholl 2000). Studies have shown that women who initiate antenatal care early (by the end of first trimester) are more likely to have babies with normal weights and improvement in their haemoglobin concentrations during pregnancy (Tayie and Lartey 2012). In Finland, pregnant women who were non-attendant or who had less than the optimum antenatal visits had more complications during pregnancy and adverse pregnancy outcome with low birth weight (LBW), foetal and neonatal deaths (Raatikainen, Heiskanen, and Heinonen 2007). Women commencing antenatal care after the first trimester are at a higher risk for developing anaemia (Uche-Nwachi et al. 2010). Predictors of low level of antenatal attendance were found by studies to be associated with low maternal age, low educational and socio economic status and distance from the antenatal service (Beeckman, Louckx, and Putman 2010)(Olausson, Cnattingius, and Goldenberg 1997)(Overbosch et al. 2004).

Many studies had shown that, obese women have an increased risk of adverse pregnancy outcomes. In particular, obese women are at increased risk of gestational diabetes, pregnancy induced hypertension and pre-eclampsia. Babies of obese women are more likely to be large for gestational age and macrosomic compared with those with normal Body Mass Index (BMI) (Athukorala et al. 2010). Women with pre-pregnancy BMI<19

had the mean birth weight of their newborn significantly low. In addition, abnormal weight gain during pregnancy is highly associated with LBW (Bhattacharya et al. 2007)(Sebire et al. 2001).

Antenatal care provided in Ghana is free for all pregnant women and paid for by the National Health Insurance Scheme. This has resulted in significant increase in antenatal coverage in the country. In Kadjebi District, almost all pregnant women receive at least one antenatal care during pregnancy. However, most of them seek antenatal care late. Majority of the pregnant women initiate antenatal care late in the second and third trimester. The proportion of pregnant women making the optimum four visits recommended by WHO was 49.9% in 2010 and 48.0% in 2011(Kadjebi District Health Directorate 2012). The average number of visit per pregnant woman was 3.1 during the same period. The delay in seeking care does not allow the pregnant women to benefit fully from the interventions provided during antenatal care. This would lead to poor maternal and pregnancy outcome. The effect of poor antenatal attendance on pregnancy outcome was unexplored in the district. The study seeks to evaluate the effect of poor antenatal attendance and underutilization of interventions in prenatal care on pregnancy outcomes such as preterm deliveries and low birth weight.

Data collected routinely during antenatal care and delivery service had never been analysed to examine the association between antenatal care and pregnancy outcome in the district. Analysis of the data would provide vital information on risk factors associated with low birth weight and preterm birth. Information generated could be used to inform decision making in the district to improve care during antenatal and delivery services.

In this study we described the characteristics of women who delivered and attended antenatal care in Kadjebi district. We determined the association between antenatal attendance and pregnancy outcome using low birth weight and preterm birth and examined the effect of IPT and ITN use on preterm deliveries and low birth weight.

