ORIGINAL ARTICLE

Audit of Antenatal Investigation Results of Patients in Aminu Kano Teaching Hospital: A Two-Year Review

Murtala Yusuf,[1,2] Aisha Aminu Sharif[1]

ABSTRACT

Background: Antenatal screening forms an indispensable part of effective antenatal care and it helps to reduce maternal and perinatal morbidity and mortality. **Objectives:** This audit aimed to identify how the study center complies with the antenatal investigations standards as recommended by WHO and NICE guidelines. **Method:** The study was a 2-year retrospective study of antenatal investigation results of women who attended antenatal care in Aminu Kano Teaching Hospital. Data was collected through a review of the women's antenatal cards and compared with the standard criteria from WHO 2016 recommendation on antenatal care and NICE 2008 Guideline on antenatal care. The study period was from 1st January 2018 to 31st December 2019. **Results:** Majority of the women, 86.7% had PCV of more than 30%, 77.5% had hemoglobin genotype AA and 48.7% had O+ blood groups. Also, 5.3% of the women were Rhesus negative. Majority of those screened for gestational diabetes mellitus, 82.1% had normal oral glucose tolerance test. The seroprevalence for HIV, hepatitis B and syphilis was found to be 5.6%, 14.7% and 1.1% respectively. Most of the patients (97.1%) had an ultrasound scan done at booking but only 50.3% had it done before 24 weeks of gestation with 99.5% being normal. **Conclusion**: Although most of the antenatal investigations recommended by WHO and NICE guidelines are done in the hospital, it still falls short of the required level from the standards and as such, the centre did not fully comply with the standards of WHO and NICE guidelines. There is therefore need for improvement in order to comply with the standards which will subsequently have an impact on maternal and perinatal health statistics

Keywords: Audit, Antenatal, investigations

[1]Department of Obstetrics and Gynaecology Aminu Kano Teaching Hospital, Kano
[2]Department of Obstetrics and Gynaecology, Bayero University Kano

Corresponding Author:

Dr. Murtala Yusuf
Consultant Obstetrician and gynaecologist, Department of Obstetrics and gynaecology Aminu Kano Teaching Hospital, Kano
Senior lecturer, Department of Obstetrics and gynaecology, Bayero University Kano
Email: murtalayusuf22@yahoo.com

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Introduction

Antenatal care is a specialized pattern of care organized for pregnant women to enable them attain and maintain a state of good health throughout pregnancy, and to improve their chances of having safe delivery of healthy infants at term.[1] The components of antenatal care include risk identification, prevention and management of pregnancy-related or concurrent diseases, and health education and promotion.[2]

It is an indispensable part of an effective maternity care service as it reduces maternal and perinatal morbidity and mortality through detection and treatment of pregnancy-related complications, and indirectly through the identification of women at increased risk of developing complications during labour and delivery.[1,3,4] An analytical review of the recent World Health Statistics showed that antenatal care coverage between 2006 and 2013 was indirectly correlated with maternal mortality ratio worldwide.[3] This indicates that countries with low antenatal care coverage are those with very high Maternal Mortality Ratios.[5] For instance, antenatal care coverage in United Arab Emirates was 100% with Maternal Mortality Ratio of 8 per 100,000,[5] while

antenatal care coverage in Nigeria was 61% with Maternal Mortality Ratio of 560 per 100,000.[6] WHO recommends 90% antenatal coverage to reduce maternal and perinatal morbidity and mortality.[7]

WHO calls for a minimum of eight antenatal visits during pregnancy to improve perinatal outcomes and maternal satisfaction. The first ANC contact should take place in the first trimester, two contacts should take place in the second trimester and five in the third trimester.[2]

The first visit provides an opportunity to review the medical and obstetric history of the pregnant woman, make a physical examination, perform appropriate investigations and arrange suitable antenatal care for the rest of the pregnancy.[8]

The common investigations usually ordered are: urinalysis for glycosuria and proteinuria, Haemoglobin level, Haemoglobin genotype, Blood grouping, Random blood sugar, Venereal Disease Research laboratory Test, Australian antigen, HIV 1&2 and alpha-feto-protein especially in developed countries to rule out neural tube defect and down syndrome.[9] Other investigations include Ultrasound scan, Urine microscopy, culture and sensitivity, and Glucose challenge test.[1,4,9] Some diseases like Chlamydia, Gonorrhoea, Herpes simplex virus, Trichomonas, Candidiasis and Bacterial vaginosis are tested for during antenatal care.[4]

