ORIGINAL ARTICLE

Late Pregnancy Outcomes among Women who Attended and Women who did not Attend First Trimester Antenatal Care Visits in a Suburban Regional Hospital in Cameroon

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ABSTRACT

Background: Despite relatively high number of women who attend antenatal care (ANC) in Cameroon, there is an ever-increasing maternal mortality ratio, and pregnancy outcomes remain inadequate. A new suggested Optimal ANC Package includes attending ANC in the first trimester. This study assesses the overall ANC coverage, the percentage, and pregnancy outcomes among women who attended and did not attend ANC in the first trimester in the Buea Regional Hospital (BRH) in Cameroon.

Methods: A cross-sectional study was carried out among 200 consenting pregnant women presenting for delivery at the BRH. A bivariate analysis was used to compare the frequencies of various pregnancy outcomes within the the two categories of women who attended and who did not attend first trimester ANC.

Results: Ninety-six percent of the women attended at least 1 ANC visit with 20.5% of these women attending ANC in the first trimester and 60.2% attending at least 4 visits. Sociodemographic and obstetric factors were not found to be associated with attending ANC in the first trimester. Also, there was no statistically significant association between all the late pregnancy outcomes assessed and attending ANC in the first trimester.

Conclusions and Global Health Implications: Trends in most sub-Saharan countries seem to suggest that most women do not attend first trimester ANC. This could have negative consequences on overall perinatal outcome. More user-friendly educational programs for women of childbearing age is required in such regions to address this situation.

Key words: Antenatal Care • Optimal Antenatal Care Package • First Trimester Antenatal Care • Buea Regional Hospital • Cameroon

Background

Cameroon has good antenatal care (ANC) coverage with 82% of pregnant women attending at least one ANC in 2007 and 60% of these women attending at least 4 visits.[1,2] However, despite such coverage, Maternal mortality ratio (MMR) increased from

680 to 872 deaths per 100,000 from 2003-2012 and pregnancy outcomes are still inadequate.[2] This remains a major impediment towards the overall achievement of the fifth Millenuium Development Goal (MDG)—improving maternal health.[3] Adequate and optimal ANC has been proposed as one of the strategies to combat increasing MMR and to improve pregnancy outcomes.[4] The World Health Organization (WHO) advocates that adequate ANC should include at least four visits for any pregnancy.[5] However, recent studies have suggested that adequate and effective ANC should be upgraded to include the following four components which make up an *Optimal ANC Package*: 1) at least four ANC visits; 2) with the first visit in the first trimester; 3) the last visit in the third trimester and 4) with all the visits supervised by a skilled professional.[6, 7] These authors stressed the need for the attendance of four visits as stipulated by WHO and also the commencement of these visits as early as possible in the first trimester.[7] The authors further suggested that the definition of optimal ANC should be changed to include the above four components especially in developing countries like Cameroon[6,7] inorder to adapt to the ever increasing MMR. These changes were finally accepted in a WHO updated report in 2002.[5] One of these components (commencing first visit in the first trimester) is aimed at assessment of the health of the woman to ensure that she is as healthy as possible during the pregnancy and delivery.[7] During this first trimester visit, remedial actions and treatment of previous medical conditions are undertaken so as to improve pregnancy outcomes. The overall aim of this study was therefore to determine if commencing ANC in the first trimester as proposed by this package, and later adopted by WHO, was associated with better pregnancy and delivery outcomes in a suburban population of pregnant women in Cameroon. The study assessed the prevalence of women who attended at least four ANC visits in the BRH. It also determined the prevalence of women who commenced ANC in the first trimester, the sociodemographic and clinical factors associated with commencing ANC in this trimester, and the late pregnancy and delivery outcomes in women who started ANC in the first trimester of pregnancy as opposed to women who did not.

Methods

Study design and setting

A cross-sectional study was carried out at the Buea Regional Hospital (BRH). The BRH is situated in the Buea Health District (BHD) which is part of the Fako Division, South-West Region, Cameroon. The BRH acts as the reference hospital in the health district and performs more deliveries than all the other health facilities in the district. The hospital has all the standard units of general medicine. One Obstetrician runs the maternity.[8]

Participants and sampling

All pregnant women-newborn pairs who attended the BRH during the period of the study were included. Women who delivered at a gestational age below 28 weeks, those who had multiple gestations and those who did not provide consent to take part in the study were excluded.