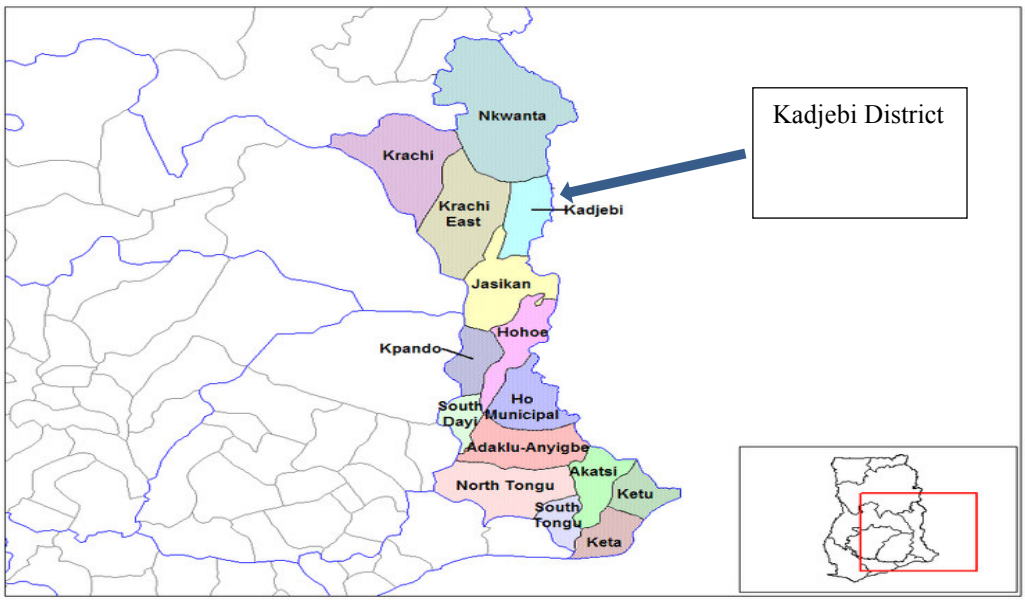
2. Method

2.1 Study Area

Kadjebi District is one of the 25 administrative districts in the Volta Region in Ghana. It is located in the northern part of the Volta Region, occupying an area of 675sq km. The district shares boundaries with Jasikan, Nkwanta South and Biakoye Districts. Kadjebi District also shares boundary with Republic of Togo. The total population of the district was 63,995, projected from 2000 Ghana Population Census (Kadjebi District Health Directorate 2012). The expected pregnancy in the district was 2,558.

There were eight facilities providing antenatal care and delivery services in the district. These consist of Mary Theresa Hospital, four Health Centres, two CHPS Zones and one private maternity home. All the maternity units in the district were involved in the study.

Figure 1: Map of Kadjebi District



2.2 Study Design

We conducted retrospective cohort study from October 2012 to January 2013, using data from antenatal and delivery records of all the maternity units in Kadjebi District. The study subjects were a cohort of women who

delivered in maternity units in the district from 1st January to 31st December 2011.

2.3 Data collection

We retrieved data on the women from the hand written antenatal and delivery registers at the maternity units using a structured questionnaire. The principal investigator with a trained assistant collected data from the antenatal and delivery registers. Investigators consulted a midwife in the maternity unit where the entries in the registers were unclear for clarification.

2.4 Data Analysis

Data from the antenatal and delivery registers was entered into Epi Info 7 and analyzed anonymously. Pre-pregnancy nutritional status was determined using the Body Mass Index (BMI), calculated as weight at antenatal booking (kg) before or at 16 weeks of gestation, divided by height (m) squared ($BMI=weight/(Height)^2$). The maternal BMI at booking was then categorized using body mass groupings recommended by Abrams and Parker (normal, BMI= 20 – 24.9; moderately obese, BMI= 25 – 29.9, and very obese, BMI>30. In this study, women with BMI<20 were considered to be underweight.

Exposure variables we considered in the analysis were antenatal care, registration for antenatal care, use of Intermittent Preventive Treatment (IPT) of malaria in pregnancy using SP (Sulphadoxine Pyrimethamine) and use of Insecticide Treated Net (ITN).

We classified antenatal care into "poor antenatal care" (<4 antenatal visits) and "good antenatal care"(≥4 antenatal visits). Registration for antenatal care was grouped into "Early Registration" (before or at 16 weeks of gestation) and "Late Registration" (after 16 weeks of gestation). Use of IPT was categorized into two groups: "IPT 1" (Pregnant women receiving only one dose of SP) and "IPT 2+" (Pregnant women receiving two or three doses).

Outcome variables considered were preterm deliveries, term deliveries and birth weight. Preterm delivery was defined as deliveries ≤36 weeks and term deliveries as deliveries between 37-42 weeks. Birth weight was categorized into low birth weight (<2.5kg), normal birth weight (2.5-3.5kg) and "large birth weight" (>3.5kg). Birth outcome was grouped as live birth and stillbirth.

We described the characteristics of the pregnant women and use of antenatal services and ITN in terms of frequencies. The association between exposure variables and outcome were examined using calculated risk ratios evaluated at 95% Confidence Interval (CI) and p-value <0.05 as statistically significant. We performed logistic regression analysis for all possible clinically significant confounding factors.

