



# Utilisation of antenatal services at comprehensive health center umunya, anambra state: a retrospective study

Uloma Agu<sup>1\*</sup>, Maurice C. Agu<sup>2</sup> and Godswill A. Nnaji<sup>1</sup>

\*Correspondence: [ask4realuloma@yahoo.com](mailto:ask4realuloma@yahoo.com)



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<sup>1</sup>Department of Family Medicine, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria.

<sup>2</sup>College of Health Technology, Obosi, Anambra State, Nigeria.

## Abstract

**Background:** Early antenatal booking leads to early detection and management of abnormalities resulting in a reduction in maternal morbidity and mortality rates. The study sought to determine the frequency of antenatal visits, the gestational age at booking and to audit the provision and examine the utilization of antenatal services provided at Comprehensive Health Centre, Umunya.

**Methods:** A retrospective, cross sectional, descriptive study carried out among women who delivered at comprehensive health center, Umunya from January 2007 to July 2014. A sample size of 323 determined by Vaughan's formula was used. Data was extracted from the patients' records and analysed using SPSS 15. Chi-square tests was used as test of significance at  $p < 0.05$ .

**Results:** Mean gestational age at booking was (mean $\pm$ SD),  $22.76 \pm 8.151$  weeks. Approximately, two thirds of the women (66.3%) attended antenatal clinic  $\geq 4$  times. The assessment of antenatal care services at the center showed that height and weight measurements were done in 33.7% and 65.9%, respectively. Blood pressure was recorded in 99.7%, while almost all the women (95.6%) had routine iron and folic acid supplementation prescribed. Intermittent malaria prophylaxis was prescribed in 19.5% of the women. Tetanus toxoid immunization was administered in 80.5% of the women. In the examination of the utilization of the services, hemoglobin assessment was recorded in 82% of the women, urinalysis in 292 (90.4%), HIV screening in 99.4%, Syphilis test in 75.5% and Blood group test in 77.7%.

**Conclusion:** The study demonstrates suboptimal provision of services especially with height and weight measurements and prescription of malaria intermittent preventive therapy. It also showed suboptimal utilization of laboratory services.

**Keywords:** Utilization of ANC services, provision of ANC services, laboratory investigation, antenatal visits

## Introduction

Antenatal care is promotive health care given to pregnant women. It is the first contact for pregnant women to connect with health care delivery system. An estimated 358,000 women died from complications of pregnancy in the year 2008 and 99% of these deaths occurred in developing countries of which three fifths occurred in Sub-Saharan Africa [1]. In Nigeria, the maternal mortality ratio is as high as 800 deaths per 100,000 live births [2].

The purpose of antenatal care is to maintain the mother and baby in the best possible state of health. It is relevant for the improvement of maternal health as it enables the monitoring of the

health of the mother and anticipation of any difficulties during pregnancy, labor and birth [3]. Early start of antenatal care enables the health providers to determine a woman's baseline health, makes for early detection and management of abnormalities.

The content of antenatal care commonly includes physical examination, Height, weight and blood pressure measurements, laboratory investigations and screening tests which include Voluntary Counseling and Testing and HIV screening, screening for anaemia, urinalysis, screening for syphilis, while preventive contents include giving tetanus toxoid immunizations, nutritional supplements (iron and folic acid supplements), and intermittent

preventive therapy. Several studies have linked proper antenatal care with reduced infant mortality rates [4,5].

Provision of skilled care to mothers during pregnancy and delivery will reduce the rates of maternal mortality and morbidity. Women who seek care early are likely to be on nutritional supplements for a longer period thus reducing the prevalence of anaemia. These can take place when mothers present early and make frequent visits for care and when the health workers also provide adequate antenatal services. The provision of prevention of mother to child transmission of HIV and antiretroviral treatment and anti-malaria prophylaxis are also good reasons to seek early antenatal care.

The study was therefore conducted to evaluate the frequency of antenatal visits, the gestational age at booking, to audit the quality of the antenatal services provided and examine the utilization of the services at CHC Umunya. Understanding the pattern of usage of antenatal care at Umunya will help health workers meet the needs of these patients.