Data collection, variables and measurements

The study was carried out over a period of three months, from January 2 to March 23, 2013. Women who were about to put to birth were monitored throughout their labor. Their hospital records were assessed to obtain the following information:[8]

- *Socio-demographic characteristics* including socio-economic status, and level of education divided into low (no education and primary education) and high (secondary and university education).
- *Obstetric history* (gravidity, parity, year of first pregnancy, previous birth weight, antenatal care (ANC) history for the current pregnancy, and history of anaemia, fever and malaria during the current pregnancy.
- *Past medical history* (history of chronic illness like HIV, history of pregnancy related illnesses like pre-eclampsia/eclampsia and gestational hypertension and pre-pregnancy weight).
- *Toxicological history* (alcohol intake, cigarette smoking, other substance abuse and recreational drug use).

Participants' weight to the nearest kilogram (kg) and height to the nearest centimetre (cm) were measured using a *Camry bathroom scale* and a locally

made stadiometer calibrated to the *Butterfly brand* measuring tape respectively. A standard physical examination was performed. Throughout the labor, the fetus was monitored for the presence of acute fetal distress (i.e., fetal heart rate < 120 beats per minute and/or green meconium-stained amniotic fluid at delivery). After delivery, the neonates were assessed for viability (breathing, beating of the heart, pulsation of the umbilical cord or definite movements of voluntary muscles), and their APGAR scores at the first, fifth and tenth minutes were assessed. The baby's weight was measured to the nearest gram using a *Holtex+ digital* baby scale. The newborns were monitored for the presence of respiratory distress (respiratory grunting, nasal flaring, intercostal recessions, sub-xyphoid recession, thoraco-abdominal asynchrony, and respiratory rate < 40 or > 60 breaths per minute). Stillbirths and in-hospital neonatal deaths were recorded. The mother was informed of the entire study before labor and her consent was requested at the end of the labor process to reduce the possibility of coercion due to labor pains. Only those who agreed to participate in the study post-labor were included after they signed the inform consent form. All the data collected was then entered into a survey questionnaire (attached below). Minors and their guardians signed assent and guardian consent forms respectively.[8]

Data management and statistical analysis

The data were stored securely in a private location and kept confidential. Participants were referred to only by their identification numbers. Identifiable information (consent forms) was kept separate from the questionnaires and it was only possible to link both through a coding sheet which was available only to the principal investigator. Data were analysed using *Epi Info version 3.5.4.* Means (standard deviations) were used to summarise continuous variables and frequencies for categorical variables. Frequencies were compared using Fisher's exact tests. Statistical significance was set at p < 0.05.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of the Faculty of Health Sciences, University of Buea.

Results

ANC attendance

Of the 200 participants, 96% attended at least one ANC visit, 60.2% attended at least four ANC visits and 20.5% commenced ANC visits in the first trimester.

Socio-demographic and obstetrical characteristics of mothers

The mean age of the mothers was 26.4 ± 5.8 years; 57.0% were married; 50.5% were unemployed; 79.9% of them had a high level of education; and 6.6% of the women reported spending less than $1 (United States dollar) a day. Women who were married, had a high level of education, multiparous, multigravidas, employed, non-teens and those who spent more than $1 (USD) a day were not more likely to commence ANC in the first trimester (Table 1).

Pregnancy outcomes

Late pregnancy outcomes were divided into maternal and fetal pregnancy outcomes. Maternal pregnancy outcomes included: weight gain during pregnancy, BMI at delivery, preterm delivery, caesarean delivery, prolonged labor and post-partum hemorrhage. Fetal pregnancy outcomes included: fetal distress, neonatal asphyxia, respiratory distress, low birth weight (LBW) and high birth weight (HBW). Other pregnancy outcomes assessed were: malaria and anemia in pregnancy.

There was no statistically significant differences in the following pregnancy outcomes between women who commenced ANC in the first trimester and those who did not: poor weight gain, malaria in pregnancy, anemia in pregnancy, delivery BMI, preterm delivery, caesarean delivery, neonatal asphyxia, fetal distress, respiratory distress, neonatal death, shoulder dystocia, prolonged labor, post-partum hemorrhage, LBW and HBW (Table 2).

Discussion

The aim of this study was to assess the overall ANC coverage in the BRH and to determine the pregnancy and delivery outcomes of women who commenced ANC visits in the first trimester. We determined

that 96% of the women attended at least 1 ANC visit with 20.5% of this women starting their visits in the first trimester. However, there was no significant differences in the late pregnancy and delivery outcomes of women who commenced visits in the first trimester when compared to women who did not.

