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Research Article

Maternal Perception of Barriers to Utilization of Prenatal Ultrasound in Prenatal Care in the Northern Part of Nigeria

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Abstract Prenatal ultrasound has in the past one decade gained acceptance as a standard tool for obstetric management in North-Central Nigeria but it is however faced with barriers hindering its utilization in prenatal care. The objective of this study was to assess the perception of pregnant women about the barriers to utilization of prenatal ultrasound in prenatal care in North-Central Nigeria. A hospital-based cross-sectional prospective survey was conducted at the antenatal clinic of Federal Medical Centre, Makurdi, Benue State in North-Central Nigeria between December 2008 and June 2009. The survey targeted pregnant women who were attending antenatal clinic in the hospital. A convenience sample of 596 patients who have had at least one previous prenatal ultrasound were included in the study. Results showed all the barriers were rated high with necessity of scan (attitude) and satisfaction with prenatal ultrasound service rating higher than the rest; being 2.91 ± 1.12 and 3.00 ± 0.63 respectively on a 4-point scale. Socio-demographic variables correlated significantly to the identified barriers ($p < 0.05$) while one-way ANOVA showed that all the socio-demographic variables were significant contributors to their ratings of various barriers ($p < 0.05$). In conclusion, negative attitude, long distances to service providers, considerably heavy financial cost, long waiting periods and unsatisfactory previous scan experience are major barriers to prenatal ultrasound. Socio-demographic variables have significant influence on these barriers and improvement on these variables can help overcome the barriers.

Keywords prenatal ultrasound; prenatal care; barriers; utilization

1 Introduction

Prenatal ultrasound covers all aspects of ultrasound imaging tests performed during pregnancy for a variety of reasons. Ultrasonography has been in both therapeutic and diagnostic use for about six decades and was first used in obstetrics by Ian Donald [17]. It has since gained acceptance and prominence as an integral part of prenatal care, and thus obstetricians request quite a large number of prenatal sonograms in the management of pregnancy. While between 60% and 70% of pregnant women in US have sonograms at some point during pregnancy [1], the utility of prenatal sonography is still debatable. Leivo et al. [12], and Youngblood [19] are of the opinion that screening sonography is cost-effective during pregnancy while Chervenak et al. [5] are thinking in tandem with the former and argue for its routine use during pregnancy. Others are of the opinion that it increases the cost of prenatal care [10], does not lead to improvement in perinatal outcome [4, 8], and offers little benefit in low-risk patients [7].

With the debate on the utility of prenatal ultrasound yet to abate, our experiences in the antenatal clinic have reinforced our belief that prenatal ultrasound is a very important tool in the management of pregnancy. But there are factors which hinder its effective utilization as a prenatal care tool.

Several studies on prenatal care generally speaking have been carried out which identified some of these barriers. Scupholme et al. [16], reported that the main barriers to prenatal care were systematic (organizational), patient-related and financial. Two other reports identified some demographic risk factors such as race and ethnicity, age, level of education, birth order, marital status, poverty, geographic location and time trends as barriers to prenatal care [2, 3]. Financial issue was identified in a number of studies as a major barrier to prenatal care [11, 14, 15].

In the present study, we sought to assess the perception of parturients of some of the perceived barriers to prenatal ultrasound. Prior to the commencement of the study we identified the following, from clinical experience and literature search, as perceived barriers to prenatal ultrasound: necessity of the scan as perceived by the patient (attitude), distance of the service point from the patient's home, cost of the test, length of waiting time and satisfaction with the service rendered.

Age (Years)	Frequency	%
18–24	112	18.8
25–30	212	35.6
31–34	108	18.1
≥ 35	164	27.5
Total	**596**	**100**
Educational level	**Frequency**	**%**
Non-formal	36	6.0
Primary	172	28.9
Post-primary	212	35.6
Tertiary	176	29.5
Total	**596**	**100**
Parity		
Once	112	18.8
Twice	124	20.8
Thrice	200	33.6
Four and above	160	26.8
Total	**596**	**100**
Socioeconomic status		
Status	**Frequency**	**%**
House wife	264	44.3
Junior civil servant	116	19.5
Senior civil servant	108	18.1
Business woman	108	18.1
Total	**596**	**100**

Table 1: Socio-demographic characteristics of the respondents.