2.5 Ethical Considerations

We obtained consent for the study from the District Director of Health Services and the Medical Superintendent of the Mary Theresa Hospital. We also obtained consent from the in-charges of the health centres and the CHPS zones. The data was entered and analyzed anonymously.

3. Results

3.1 Characteristics of the pregnant women

About 663 pregnant women delivered at the maternity units in Kadjebi District between 1st January and 31st December 2011. About 94.9% (629) of the pregnant women were residents of Kadjebi District while, 5.1% (34) were non-residents. In Figure 2, most of the pregnant women 56.4% (374) who delivered in the district were from Kadjebi-Asato sub-district.

Figure 2: Place of residence of pregnant women who delivered in Kadjebi District in 2011

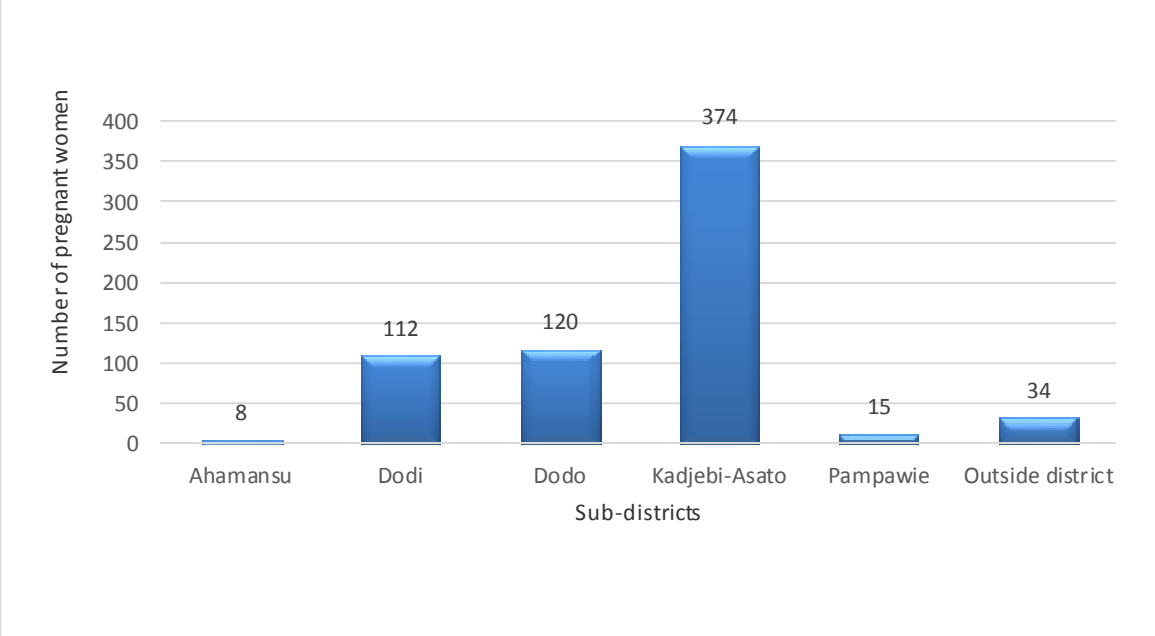


Table 1, describes the characteristics of the pregnant women delivering in the maternity units in Kadjebi District in 2011. The women were aged between 15 and 45 years, with mean age of 25.8 years. Majority of the women 53.9% (355) were in the age group 20-29 years. A significant proportion of the pregnant women were teenagers, 16.2% (107). Most of the pregnant women, 76.7% had no education. Majority of the women (93.0%) were in employment. The mean parity of the women was 2.1.