## Materials and methods

Umunya is an outstation of the Nnamdi Azikiwe University Teaching Hospital, Nnewi. It provides care to the rural community of Umunya and the environs.

## Study design and population

A retrospective, cross sectional, descriptive study was conducted using antenatal and delivery records of women who delivered at comprehensive health center Umunya from January 2007-July 2014.

## Sample size determination

A minimal sample size of 323 was used for the study. The determination of sample size was calculated using the Vaughan's formula as follows [6]:

$$N = PQ / (E/1.96)^2$$

Where P is the maximum expected attendance rate of pregnant women to antenatal clinics.

Q is 100-P

E is the margin of sample error tolerated in percentage (5% being the maximum accepted value).

Using an attendance rate of an approximated average of 70% of pregnant women using antenatal care services in Nigeria (a summation of a Nigerian figure of 61% [7] and an Ibadan, Nigeria figure of 76.8% [8]) a sample population of 323 was used.

## Sampling procedure

Consecutive and complete records of the patients who attended antenatal clinics during the period of the study were retrieved and data collected from each until the required sample size was obtained.

## Instrument

The instrument for data collection was a questionnaire that was designed to extract information about the participants'

demographic data, their gestational age at booking, and the antenatal care services that were prescribed and those utilized that were recorded. The copies of the questionnaire were given to three experts in the department of family medicine who examined the content of the questionnaire items, their level of clarity, appropriateness of the language used and the ability of the instrument to elicit accurate information in relation to the purpose of the study.

## Study protocol

During the first antenatal visits, full and relevant histories are taken and documented. Physical examination included inspection and palpation of the pregnant woman, measurement of the symphysis-fundal height (SFH) and auscultation performed after 26 weeks of gestation.

The date of the first day of the last menstrual period (LMP) was used to determine the gestational age (GA) and expected date of delivery (EDD). Palpation of the abdomen and SFH measurements was used to support the EDD. SFH measurement was used if the LMP was unknown. Obstetric ultrasound was used to confirm the expected dates of delivery if the woman was unsure of her dates or if there was any other need.

Blood pressure was measured and urine dipstick test was done during each visit for the screening of protein and glucose in the urine. Voluntary counseling for HIV were offered to all pregnant mothers, but HIV testing was done voluntarily. Those who tested positive were included in the PMTCT program. Screening test for HIV was free at this centre.

Blood samples were taken to assess haemoglobin levels using a haemoglobinometer during the antenatal visits. Tests for blood group, Rhesus factor and screening for syphilis using a rapid plasma reagin test were ordered. These tests were done after voluntary presentation of the woman to the laboratory and after payment for the services.

After consultation, sufficient ferrous sulphate and folic acid tablets were prescribed for supplementation, which will last till the next appointment. Other drugs and malaria preventive therapy were also prescribed. Tetanus toxoid immunization was also given to prevent neonatal tetanus, 0.5ml of the toxoid was administered intramuscularly. This was given at the first visit if this visit was in the second trimester or later in the second trimester if the first visit was earlier. This was followed by a second dose after 4 weeks.

## Data analysis

Data was analyzed using SPSS 15. Descriptive statistics was used to display results, while Chi-square test was used for test of significance at  $p \leq 0.05$ .

## Ethical precepts

The records were handled with utmost confidentiality and patients records were returned to the file racks immediately after relevant information was extracted from files. The information was treated anonymously revealing no identities.

## Results

The mean age of the study population was (Mean±SD) 27.34±5.178 years, while the age range was from 16 to 40 years. Most of the women were between 26 and 30 years (Table 1). Marital status showed that most of them were married (97.8%), while only 7 (2.2%) were single mothers.

Most of the mothers were multiparous (61.9%), while primigravid (27.6%) and grand-multiparous (10.5%) were in minority. Majority were of the lower social class. A little less than two third of the women -64% had a source of income while 36% had no income. Out of those who had an income, 56.0% were petty traders (see Table 1).