2 Patients and methods

A hospital-based cross-sectional prospective survey was conducted at the antenatal clinic of the Federal Medical Centre, Makurdi, Benue State in North-Central Nigeria between December 2008 and June 2009. The survey targeted pregnant women who were attending antenatal clinic in the hospital. A convenience sample of 596 patients who have had at least one previous prenatal ultrasound were included in the study. This sample spread over a seven-month period is enough to detect differences in perception since about 1000 obstetric patients undergo prenatal ultrasound in the hospital in a year. All the patients indicated willingness to participate in the study before being included in the study. The data collection instrument was a twelve-item self-completion questionnaire designed by the researchers in line with the objectives of the study. The questionnaire was in two sections: A and B. Section A was on socio-demographic data of the patients while section B dwelled on the various barriers to prenatal ultrasound. These barriers were identified during extensive literature search and clinical experience prior to the study. We defined barriers to prenatal ultrasound as those conditions that prevent a pregnant woman from freely and successfully accessing prenatal ultrasound while motivators are the factors that encourage them. Item 5 (section B) was an ordinal scale question about previous referral for obstetric ultrasound. Items 6–10 were Likert-type questions about barriers. The most negative options were assigned a value of 4 while the least negative were assigned a value of 1. Item 11 was a ten-point rating scale on the patient's overall perception of obstetric ultrasound service in the locality. The patients were given opportunity to make free comments on obstetric ultrasound service in item 12.

The questionnaires were administered to the patients at the antenatal clinic on their appointment days by direct issuance. The questionnaires were filled out and returned to the survey team on the same day, and the duly completed questionnaires were analyzed at the end of the data collection phase.

The data collected were analyzed using the Statistical Package for Social Sciences (SPSS) version 14.0. Both descriptive and inferential statistics were carried out. Pearson's correlation was done to investigate the relationship between the identified barriers and the socio-demographic variables; age, level of education, socioeconomic status and parity. One-way analysis of variance (ANOVA) was carried out to establish the degree of influence of these socio-demographic variables on the barriers. Statistical tests were two-tailed with $p < 0.05$ to indicate statistical significance.

3 Results

A total of 596 patients with the characteristics shown in Table 1 were surveyed. Table 2 shows the patients with the characteristics shown in Table 1 were surveyed. Table 2 shows the patients' rating of their perception of the observed barriers to prenatal sonography. All the barriers were rated high with patients' feeling about the necessity of scan (attitude) and satisfaction with prenatal ultrasound service rating higher than the rest; being 2.91 ± 1.12 and 3.00 ± 0.63 respectively. Table 3 shows Pearson's correlation values between the observed barriers and socio-demographic variables. The table shows that socio-demographic variables correlated significantly either positively or negatively with the identified barriers $(p < 0.05)$.

One-way ANOVA showed that all the socio-demogaphic variables were significant contributors to their ratings of various barriers $(p < 0.05)$.

One a ten-point scale, the patients' overall perception of obstetric ultrasound service in the locality was encouraging, being 7.24 ± 1.99.

Content analysis of the patients' free comments indicate that 10.7 percent of the patients $(n = 64)$ were of the opinion that it was a very important test and should be carried out on all pregnant women. 2.7 percent each $(n = 16)$ wanted more service points to be provided, retraining of the sonographer, and the ultrasound laboratory to be located

	Ratings				
Barrier	**Min**	**Max**	**Mean ± SD**	**Skewness**	**Kurtosis**
Necessity of scan	1	4	2.91 ± 1.12	$-.741 \pm .107$	$-.831 \pm .214$
Distance to service point	1	4	$2.61 \pm .92$	$.034 \pm .107$	$-.895 \pm .214$
Financial cost	1	4	$2.32 \pm .69$	$.051 \pm .107$	$-.227 \pm .214$
Waiting time	1	4	2.25 ± 1.08	$.210 \pm .107$	$-1.292 \pm .214$
Satisfaction with service	1	4	$3.00 \pm .63$	$-.732 \pm .107$	$1.837 \pm .214$

Table 2: Respondents' rating of their perception of observed barriers to prenatal sonography.

Barriers	**Age**	**Educational level**	**Parity**	**Socioeconomic status**
Necessity of scan	$r = .107^*$	$r = .612^*$	$r = .050$	$r = .045$
	$p = .015$	$p = .000$	$p = .254$	$p = .308$
Distance to service point	$r = -.163^*$	$r = -.217^*$	$r = .074$	$r = -.195^*$
	$p = .000$	$p = .000$	$p = .092$	$p = .000$
Financial cost	$r = .143^*$	$r = -.153^*$	$r = -.159^*$	$r = .405^*$
	$p = .001$	$p = .000$	$p = .000$	$p = .000$
Waiting time	$r = .264^*$	$r = .013$	$r = -.052$	$r = -.074$
	$p = .000$	$p = .764$	$p = .232$	$p = .090$
Satisfaction with service	$r = -.177^*$	$r = .184^*$	$r = -.169^*$	$r = .299^*$
	$p = .008$	$p = .000$	$p = .000$	$p = .000$

*Significant correlation value.