In this study, all the pregnancy outcomes assessed were not associated with early ANC attendance. However, most of the factors were assessed after viability of the fetus (after 28 weeks of gestation) hence this study was able to assess only the late pregnancy and delivery outcomes. The study did not therefore assess the early pregnancy outcomes in women in the BRH. Further studies are therefore necessary to assess the effects of first trimester ANC in suburban Cameroon especially concerning crucial factors like the risk of abortions in the first and second trimesters of pregnancy. Studies carried

Table 1: Socio-demographic characteristics and obstetric history of mothers delivering in the Buea Regional Hospital, January – March 2013

Socio-demographic factor	Groups	ANC FT* N	(%)	No ANC FT† N	(%)	N	p value
Marital status (N=200)	Married	22	19.3	92	80.7	114	0.4
	Single	19	22.1	67	77.9	86	
Occupation (N=200)	Unemployed	20	19.8	81	80.2	101	0.5
	Employed	21	21.2	78	78.8	99	
Level of education (N=199)	Low	5	12.5	35	87.5	40	0.1
	High	36	22.6	123	77.4	159	
Age groups (N=200)	Teenagers	4	13.3	26	86.7	30	0.2
	Non-teens	37	21.8	133	78.2	170	
Daily income (N=200)	<1USD‡	3	12.5	21	87.5	24	0.2
	≥1USD	35	22.5	123	77.8	158	
Gravidity (N=200)	<5	34	19.9	137	80.1	171	0.4
	≥5	7	24.1	22	75.9	29	
Parity (N=200)	Nulliparous	20	22.2	70	77.8	90	0.4
	Multiparous	21	19.1	89	80.9	110	

*Women who attended ANC in the first trimester; †Women who did not attend ANC in the first trimester; ‡USD: United States dollars

Table 2: Pregnancy outcomes of women who attended antenatal care visits in the first trimester in the Buea Regional Hospital, January – March 2013

Pregnancy outcomes	ANC FT* n	(%)	No ANC FT† n	(%)	Total	p-value
Weight gain						
≤10 kg	11	32.4	35	36.1	46	0.4
>10 kg	23	67.6	62	63.9	85	
Malaria in pregnancy						
Yes	13	31.7	43	27.0	56	0.3
No	28	68.3	116	73.0	114	
Anaemia in pregnancy						
Yes	19	46.3	54	34.0	73	0.1
No	22	53.7	105	66.0	127	
Delivery BMI‡						

(Contd...)

Table 2: (*Continued***)**

Pregnancy outcomes	ANC FT* n	(%)	No ANC FT† n	(%)	Total	p-value
<25 kg/m²	5	12.5	25	15.7	30	0.4
≥25 kg/m²	35	87.5	134	84.3	169	
Preterm delivery						
Yes	9	22.0	28	17.6	37	0.3
No	32	78.0	131	82.4	163	
Caesarean delivery						
Yes	6	14.6	19	11.9	25	0.4
No	35	85.4	140	88.1	175	
Asphyxia (1st minute)						
Yes	17	41.5	55	35.7	72	0.3
No	24	58.5	99	64.3	123	
Asphyxia (5th minute)						
Yes	4	9.8	29	18.5	33	0.1
No	37	90.2	128	81.5	165	
Asphyxia (10th minute)						
Yes	2	4.9	16	10.2	18	0.2
No	39	95.1	141	89.8	180	
Fetal distress						
Yes	8	19.5	31	19.5	39	0.6
No	33	80.5	128	80.5	161	
Respiratory distress						
Yes	3	7.3	11	6.9	14	0.6
No	38	92.7	148	93.1	186	
Neonatal death						
Yes	3	7.3	13	8.2	16	0.6
No	38	92.7	146	91.8	184	
Shoulder dystocia						
Yes	2	4.9	5	3.1	7	0.4
No	39	95.1	154	96.9	193	
Prolonged labor						
Yes	13	31.7	45	28.8	58	0.4
No	28	68.3	111	71.2	139	
Post-partum hemorrhage						
Yes	2	4.9	8	5.0	10	0.7
No	39	95.1	151	95.0	190	
Low birth weight						
Yes	10	24.4	28	17.6	38	0.2
No	31	75.6	131	82.4	162	
High birth weight						
Yes	6	14.6	22	13.8	28	0.3
No	35	85.4	137	86.2	172	