Table 1: Demographic characteristics of the pregnant women who delivered in Kadjebi District in 2011

Characteristics	**Number**	**Percent** (%)
Age/year		
Mean	25.83	
Range	15 - 45	
<20	107	16.20
20 - 29	355	53.90
30 - 39	182	27.60
≥40	15	2.30
Total	659	100.00
Educational Level		
None	501	76.72
Primary	104	15.93
Junior Secondary	24	3.68
Senior Secondary	13	1.99
Tertiary	11	1.68
Total	653	100.00
Occupation		
Unemployed	46	6.96
Student	51	7.72
Housewife	79	11.95
Farmer	130	19.67
Petty Trader/Food Vendor	234	35.40
Seamstress/Hair Dresser	103	15.58
Total	661	100.00
Parity		
Mean	2.13	
Nulliparous	104	17.81
1 - 4	418	71.58
5 - 8	62	10.62
Total	584	100.00

3.2 Antenatal Care

Table 2 shows that, almost all the pregnant women, 99.2% (513) had at least one antenatal care. The mean antenatal attendance was 3.6. Only 48.2% of pregnant women made four and more antenatal visits. Minority of the pregnant women 33.6% registered for antenatal care during the first trimester, 48.0% started antenatal care in the second trimester and 18.4% in the third trimester. Most of the pregnant women, 63.7% (218) registered late for antenatal care. About 571 pregnant women had their height measured and recorded. The mean maternal height was 155.5cm. A large proportion of the women, 86.9% had a normal height. About 13.1% of the pregnant women were short (height <145cm).

About 174 pregnant women who registered for antenatal care by 16 weeks of gestation had their BMI estimated. Their mean BMI was 22.9 (Range: 15.24 - 39.84). The BMI of 55.7% (97) of the pregnant women were normal (20 - 24.9kg/m^2), 17.8% (31) were moderately obese and 5.7% (10) were very obese.

The mean Haemoglobin (HB) at registration was 10.1g/dl (±1.22). The incidence of anaemia (HB<11g/dl) among the pregnant women at the time of registration for antenatal care was very high, 76.7% (405) and only 23.3% (123) had normal haemoglobin (HB≥11g/dl).

Table 2: Obstetric characteristics of the pregnant women in Kadjebi District in 2011

Characteristics	Number	Percent (%)
Height		
Mean (cm)	155.5	
SD	13.3	
≤140	69	12.1
141-144	6	1.1
145-149	22	3.9
150-154	92	16.1
≥155	382	66.9
Total	571	100.0
Body weight at ≤16 weeks gestation		
Mean	58.1	
SD	9.96	
≤45	11	6.0
46-50	35	19.1
>50	137	74.9
Total	183	100.0
BMI at ≤16 weeks gestation		
Mean	22.9	
Range	15.2 - 39.8	
SD	4.67	
<20	36	20.7
20.0 - 24.9	97	55.7
25.0 - 29.9	31	17.8
≥30	10	5.7
Total	174	100.0
Antenatal Attendance		
Mean	3.6	
SD	1.22	
Nil	4	0.8
1-3	264	51.1
4+	249	48.2
Total	517	100.0
Initiation of Antenatal attendance		
Early (By 16 weeks of gestation)	124	36.7
Late (After 16 weeks of gestation)	218	63.3
Total	342	100.0
Gestational Age at registration for antenatal care (Weeks)		
Mean	18.9	
SD	8.91	
<14	115	33.6
14-26	164	48.0
27-42	63	18.4
Total	342	100.0
Fundal Height at registration for antenatal care (Weeks)		
Mean	18.4	
SD	6.86	
>14	69	25.6
14-26	169	62.6
27-42	32	11.9
Total	270	100.0

Table 3, shows that, among the pregnant women receiving antenatal care, 504 received IPT during pregnancy. IPT1 was received by 29.2% (147) and IPT2+ was by 70.9% (357). Pregnant women sleeping under

ITNs the previous night were 74.0% (390) and those who received TT2+ were 99.6%. Majority of the women, 90.8% did not complain of any complication during pregnancy.