Mean gestational age at booking was (Mean±SD) 22.76±8.151 weeks. Forty six women (14.2%) booked at 13 weeks of gestation or less (see Table 2). More than half of the women (66.3%) attended antenatal clinic 4 times or more (See Table 2).

Components of antenatal care that were prescribed or utilized are shown in Table 3. Iron/folic acid supplements were prescribed for 95.6% of the women. Malarial prophylaxis was prescribed

**Table 1. Frequency of socioeconomic variables among pregnant women.**

Variables	Frequency	Percent
<b>Age group</b>		
16-20	35	10.8
21-25	85	26.3
26-30	124	38.4
31-35	55	17.0
36-40	24	7.4
<b>Parity</b>		
P <sup>0</sup>	89	27.6
P <sup>1-4</sup>	200	61.9
P <sup>5</sup> and above	34	10.5
<b>Marital status</b>		
Single	7	2.2
Married	316	97.8
<b>Occupation</b>		
Civil servant	27	8.4
Petty trader	116	35.9
Artisan	46	14.2
Unemployed house wife	78	24.1
Student	37	11.5
Farmer	16	5.0
Clergy	2	0.6
House help	1	0.3
<b>Social classification</b>		
Upper class	0	0
Middle class	27	8.4
Lower class	296	91.6
<b>Income</b>		
Yes	207	64
No	116	36
Total	323	100

**Table 2. Frequency distribution of gestational age at booking and ANC visits.**

Booking gestational age	Number	Percent
<13	46	14.2
14-26	175	54.2
27-41	102	31.6
<b>Frequency of antenatal visits</b>		
1-3	109	33.7
4-8	184	57.0
>8	30	9.3
Total	323	100

**Table 3. Frequency distribution of components of antenatal care services**

Variable	Number	Percent
<b>Prescription of iron/folic acid supplement</b>		
Yes	309	95.6
No	14	4.4
<b>Prescription for malaria prophylaxis</b>		
Yes	63	19.5
No	260	80.5
<b>Tetanus Toxoid vaccination</b>		
Yes	260	80.5
No	63	19.5
One dose of tetanus toxoid received	17	5.3
Two doses of tetanus toxoid received	240	74.3
Three doses of tetanus toxoid received	3	0.92
<b>Hemoglobin level test done</b>		
Yes	265	82
No	58	18
<b>Urinalysis</b>		
Yes	292	90.4
No	31	9.6
<b>Syphilis test</b>		
Yes	244	75.5
No	79	24.5
<b>Blood group test</b>		
Yes	251	77.7
No	72	22.3
<b>HIV test</b>		
Yes	321	99.7
No	2	0.6
<b>Blood pressure check</b>		
Yes	322	99.7
No	1	0.3
<b>Height measure</b>		
Yes	109	33.7
No	214	66.3
<b>Weight measure</b>		
Yes	213	65.9
No	110	34.1
Total	323	100

for 19.5%, while in 80.5% of the women, the prescriptions were not written. Tetanus toxoid immunization was given to 80.5% of the women. Seventeen of the women (5.3%) had only one dose while 240 (74.3%) had two doses and 3 (0.92%) had three doses.

Haemoglobin assessment was performed by 82% of the women out of which, 265 (76.8%) had only one record of haemoglobin estimation.

Urinalysis was performed by 292 (90.4%) of the women.

Most had two (24.8%) urinalysis done followed by those who did thrice (16.4%).

Syphilis test was recorded in 75.5% of the women, while blood group test was done in 77.7%.

Voluntary counseling and testing for HIV was done in 99.4% mothers. Similarly, blood pressure measurement was taken in 99.7% of mothers, while height was measured in only 33.7% and weight in 65.9% of mothers.