*Women who attended ANC in the first trimester; †Women who did not attend ANC in the first trimester; ‡BMI: Body mass index

out elsewhere have shown varied results. A similar study in Nigeria suggested that as a single component, early booking for ANC was a poor predictor of delivery and pregnancy outcomes.[9] These findings were similar to our study. Both studies assessed similar pregnancy outcomes: operative deliveries, delivery complications and LBW. In contrast, Temple *et al* in the UK showed that prepregnancy care was associated with early booking, good glycemic control in early pregnancy and reduced adverse outcomes like: spontaneous abortions, malformations, perinatal death and premature delivery.[10] Furthermore, other authors have advocated for the success of the first trimester ANC in the diagnosis of early congenital malformations, control of anaemia, and prevention of malaria complications.[11, 12] Also, the authors who proposed the *Optimal ANC Package*,[4, 6] suggested its use for screening against malaria, anaemia, HIV and diabetes, screening three major risks during delivery: uterine scar, breach presentation and premature rupture of membranes and finally warning the pregnant woman on danger signs during delivery.[13] These factors were expected to improve pregnancy and delivery outcomes. Nontheless, using this component of the *Optimal ANC Package* alone as shown in our study and others[9] may not be an adequate predictor of adverse late pregnancy outcomes in suburban populations. Therefore more research is needed to establish the benefits of: commencing ANC as early as the first trimester and the other components of the *Optimal ANC Package* as a combination, on early and late pregnancy outcomes and delivery outcomes.

A 96% ANC coverage was obtained for women who attended at least 1 visit in this study. This is higher than the national ANC coverage in Cameroon obtained in 2007 where 82% attended at least one ANC visit.[1] The ANC attendance rate in our study (96%) was also similar to that obtained in the Buea Health District (91.3%) in 2010.[14] This shows that there is a general high ANC attendance rate in Buea. Furthermore, the ANC attendance rate in our study was quite similar to that obtained in other countries in Subsaharan Africa (SSA) where rates of 92.5% and 90% were obtained in Equitorial Guinea and Kenya respectively.[15, 16] However, only 20.5% of the participants in this study commenced ANC in the first trimester despite this component being placed in the package for optimal ANC.[6, 13] This percentage was similar to the 21.6% obtained in the rural districts of Zimbabwe in 1999 but quite higher than those obtained in Nigeria in 2008 (7.6%), Uganda in 2007 (16%) and Malawi in 2010 (9.0%).[17-20] Nontheless, in Eastern Sudan a higher proportion of 31% of women commenced ANC in the first trimester.[21] This low prevalence of women who commence ANC in the first trimester from all the above studies seems to show a trend across SSA where women do not book early for ANC.

This study, however, did not identify any factors that could explain the tendency for women not to book early for ANC in the first trimester. All the sociodemographic factors assessed had no significant association with ANC attendance in the first trimester. Marital status, level of education, parity, gravidity, employment status, age and income levels did not have any influence on commencing ANC in the first trimester. Other studies in Cameroon however showed a relationship between optimal ANC and wealth, education, and place of residence.[6] In a study done in the Muea health area, a rural community in Cameroon, participants' education level was shown to be a significant predictor for booking early for ANC services.[22] In Nigeria, ignorance and misconceptions of the purpose of, and right time to commence, ANC were the main reasons presented by a majority of the women for late booking for ANC.[23]

Overall, the study results suggest that total ANC attendance in the BRH is adequate (96%) with 20.5% of these women attending ANC in the first trimester. The prevalence of first trimester ANC attendance in the BRH is low. This calls for population health education amongst women of childbearing age emphasizing the need for continuous follow-up during pregnancy and early booking for ANC. Even though ANC attendance in the first trimester was not shown to influence late pregnancy outcomes in this study, further studies are neded to establish the benefits of this component of the *Optimal ANC Package* on early pregnancy outcomes in this suburban population.

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Key Messages

- Overall antenatal care in the Buea Regional Hospital is adequate with 96% of women attending at least 1 ANC visit, and 60.2% of women attending at least 4 visits during pregnancy.
- However only 20.5% of these women fulfill one of the components of *Optimal Antenatal Care Package,* that is ANC attendance in the first trimester.
- ANC attendance in the first trimester when used alone was not a useful predictor of late pregnancy outcomes in this suburban population.
- Trends around Subsaharan Africa suggest low ANC visits in the first trimester suggesting the need for more user-friendly educational programs for women of childbearing age.

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Global Health Implications

Trends in sub-Saharan countries seem to suggest that most women do not attend first trimester ANC. Hence most regions do not satisfy the provision of adequate ANC proposed in the *Optimal ANC Package*. This could have negative consequences on overall perinatal outcomes in women and their children hence increasing morbidity and mortality. More user-friendly educational programs targeting women of childbearing age is required in such regions to address this situation.