Anaemia is the world's second leading cause of disability, and one of the most serious global public health problems, with the global prevalence of anaemia among pregnant women at about 38%, so performing a full blood count, is part of routine antenatal care.[3] However in settings where full blood count testing is not available, onsite haemoglobin testing with a haemoglobinometer is recommended over the use of the haemoglobin colour scale as the method for diagnosing anaemia in pregnancy.[3]

Although there are many uncertainties about the cost-effectiveness of different screening strategies for hyperglycaemia, the prevalence of GDM and diabetes mellitus according to the 2013 criteria in diverse populations, and the impact of the earlier diagnosis on pregnancy outcomes make routine screening of those at risk important.[3]

Urinalysis is recommended at each antenatal visit to screen for pre-eclampsia.[10,11] Urine microscopy, culture and sensitivity is important for the identification and treatment of asymptomatic bacteriuria to reduce the risk of pyelonephritis.[10]

However routine screening for bacterial vaginosis is not recommended, because identification and treatment of asymptomatic bacterial vaginosis do not lower the risk of preterm birth and other adverse reproductive outcomes for the remaining infections. Likewise, screening for Chlamydia, Cytomegalovirus, Rubella, Toxoplasmosis and Group B streptococcus infections are not routinely recommended. [10]

Syphilis and HIV/AIDS testing are recommended as part of the routine antenatal investigations as they pose major health risks in the developing world, impacting maternal and infant health due to congenital infection via vertical transmission and/or through breastfeeding while for the mother, untreated syphilis and HIV can cause multiple medical problems including death, and the open sores of syphilis also increase the risk of HIV infection. These are estimated to cause over 500,000 adverse pregnancy outcomes per year, including stillbirth and congenital infection.[12]

Hepatitis B virus screening is offered to pregnant women so that effective interventions can be offered to infected women to decrease the risk of mother to child transmission, while Hepatitis C virus screening is not recommended as there is insufficient evidence to support its clinical and cost effectiveness.[10]

Routine ultrasound scan is done in all pregnancies based on the assumption that it will prove beneficial by enabling earlier detection of problems that may not be apparent, such as multiple pregnancies, intrauterine growth restriction, congenital anomalies, malpresentation and placenta praevia. It also allows accurate gestational age estimation, leading to timely and appropriate management of these pregnancy complications.[3]

A detailed scan is done to identify fetal anomalies and allow reproductive choice (termination of pregnancy), parents to prepare (for any treatment/disability/palliative care/termination of pregnancy), managed birth in a specialist centre and for possible intrauterine therapy.[10]

Prior to all laboratory testing in pregnancy, information should be provided to the pregnant woman about why the test is recommended, the risk of disease transmission to the foetus, how the results will be delivered and the implications of the results.[13]

Antenatal screening forms an essential part of good antenatal care; hence this audit tried to identify if the hospital complies with the antenatal investigations

recommended by the standards from WHO and NICE guidelines and also identify the rate of abnormal results from the investigations. This will help the hospital to review the protocol for antenatal investigations in order to strictly follow WHO guidelines which can subsequently improve maternal and fetal outcomes.

Method

The review measured compliance with protocols on antenatal investigations that are recommended to be done as part of routine antenatal care. These items were taken from the NICE Guidelines for antenatal care and WHO Guidelines on antenatal care.[3,10]

Study design: The study was a 2-year retrospective study of antenatal investigation results of women who attended antenatal care at the antenatal clinic of Aminu Kano Teaching Hospital, and also delivered their babies there. Data was collected through a review of the women's antenatal cards retrieved from the health records and comparing the antenatal investigations done with the standard criteria from the WHO 2016 recommendation on antenatal care for positive pregnancy experience and NICE 2008 Clinical Guideline on antenatal care. The study period was from 1st January 2018 to 31st December 2019. A proforma was designed which covers sociodemographic characteristics and the list of antenatal investigations recommended by the standard from WHO and NICE 2008 Clinical Guideline on antenatal care whether they are being done appropriately or not and the investigation results were also documented. All pregnant women, both primigravidas and multigravidas were reviewed. In case of multigravidas, the last antenatal card was considered.

Data Collection Tools: A proforma was used to extract data on socio-demographic characteristics and reproductive information like gravidity and gestational age at booking. The antenatal investigations done for each patient and the results of the investigations were documented.