**Table 4** showed no significant association between age and

**Table 4. Cross tabulation between age groups and frequency of haemoglobin measurements, syphilis test, blood group test, tetanus vaccination and frequency of malaria prophylaxis prescription.**

Variable	Frequency of hemoglobin assessment					P-value
Age group	0	1	2	3	Total	0.51
16-20	9	24	2	0	35	
21-25	18	63	4	0	85	
26-30	17	99	7	1	124	
31-35	10	43	2	0	55	
36-40	4	19	0	1	24	
Total	58	248	15	2	323	
<b>Age group</b>	<b>Syphilis test</b>			<b>Total</b>	<b>P-value</b>	
	<b>Yes</b>	<b>No</b>				
16-20	25	10	35			
21-25	58	27	85			
26-30	102	22	124			
31-35	38	17	55			0.07
36-40	21	3	24			
Total	244	79	323			
<b>Age group</b>	<b>Blood group test</b>			<b>Total</b>	<b>P-value</b>	
	<b>Yes</b>	<b>No</b>				
16-20	25	10	35			
21-25	64	21	85			
26-30	104	20	124			
31-35	38	17	55			0.16
36-40	20	4	24			
Total	251	72	323			
<b>Age group</b>	<b>Malaria prophylaxis prescription</b>			<b>Total</b>	<b>P-value</b>	
	<b>Yes</b>	<b>No</b>				
16-20	6	29	35			
21-25	20	65	85			
26-30	24	100	124			
31-35	8	47	55			0.76
36-40	5	19	24			
Total	63	260	323			
<b>Age group</b>	<b>Tetanus toxoid vaccination</b>				<b>Total</b>	<b>P-value</b>
	<b>none</b>	<b>One dose</b>	<b>Two doses</b>	<b>Three doses</b>		
16-20	10	4	21(60%)	0	35	0.027 (Sig)
21-25	19	4	62(73%)	0	85	
26-30	21	4	99(80%)	0	124	
31-35	8	4	40(72%)	3	55	
36-40	5	1	18(75%)	0	24	
Total	63	17	240	3	323	

Age was significantly associated with uptake of tetanus toxoid

the various components of healthcare services provided and utilized by the mothers. The relationship between age group and the components of antenatal care was only significant in the tetanus toxoid immunization. Women in age group 16-20 years had the least number of the minimum two vaccinations.

**Table 5** showed that the association between parity and the various components of health care services provided and utilized by the mothers were not significant.

**Table 6** showed that income was related significantly to the performance of the syphilis and blood group test. It was not significantly related to hemoglobin test or tetanus toxoid vaccination.

## Discussion

Antenatal care is regarded as the corner stone of maternal and perinatal health care. The study found the mean number of visits for antenatal care was  $4.87 \pm 2.6$  visits. This figure was similar to what was obtained by Osungbade et al [9]. More than half of the women in this study reached the four or more antenatal visits as recommended by WHO [10].

Demographic analyses of the study population showed that majority (91.6%) of the study population were from the low socioeconomic stratum of the society [11]. Many of them were petty traders. This is probably one of the reasons for the low performance of important tests. Since many of the laboratory services attract some charges, (except HIV screen) it is probable that lack of funds would account for the poor utilization of antenatal services among this study population.

The mean booking gestational age of  $22.75 \pm 8.15$  is similar to what was observed in other studies in Nigeria [9,12,13]. The implication of this finding is that these women started attending antenatal care after the period of embryogenesis, when the organs are developed. Teratogenic substances (herbs, drugs, etc) taken during this period could affect organogenesis. Early booking with patient education could offer patient education against the consumption of any harmful or unwholesome herb and doubtful medication.

Mere attendance at a health facility is insufficient for achieving the goals of antenatal care. The quality and utilization of

**Table 5. Cross tabulation between parity and frequency of haemoglobin measurements, syphilis test, blood group test, tetanus vaccination and frequency of malaria prophylaxis prescription.**