Table 3: Services received by pregnant women during antenatal care

Services	Number	Percent (%)
IPT		
IPT 1	147	29.2
IPT 2	149	29.6
IPT 3	208	41.3
Total	504	100.0
Tetanol (TT)		
Protected not dosed	2	0.4
TT 1	125	24.2
TT 2	195	37.8
TT 3	139	27.0
TT 4	27	5.2
TT 5	28	5.4
Total	516	100.0
ITN use		
No	137	26.0
Yes	390	74.0
Total	527	100.0
Complications of Pregnancy		
Anorexia	1	0.2
Lower Abdominal Pain (LAP)	2	0.4
Malaria	46	8.6
No complications	486	90.8
Total	535	100.0

3.3 Delivery

Table 4 indicates there were 673 deliveries during the period of the study. Almost all the births (95.4%) were live singleton births, 3.0% (20) were live twin births and 1.6% (11) were stillbirths. Among the babies, 50.5% were males. About 55.5% of the deliveries were preterm. Most of the neonates, 88.8% had normal birth weight and only 7.7% were of low birth weight.

3.4 Determinants of Antenatal Attendance

Poor antenatal attendance was not significantly associated with age, educational status, occupation, early registration for antenatal care and sickling status of the pregnant women as shown in table 5 (P>0.05). However, there was borderline association between poor antenatal attendance and maternal height <145cm (RR: 1.19, CI: 1.01 – 1.41, P=0.05). After controlling for confounding, poor antenatal attendance was significantly associated with height <145 (LR, OR: 0.65, CI: 0.45-0.95, P= 0.0246). Logistic regression odd ratio was less than one, indicating maternal height <145cm was protective against poor antenatal attendance. Therefore pregnant women of height<145cm were good antenatal attendants. Logistic regression model depicting poor antenatal attendance is:

Poor antenatal attendance =Age + No Education+ Unemployed +Height <145cm

Table 4: Pregnancy outcome of the women delivering in Kadjebi District

Characteristics	Number	Percent (%)
Duration of pregnancy at delivery (weeks)		
Mean	36.42	
SD	2.28	
≤30	24	3.8
31-35	97	15.3
36-42	514	80.9
Total	635	100.0
Gestation at delivery (weeks)		
Preterm (28 - 36)	350	55.1
Term (37- 42)	285	44.9
Total	635	100.0
Delivery Outcome		
Single	642	95.4
Twins	10	3.0
Still Births	11	1.6
Total Deliveries	673	100.0
Sex of Baby		
Female	321	49.5
Male	327	50.5
Total	648	100.0
Birth weight		
Mean	3.02	
SD	0.50	
1.5-2.49	50	7.7
2.5-3.99	576	88.8
4.0-5.3	23	3.5
Total		

Table 5: Association between Poor antenatal attendance and characteristics of pregnant women, ITN use and IPT1

Characteristics	Risk Ratio	95% CI	P-value
Age <20	0.98	0.76-1.27	0.98
No Education	1.11	0.89-1.42	0.44
Unemployed	0.89	0.73-1.10	0.33
Height <145cm	1.19	1.01-1.41	0.05
Primigravida	0.82	0.62-1.07	0.15
Sickling Positive	1.3	0.96-1.83	0.19*
Early registration	1.0	0.61-1.62	0.91

*Fishers Exact test was quoted

3.5 Preterm delivery

Preterm delivery was significantly associated with age, occupation, parity, sickling status and IPT use in pregnancy as shown in table 6. After controlling for confounding, age in logistic regression, preterm delivery was significantly associated with sickling status (LR, OR: 4.37, CI: 1.55-12.33, P: 0.0052).

Table 6: Association between Preterm deliveries and characteristics of pregnant women, ITN use and IPT1

Characteristics	Risk Ratio	95% CI	P-value
Age <20 years	1.88	1.29-2.74	0.003
No Education	0.72	0.43-1.20	0.3
Unemployed	1.78	1.30-2.46	0.0007
Height <145cm	1.08	0.76-1.54	0.76
Primigravida	2.25	1.56-3.23	4.4×10^{-5}
Sickling Positive	2.6	1.52-4.90	0.008
Anaemia (HB<11g/dl)	0.89	0.60-1.32	0.65
Poor Attendance	1.14	0.79-1.63	0.56
Early registration for Antenatal	1	0.61-1.62	0.91
IPT 1	1.63	1.13-2.35	0.014
ITN use (Yes)	1.16	0.78-1.72	0.54

3.6 ITN use

Table 7 shows that, ITN use was not associated with age, educational status, antenatal attendance, early registration for antenatal care and sickling status (P>0.05). ITN use was associated significantly with maternal unemployment (RR: 0.83, CI: 0.72-0.96, P: 0.0049). However, controlling for age, ITN use was still significantly associated with maternal unemployment, Odd ratio, 2.22 (CI: 1.36 - 3.62, P: 0.0013). Unemployed pregnant women were twice unlikely than employed pregnant women to use ITNs during their pregnancy.