Data Analysis: The data collected was then transferred into a spreadsheet on Microsoft excel and then analyzed using SPSS version 22.0 statistical software.

Results

There was a total of 4438 antenatal bookings during the study period out of which 2036 were delivered at AKTH (45.9%). Among 2036 who delivered in AKTH a total of 1569 case files were retrieved giving a retrieval rate of 77 percent. These were the case files that were analyzed.

Most of the women (81.1%) were within the age group of 18-34years, 18.5% above the age of 34 years while only 0.3% were below the age of 18 years. Majority of the women 85.3%, 68.8% and 53.9% were Muslims, Hausa by tribe and have tertiary level of education. All the women were married with 43.2% being multigravidas, 29.5% primigravidas and 23.7% grand-multigravidas. Also majority (53.2%) of them booked at the gestational age of 20-30 weeks and only 19.3% booked at the gestational age of less than 20 weeks.

Screening for anaemia was done for 86.1% of the women; majority (85.3%) had Packed cell volume done and only 0.8% had FBC done, with 54.6% of the screening done before 28 weeks. Out of those screened, 86.7% had packed cell volume of more than 30% and only 0.2% had packed cell volume of less than 18%. Genotype test was done for 79.3% with 77.5% being AA, 21% AS, 0.5% SS and 0.08% SC. Blood grouping was done for 79.3% with 48.7% being O+ and only 0.2% were AB-. Also 5.3% of the women were Rhesus negative with indirect coombs test done for all which showed 100% not sensitized.

Urinalysis for protein was done for 97% of the women, out of which 96.9% were found to be negative, 2.5% 1+ and 0.6% 2+.

Screening for gestational diabetes mellitus (GDM) was done for 84 patients with risk factors using oral glucose tolerance test (OGTT). Majority (82.1%) had normal OGTT, 14.2% had impaired glucose tolerance (IGT) and 3.7 % had gestational diabetes mellitus.

Urine culture test was done for only 2.3% with only 16.7% having positive culture which were all given antibiotic treatment.

About 85% were screened for HIV, while 78.4% and 72.5% were screened for Hepatitis B and Syphilis respectively; the seroprevalence for these diseases were 5.6%, 14.7% and 1.1% respectively.

Most of the patients (97.1%) had an Ultrasound scan done at booking but only 50.3% had it done before 24 weeks of gestation with 99.5% being normal. Only 39 % had USS screening done for fetal anomaly out of which 0.7% were found to be abnormal with findings of hydrocephalus.

Table 1: Socio-demographic characteristics

	FREQUENCIES (n = 1569)	PERCENTAGES (%)
AGE (years)		
<18	6	0.3
18-34	1272	81.1
>34	291	18.5
RELIGION		
Islam	1338	85.31
Christianity	231	14.7
ETHNICITY		
Hausa	1080	68.8
Yoruba	114	7.3
Igbo	123	7.8
Others	252	16.1
LEVEL OF EDUCATION		
Primary	81	5.2
Secondary	588	37.5
Tertiary	846	53.9
Others	54	3.4
GRAVIDITY		
Primigravida	462	29.5
Multigravida	678	43.2
Grand-multigravida	429	27.3
GA AGE AT BOOKING		
<20 weeks	303	19.3
20-30 weeks	834	53.2
>30 weeks	432	27.5

Table 2: Antenatal investigations done compared with the recommended standard

Recommended Investigations	Frequencies (n = 1569)	Percentage Achieved	Percentage Recommended
FBC, PCV or haemoglobin	1350	86.1	100
Screening for anaemia at booking, and at 28 weeks.	738	54.6	80
Hb genotype	1245	79.3	80
Blood grouping and rhesus D status	1245	79.3	80
Urinalysis at each antenatal visit.	1521	96.9	100
Screening for GDM	84	5.40	80
Midstream urine culture	36	2.30	50
RVS	1332	84.9	100
HBsAg	1230	78.4	100
VDRL	1137	72.5	100
Ultrasound scan at booking	1523	97.1	100
Ultrasound scan before 24 weeks	789	50.3	80
Anomaly scan between 18 weeks and 21 weeks	612	39.0	50

Table 3: Haematological investigations

	Frequencies	**Percentages**
PCV		
<18%	3	0.2
18-29%	177	13.1
30% and more	1170	86.7
Genotype	**Frequencies**	**Percentages**
AA	965	77.5
AS	273	21.9
SS	6	0.5
SC	1	0.08
AC	0	0.0
Blood group	**Frequencies**	**Percentages**
O+	606	48.7
O-	33	2.7
A+	270	21.7
A-	15	1.2
B+	273	21.9
B-	15	1.2
AB+	30	2.4
AB-	3	0.2