Parity	Frequency of hemoglobin assessment				Total	Significance
	None	Once	Twice	Thrice		
P <sup>0</sup>	14	70	5	0	89	0.57
P <sup>1-4</sup>	35	153	10	2	200	
P <sup>5</sup> and above	9	25	0	0	34	
Total	58	248	15	2	323	
<b>Syphilis test</b>						
	Yes	No			Total	
P <sup>0</sup>	62	27			89	0.22
P <sup>1-4</sup>	157	43			200	
P <sup>5</sup> and above	25	9			34	
Total	244	79			323	
<b>Blood group test</b>						
	Yes	No			Total	
P <sup>0</sup>	76	13			89	0.07
P <sup>1-4</sup>	152	48			200	
P <sup>5</sup> and above	23	11			34	
Total	251	72			323	
<b>Tetanus toxoid vaccination</b>						
	None	One dose	Two dose	Three doses	total	P-value
P <sup>0</sup>	25	2	61	1	89	0.07
P <sup>1-4</sup>	29	12	158	1	200	
P <sup>5</sup> and above	9	3	21	1	33	
Total	63	17	240	3	321	
<b>Malaria prophylaxis prescription</b>						
	Yes	No			Total	P- value
P <sup>0</sup>	19	70			89	0.70
P <sup>1-4</sup>	39	161			200	
P <sup>5</sup> and above	5	29			34	
Total	63	260			323	

Parity was not significantly associated with the components of antenatal care services



**Table 6. Cross tabulation between income and frequency of haemoglobin measurements, syphilis test, blood group test, tetanus vaccination and frequency of malaria prophylaxis prescription.**

Income	Frequency of haemoglobin assessment					P value
	None	Once	Twice	Thrice	Total	
No	25	83	7	1	116	0.41
Yes	33	165	8	1	207	
Total	58	248	15	2	323	
<b>Syphilis test</b>						
	Yes	No	Total		P value	
No	80	36	116		0.03	
Yes	164	43	207			
Total	244	79	323			
<b>Blood group</b>						
	Yes	No	Total		P value	
No	90	26	116		0.002	
Yes	161	46	207			
Total	251	72	323			
<b>Tetanus toxoid vaccination</b>						
	None	Once	Twice	Thrice	Total	P value
No	28	8	79	1	116	0.30
Yes	35	9	161	2	207	
Total	63	17	240	3	323	
<b>Malaria prophylaxis prescription</b>						
	Yes	No	Total		P value	
No	28	88	116		0.12	
Yes	35	172	207			
Total	63	260	323			

Income was significantly associated with the syphilis test and the blood group test but not with the hemoglobin test, tetanus toxoid vaccination and malaria prophylaxis.

antenatal services is very important in achieving the objective of a good pregnancy outcome. This study audited the services that should be provided in antenatal care, which include recordings of Weight, Height, Blood Pressure (BP), screening for Anaemia, testing for Syphilis, Urine testing, Malaria prophylaxis, Tetanus toxoid immunization, HIV testing, and Micronutrient supplementation.

Though gain in maternal weight was more significance as a predictor of low birth weight, birth asphyxia and mode of delivery than maternal weight alone, most women do not know their pregravid weight therefore maternal weight was used as reference [14-16]. Measurement of maternal weight as an audit of the services provided was recorded in only 65.9% of the women. This recorded figure is low, compared to the recordings of maternal weight by Osungbade et al and Sagay et al., 97.3% and 78%, respectively [9,17]. Maternal height, another important predictor (cephalopelvic disproportion) of pregnancy outcome was only assessed in 33.7% of the women [18]. This figure is lower than that recorded in rural South Africa where 92% had their heights recorded but higher than that in Jos, Nigeria where there was no recording of the height [17,19].

The implication of this finding is that these women's risk for cephalo pelvic disproportion could not be adequately evaluated.

Haemoglobin concentration was tested only once in 76.8% of mothers in this study. Although, this figure is higher than 42.8% and 19.2% recorded by Osungbade and Osungbade, it is sub optimal [9,17]. The fact that it was only checked once in 76.7% and never checked at all in 17.9% of the women is quite disturbing. Health workers should put more effort to get the mothers have their hemoglobin levels checked regularly as to identify anaemic mothers early and institute prompt management. Maternal anaemia contributes to increased maternal and perinatal mortality and it is a risk factor for iron deficiency in the infant with adverse behavioral and cognitive development in the child [25,26]. It is also an independent risk factor for low birth weights and preterm delivery [20-22].