ITN use = Age + Unemployed

Table 7: Association between ITN use and social characteristics of pregnant women

Characteristics	Risk Ratio	95%CI	P-value
Age <20	0.97	0.83-1.42	0.85
No Education	1.09	0.94-1.27	0.27
Unemployed	0.83	0.72-0.96	0.0049
Height <145	0.93	0.84-1.04	0.245
Primigravida	1.39	0.91-1.84	0.204
Early registration	0.89	0.75-1.06	0.23
Sickling Positive	0.89	0.60-1.33	0.75

3.7 IPT

In table 8, the use of IPT in pregnancy compared with social factors of pregnant women showed significant association between IPT use and parity and level of antenatal attendance of the pregnant women (Parity, RR: 0.45, CI: 0.25-0.82, P<0.01, Antenatal attendance, RR:2.3, CI:1.68-3.17, P<0.00001). After controlling for age and educational status in logistic regression, IPT1 use was significantly associated with poor antenatal attendance (OR: 0.32, CI: 0.21-0.49, P<0.000).

Table 8: Association between IPT use and social characteristics of pregnant women

Characteristics	Risk Ratio	95%CI	P-value
Age <20	0.86	0.55-1.34	0.58
No Education	0.79	0.36-1.74	0.52*
Unemployed	0.9	0.65-1.26	0.61
Height <145	1.06	0.8-1.40	0.76
Primigravida	0.45	0.25-0.82	0.0064
Early registration	0.84	0.56-1.27	0.5
Sickling Positive	1.24	0.66-2.31	0.73
Anaemia (Hb<11g/dl)	0.68	0.63-1.78	0.42
Poor attendance	2.3	1.68-3.17	1.24×10^{6}

*Fishers Exact test was quoted

IPT1 use = Age + No Education + Poor antenatal attendance

3.8 Low Birth Weight

In Table 9, Low birth weight was significantly associated with educational level, occupation, parity and early registration for antenatal care. After controlling for age only occupation and early registration for antenatal care was significantly associated with low birth weight (Unemployed, OR: 5.17, CI: 1.72-15.60, P: 0.0035; Early registration for antenatal, OR: 0.27, CI: 0.07-0.95, P: 0.0415).

Table 9: Association between low birth weight and characteristics of pregnant women, IPT and ITN use

Characteristics	Risk Ratio	95%CI	P-value
Age <20	1.69	0.91-3.13	0.14
No Education	0.43	0.21-0.86	0.04
Unemployed	2.97	1.75-5.03	5.57×10^{-6}
Height <145	1.50	0.83-2.69	0.24
Primigravida	2.57	1.42-4.65	0.0032
Early registration	0.28	0.09-0.94	0.034*
Sickling Positive	0.82	0.12-5.65	1.00*
Anaemia (Hb<11g/dl)	0.65	0.34-1.25	0.27
Less than 4 visits	0.53	0.27- 1.03	0.09
IPT 1	1.7	0.90-3.20	0.146
ITN use	1.22	0.62-2.40	0.71

* Fishers Exact test was quoted

Low birth weight was not significantly associated with sickling status, anaemia, use of IPT and ITN (P>0.05). Unemployed pregnant women are five times at risk of delivering low birth weight babies than employed pregnant women.