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APPENDIX I
SURVEY QUESTIONNAIRE

SECTION A: IDENTIFICATION

1	ID number	Participant number/day/month of year
2	Referred	0=yes, 1=no
3	Institution referred from	
3	Age	(in years)
4	Region of origin	
5	Tribe	
6	Marital status	1=Married, 2=Single, 3=Widow
7	Occupational status	1=Unemployed, 2=Employed, 3=Self-employed
8	Occupational status of spouse if married	1=Unemployed, 2=Employed, 3=Self employed
9	Gravid status	
10	Year of first pregnancy	
11	Last menstrual period gestational age	(in completed weeks)

SECTION B: PAST MEDICAL HISTORY

12	What were the weights of your previous children at birth? (If any) in kg	1=………… 2=………… 3=………… 4=………… 5=………… 6=………… 7=………… 8=…………
13	Did you attend ANC for this present pregnancy?	0=Yes, 1=No
14	ANC attendance in the first trimester?	0=Yes, 1=No
15	If yes, how many ANC visits did you attend for the present pregnancy?	

(Contd...)

16	Have you ever been diagnosed of having diabetes?	0=Yes, 1=No
17	Was your blood sugar tested during this pregnancy?	0=Yes, 1=No
18	If yes, what was the value during	
	The first trimester	mg/dl
	The second trimester	mg/dl
	The third trimester	mg/dl
19	Were you diagnosed of having anaemia during pregnancy?	0=Yes, 1=No
20	If yes, what was the haemoglobin concentration value during	
	The first trimester	g/dl
	The second trimester	g/dl
	The third trimester	g/dl
21	Did you have fever during this pregnancy?	0=Yes, 1=No
22	If yes, during which trimester did you have the fever?	0=1st trimester, 1=2nd trimester, 2=3rd trimester
23	Were you diagnosed of having malaria in pregnancy?	0=Yes, 1=No
24	If yes, during which trimester were you diagnosed?	0=1st trimester, 1=2nd trimester, 2=3rd trimester
25	Were you diagnosed of having a UTI during pregnancy?	0=Yes, 1=No
26	If yes, during which trimester were you diagnosed?	0=1st trimester, 1=2nd trimester, 2=3rd trimester
27	Is there any one in your family who has diabetes?	0=Yes 1=No
28	If yes, who?	First degree relative (0=Father 1=Mother 2=Brother 3=Sister) Second degree relative (4=Grandfather 5=Grandmother 6=Cousin 7=Nephew 8=Niece) Third degree relative (9=Distant cousin 10=Granduncle 11=Grandaunt) Others (specify)
29	Do you have any chronic illnesses?	0=Yes, 1=No
30	If yes, please specify	
31	What was your weight before you became pregnant?	(in kg, check from records like previous hospital records, ANC records, etc)
32	Do you drink alcohol?	0=Yes, 1=No
33	If yes, calculate quantity in g/l	
34	Have you ever smoked cigarettes?	0=Yes, 1=No
35	Do you currently smoke cigarettes?	0=Yes, 1=No
36	If yes, calculate quantity in terms of pack years	
37	When did you stop?	
38	Calculate quantity in pack years before she stopped smoking	
39	Do you take any other recreational drugs?	0=Yes, 1=No
40	What is your level of education?	0=No education 1=Primary education 2=Secondary education first cycle 3=Secondary education second cycle 4=Tertiary education
41	How much do you averagely spend per day? (For the past one year)	

SECTION C: PHYSICAL EXAMINATION

42	Measure present pregnancy weight (in kg)	
43	Measure height (in cm)	
44	Fundal height (in cm)	
45	Abdominal circumference (in cm)	

SECTION D: LABOUR PHASE

46	Length of labour (in number of completed hours)	
47	Mode of delivery	0=vaginal delivery 1=instrumental vaginal delivery 2=caesarean section
48	What was the indication (for 1 and 2 only)	

SECTION E: NEWBORN ASSESSMENT

49	Sex	0=Male 1=Female
50	Weight (in g)	
51	Height (in cm)	
52	Head circumference (in cm)	
53	Chest circumference (in cm)	
54	Arm circumference (in cm)	
55	Mid neck circumference (in cm)	
56	Arm length (in cm)	
57	Leg length (in cm)	
58	APGAR score (1st, 5th and 10th minute)	
59	Weight of placenta (in g)	
60	Number of cotyledons	
61	Length of cord (in cm)	
62	Foetal complications of delivery	0=Shoulder dystocia 1=Foetal distress 2=Respiratory distress 3=Foetal hypoglycaemia 4=Foetal death 5=none 6=Others (specify)

SECTION F: MATERNAL ASSESSMENT

| 63 | Estimated blood loss after delivery (in ml) | |
| 64 | Maternal complications of delivery | 0=Perineal tears 1=Post partum haemorrhage 2=Instrumental delivery 3=Caesarean section 4=Prolonged labour 5=Maternal death 6=Others (specify) |