In this study, prescription for iron and folic acid supplementation was up to 82%. This was similar to that of Osungbade of 80% [9]. It was much higher than the figures in another study by Osungbade of 36.4% [23].

Blood pressure recordings in this study was found to be up to 99.7% This finding was similar to the finding in rural south Africa and higher than 95.1% recorded in some parts of Nigeria [9,19]. Hypertension, preeclampsia and eclampsia are leading causes of maternal mortality. Early detection through BP measurement can alert the care providers to take actions that can reduce mortality rates.

The findings show sub optimal syphilis screening 75.5%, sub-optimal blood group (77.7%) and almost optimal HIV screening (99.4%). In a study in sub-Saharan Africa only 40% of women were screened for syphilis [24]. Blood group testing was lower than 84% in the South African Study [19]. Syphilis can cause still births, preterm, low birth weights and congenital malformations. Blood group testing is necessary to detect Rhesus negative mothers by care providers who may be able to provide optimal treatment to the neonate. HIV testing uptake was quite high. The uptake was higher than that in a South African study (76%) [19]. HIV testing is the means of enrolling in PMTCT services. The women received counseling during which the benefits to the unborn baby were explained to the mother.

In this study, 80.4% of mothers had Tetanus toxoid immunization, while about 5.2% received only one dose before delivery. This figure is higher than 34.8% tetanus immunization (2 doses) recorded by Osungbade and 56% by Adeiga [9,25]. Tetanus toxoid immunization is an intervention to prevent neonatal tetanus. To be effective, at least two doses should be given four weeks apart and ending two weeks before delivery. Age group was significantly related to the number of tetanus toxoid vaccination. Those of the younger age group had the least percentage of being vaccinated twice before delivery. Greater efforts should be made to get 100% of our women to receive at least two doses of tetanus toxoid vaccination.

In this study, the use of intermittent preventive therapy for malaria prophylaxis prescription was (19.5%) much lower

than the figure (72.1%) recorded by Osungbade, higher than 6.4% in another study by Osungbade, 0% in Jos and 60% by the National population commission, respectively [9,17,23,26]. Malaria prophylaxis provision should be encouraged by all health workers as we live in an endemic area.

Malaria in pregnancy has a high prevalence in Nigeria [27]. It worsens anemia, causes low birth weights, intrauterine growth retardation, congenital malaria and preterm deliveries [28,29]. Bivariate analysis between parity, income and components of health care services provided showed only income was significantly related with the syphilis test and blood group test. This may be attributed to the fact that these tests have a higher price tag than that of hemoglobin test. Age was not significantly related to the other components of care except the frequency of tetanus immunization. The blood pressure check, tetanus toxoid vaccination and HIV tests are free.

## Conclusion

The study shows that a high proportion of pregnant women attended antenatal care clinics at least four times before delivery. The audit of provision and utilization of the services of antenatal care was found to be suboptimal. Some important service components such as maternal weight and heights, tetanus immunization and malaria prophylaxis were grossly underprovided and underutilized by these women.

## Limitations

The information were extracted from secondary data with the potential challenges of using secondary data collected for other purpose in a survey. These may include observer, interviewer errors, etc. However, any effect on the data is minimal and would act on both positive and negative ways as to nullify such effects on the result of the study.

## Recommendation

We recommend that health workers be trained and retrained to carry out health education provide adequate services and encourage women to utilize the services provided during antenatal care. Equipment for the provision of these services should be readily available at the canters. Women should be encouraged to book early by increasing their awareness to the benefits of such behavioral change and providing them with incentives such as free antenatal health care for all pregnant women.

## Competing interests

The authors declare that they have no competing interests.

## Authors' contributions

Authors' contributions	UA	MCA	GAN
Research concept and design	✓	✓	--
Collection and/or assembly of data	✓	✓	--
Data analysis and interpretation	✓	✓	✓
Writing the article	✓	✓	✓
Critical revision of the article	✓	--	✓
Final approval of article	✓	✓	✓

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