Table 4: Other Investigations; Urinalysis, OGTT and Urine microscopy, culture and sensitivity

	FREQUENCY	PERCENTAGES
URINALYSIS		
Negative	1474	96.9
Proteinuria 1+	38	2.5
Proteinuria 2+	9	0.6
Proteinuria 3+	0	0.0
OGTT		
Normal	69	82.1
IGT	12	14.2
GDM	3	3.7
URINE CULTURE		
Microbial growth	6	16.7
No microbial growth	30	83.3

Table 5: Serological tests

Test	**Reactive**	**Non-reactive**
RVS	74 (5.6%)	1258 (94.4%)
HBsAg	181(14.7%)	1049(85.3)
VDRL	13(1.1%)	1124(98.9%)

Discussion

The number of women who had antenatal care during the audit period was in keeping with the high level of utilization of antenatal services in teaching hospitals in urban communities, although more than half of them booked in the second and third trimester which is similar to the finding in a study conducted in North central Nigeria.[14] This late attendance for their first antenatal visit reduces the potential benefits of the antenatal care including taking action on the results of haemoglobin, rhesus and serological tests. So, it is important to educate women on the need for early antenatal booking.

Although, more than 80% of the women were screened for anaemia, this falls short of the standard recommendation (100 %). Anaemia is common in the environment, a previous study in Kano state general hospitals found a prevalence of 24.5%.[15] Similarly higher rate of anaemia of 54.5% was reported from a teaching hospital in Uyo.[16] Perhaps, the lack of universal screening or documentation accounted for

the lower value found in this study. About 80% of the women had ABO and Rhesus typing and Haemoglobin genotype tests done. However, this fell short of expectation perhaps due to incomplete documentation because, in most of the supposed untested, neither the filled form nor ANC card had any record of the test. In addition, some patients especially those for secondary NHIS care had their investigations at the NHIS primary care clinic. Moreover, the frequencies of ABO, Rhesus typing and haemoglobin genotype obtained were similar to the pattern obtained in a similar study conducted in Port Harcourt.[17] Almost all of the women had urinalysis, with a majority of the result being negative and only 0.6% having significant proteinuria of 2+. Although only 2.3% of the women had urine culture done, the prevalence of asymptomatic bacteriuria among them was 16.7% which is higher than the finding of 10% in a study conducted in Egypt.[19]

Only 5.4% of the women were screened for Gestational diabetes using OGTT which shows a prevalence of 17.9%, this is higher than the prevalence of 10.5% found in a study in Rivers,[20] 0.3% in a study in Nigeria and the global range of 0.15-3.0%,[21] this is likely due to the small number of women screened. All women at risk of GDM need to be screened as women with GDM are at increased risk of maternal and fetal morbidity and mortality which are preventable through early diagnosis and treatment.

Screening for HIV, Hepatitis B and syphilis is effective in pregnant women and in preventing transmission to the child. From this study, the prevalence of HIV was 5.6% which is lower than the 11.5% reported from a study in Abuja,[23] while Hepatitis B was 14.7% which is higher than 7.9% reported in a study in the same center.[24] Also, the seroprevalence of syphilis was found to be 1.1% which is much higher than the seroprevalence rate of 0.05% from a study in Maiduguri,[25] however the screening test done was Venereal disease research laboratory which gives a false positive result and there was no confirmatory test done using the Treponema pallidum hemagglutination assay.

Only 50.3% of the women had Ultrasound scan done before 24 weeks which is of great value in reducing mortality and morbidity resulting from wrong dates, multiple pregnancies and fetal malformations.[26] Ultrasound scan for foetal anomaly which was done for only 39% of the women shows the proportion of women with anomalies to be 0.7%, this is much lower than the finding of 7.8% in a study conducted in Ibadan.[27]

Conclusion

The findings from this audit revealed that most of the antenatal investigations recommended were carried out at the study centre, but it fell short of the recommended percentages from the standards and as such the center did not fully comply with the standards of WHO and NICE guidelines. There is therefore need for improvement in order to comply with the standards which will subsequently have an impact on maternal and perinatal outcomes. There is a need to improve the quality of record-keeping of clinical data so that subsequent audit can provide a more accurate picture of the care provided.

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