Table 3: Pearson's correlation between socio-demographic characteristics of the respondents and their rating of identified barriers.

within the antenatal clinic instead of radiology department. Majority of the patients (81.2 percent, $n = 484$) declined making any comments.

4 Discussion

Motivators for utilization of prenatal ultrasound as prenatal care tool are intimately related to patient's attitude, cost and satisfaction with previous scan. In this study, we investigated five factors that may be barriers to utilization of prenatal ultrasound. These factors were identified during extensive literature search prior to the study. We defined barriers to prenatal ultrasound as those conditions that prevents a pregnant women from freely and successfully accessing prenatal ultrasound while motivators are the factors that encourage them.

Our results revealed that the two biggest barriers to prenatal ultrasound were patients' attitude towards the scan and poor satisfaction rating of previous scan experience. These two factors were rated quite high, meaning that the patients thought the scans were unnecessary and were not satisfied with their previous scan experience. Scupholme et al. [16] had reported patient-related issues as one of the barriers to prenatal care and these include attitude towards prenatal care. They in addition, reported that education influenced access to prenatal care and it is our opinion that adequate and good prescan patient education can change the negative perception of patients to prenatal ultrasound. Thus, in addition to carrying out the scan, patients should be well informed about the test and its importance to their wellbeing and that of their unborn babies. Mayer [13] and Dobie et al. [6] had also identified patients' beliefs about the importance of initiation and compliance with prenatal care as barriers to obtaining adequate prenatal care. The finding of unsatisfactory previous scan experience is in line with the result of a previous study which reported average rating of just above 50 percent for all the indices of satisfaction the researchers evaluated except waiting time which was slightly below 50 percent [18]. Though, their study was carried out in South-East Nigeria, the result is not expected to vary significantly in North-Central Nigeria with both geo-political regions having similar prevailing socioeconomic conditions.

Heavy financial cost, long waiting times before scans are done and long distances from service points are other barriers rated high in this study. These findings have been reported previously. Poverty has been cited as one of the socioeconomic barriers to prenatal care [2] while others attributed poor access to prenatal care to financial issues [11, 14, 15]. We suggest that the government at various levels can come in and subsidize the cost of prenatal ultrasound as a way of overcoming the barrier of poverty. Large numbers of antenatal patients scanned at the University of Nigeria Teaching Hospital, Enugu waited for long hours before scans were carried out [9]. Providing more service points

and training more clinical staff on ultrasonography will help in making prenatal ultrasound easily accessible.

Most of the patients did not make any free comments about prenatal ultrasound service presumably because they do not understand the highly technical nature of ultrasound. Majority of the patients were not educated beyond the post-primary school level and may not have had adequate exposure to understand ultrasound well. However, the few that commented lauded the service and some suggested provision of more service points, retraining of the sonographers and having the ultrasound laboratory within the antenatal clinic as measures to be taken to improve the service.

There was a significant relationship between socio-demographic variables and the identified barriers to prenatal ultrasound. This implies that socio-demographic variables are important factors in utilization of prenatal ultrasound and the barriers identified in this study can be tackled by better understanding of socio-demographic characteristics of the patients. Socio-demographic variables influenced the perception of the barriers in both negative and positive directions. For instance, according to the result of the study, while increasing age level of education led to high rating for the patients' feeling about the necessity of the scan, both variables led to lower rating of distance to service point as a barrier. Thus, the older and more educated mothers are more likely to question why they are being sent for a scan and are more likely to travel the long distance to obtain the service if they understand the importance of the scan. This implies that adequate patient education about the importance of prenatal ultrasound in the antenatal clinic is necessary to help overcome the negative perception of these barriers and encourage the mothers to avail themselves of the service against all odds.

5 Conclusion

Negative attitude of parturients, long distances to service providers, considerably heavy financial cost, long waiting periods and unsatisfactory previous scan experience are major barriers to prenatal ultrasound. Socio-demographic variables have significant influence on these barriers and improvement on these variables can help overcome the barriers.

6 Recommendations

1. More ultrasound laboratories should be built by hospitals to improve access to prenatal ultrasound. These new laboratories should be built as integral parts of the antenatal clinics to eliminate the long distance between the antenatal clinic and ultrasound laboratory.
2. More clinical staff should be trained to man the equipment and make prenatal ultrasound service prompt and efficient.
3. Government should find a way of reducing the cost of prenatal ultrasound to relieve the parturients of the considerably heavy financial burden associated with it.
4. Obstetricians and midwives should adequately educate the parturients on the importance of prenatal ultrasound in the antenatal clinic prior to sending them for scan. The sonographers should also complement this by educating the parturients before, during and after the scan.

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