Table 10: Logistic regression model after controlling for age

Outcome	Exposure	OR	95% CI	P-Value
Less than 4 visits	Height <145cm	0.66	0.45-0.96	0.031
ITN use	Unemployed	2.07	1.24-3.45	0.0054
IPT 1 use	Poor antenatal attendance No education	3.08 2.28	2.00-4.74 1.33-3.90	0.0 0.0027
Preterm	Sickling Positive	4.37	1.55-12.33	0.0054
Low birth weight	Unemployed Early registration	5.17 0.27	1.72-15.60 0.07-0.95	0.0035 0.0415

4. Discussion

The incident of teenage pregnancy of 16.2% found in the district was high and was comparable with 16.9% recorded in 2011 in Kadjebi District Health Directorate, annual performance report (Kadjebi District Health Directorate 2012). The incident of teenage pregnancy in the district was higher than the average for the Volta Region (13.3%) but lower than 23% found in Northern and Central region according to 2008 Demographic and Health Survey (Ghana Statistical Service 2013). Teenage pregnancy is associated with pregnancy complications and social problems. Girls dropping out of school may be as a consequence of teenage pregnancy in the district. Most teenage pregnancies may not be planned, this may lead to adverse outcomes like septic abortions and maternal deaths. The evidence shows that efforts by the District Health Directorate of providing education on safe sex was ineffective in addressing the high level of teenage pregnancy. In addition guardians and teachers have some reservations on safe sex education to adolescents. A sector wide approach must be employed to bring teenage pregnancy under control.

Formal education of women is important, as it enables them to make informed decisions that impact on their health and wellbeing. However, majority of the pregnant women (76.7%) had no formal education. This is three times the national average and higher than 67.5% in the Northern Region of Ghana (Ghana Statistical Service 2011). The high illiteracy rate among the women was unrelated to delay in seeking antenatal care and was in contrast to studies by Tayie and Lartey and others, where evidence showed that educated pregnant women tend to use sufficiently antenatal care (Tayie and Lartey 2012). Free maternal health service provided by Ghana through the operationalization of the National Health Insurance may have removed educational and socioeconomic barriers to uptake of health services by pregnant women.

Maternal malnutrition is embodied by short stature and low BMI (<18.5) caused by chronic energy and micronutrient deficiencies (Eijk et al. 2006). A short maternal height is predictive of foetal size and highly associated with risk of foetal growth restriction, caesarian section delivery and cephalopelvic disproportion. However, our findings suggested maternal height was unrelated to low birth weight. It was evident that pregnant women with short stature (Height<145cm) were good antenatal attendants and this may have availed them to benefit fully from the interventions provided by prenatal care.

The results shows that pregnant women who had at least one antenatal care was high and was consistent with 96% obtained nationally (Ghana Statistical Service 2011). The high antenatal attendance was mainly due to the free antenatal care in Ghana paid for by the National Health Insurance Scheme. The study found antenatal attendance unrelated to educational level, maternal age and employment. This was inconsistent

with finding of Eijk et al in 2006 (Eijk et al. 2006) where antenatal attendance was associated with having more than eight years of education and higher socioeconomic status. This explains why removal of financial barrier to antenatal care would improve antenatal attendance. There was no association between poor antenatal attendance and preterm birth and low birth weight, this was inconsistent with known studies (Tayie and Lartey 2012).

Ideally, antenatal care initiated by 16 weeks of gestation would ensure pregnant women benefit fully from the interventions provided during antenatal care. Early registration for antenatal care (≤16 weeks of gestation) was 33.6%, which was lower than 55% obtained for Ghana in 2008 (Ghana Statistical Service 2011). Early registration for antenatal care is protective against low birth weight (RR: 0.28. P< 0.05).

5. Limitations

Both antenatal and delivery registers did not have last menstrual period (LMP) recorded. Gestational age at delivery was therefore not determined using the last menstrual period. This may have resulted in over estimation of preterm births. Data was missing on some of the variables in the antenatal and delivery registers and were not included in the analysis.

6. Conclusions

Teenage pregnancy was high in Kadjebi District and sector wide approach should be adopted to bring it under control. Antenatal attendance was almost universal however, optimum antennal visits was undesirably lower than expected. Unemployment among the pregnant women was very high but was unrelated to low antenatal attendance. This was attributable to free antenatal care provided by National Health Insurance Scheme. Early registration for antenatal care would reduce low birth weight and improve pregnancy outcome. Analysis of data collected in the antenatal and delivery registers could yield valuable information for public health action.

7. Acknowledgement

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