Determinants of Access to Low-Cost Ultrasound Services among Pregnant Women in Rural Areas of Keffi, Nigeria

Sir,

Subsidized antenatal ultrasound (AU) services help to minimize fetomaternal morbidity and mortality in low-and-middle-income countries. About 34% of all global maternal deaths occur in Nigeria and India, making this topic a public health priority.[1] Access to AU services is limited in rural areas because of its nonavailability, the need to travel to urban areas, poor road networks, and high cost.[1] The cost of antenatal care, ultrasound services, and childbirth in rural Nigeria is put at $10–100/pregnancy, and the woman bears over 70% of this cost.[2] There is a dearth of literature on motivators behind subsidized AU care for rural populations in Nigeria.

Our cross-sectional study aimed to investigate the motivations and determinants of women's usage of a low-cost AU program in rural Nigeria. It determined the average distance traveled by the rural pregnant women and average waiting time to access AU. It also measured associations of outcome variables with participants' sociodemographic profile. The study involved pregnant women from rural areas of Nasarawa State, Nigeria, seeking AU at the Hamamah Diagnostic Services Center (HDSC) in Keffi, a town 50 km from Abuja. This center charges around $1–2 per AU compared to $5–10 in other centers.

The inclusion criteria were pregnant women, age ≥18 years, and rural dwellers. Each respondent gave informed consent. We collected data over 2 months in 2016 using an interviewer-administered questionnaire.

Sociodemographic parameters formed the independent variables. Age and gravidity were used for stratification [Table 1]. The outcome variables were distance traveled, waiting time, choice of HDSC, satisfaction level, and loyalty. Waiting time was timed by the receptionist as the time spent on the queue before AU. The reasons for choosing HDSC, satisfaction level, and loyalty were assessed in the interviewer-administered questionnaire. We received ethical approvals from HDSC, Keffi local council, and the University of Roehampton Research Ethics Committee.

The participants were aged 18–45 years, with most of them being literate, self-identified as housewives, and carrying the fourth pregnancy or more [Table 1]. Only 15.5% had a daily household income of ≥$2 and over 78% were in extreme poverty (<$1.9/day). The choice of HDSC was because of "low cost" (45.9%), "recommendation" (33.9%), "quality of services" (15.1%), "insistence by a health worker" (4.9%), and "proximity" (0.3%). The average distance traveled by the respondents to access AU services at HDSC was 36.5 ± 11.3 km (5–65 km). The mean waiting time was 5.1 ± 4.5 min (1–65 min). All the participants were satisfied with the services received (35% very satisfied). The loyalty was 99.2%, and long distance was the only reason for not recommending HDSC.

Table 1: Participants' sociodemographic profile (n=384)

Variable	Percentage	
Age group (years)		
18-27	54.8	
28-37	36.5	
≥6	8.7	
Gravidity		
Gravida 1	15.5	
Gravida 2	22	
Gravida 3	15.3	
≥Gravida 4	47.3	
Daily house hold income ($)		
<1.9	78.3	
1.9-2	6.3	
>2	15.5	
Variable	**Participants**	**Spouses**
Educational level		
Not literate	24	17.8
Literate	76	82.2
Occupation		
Unemployed	1.5	4.0
Housewife	43.8	-
Employed	4.3	28.3
Others*	50.5	67.8

*Small-scale Trader, Farmer, Artisan, etc.

The significant predictors of reasons for choosing HDSC were respondents' and spouse occupation. Most participants (74%–88%) chose HDSC because of its low cost. Unemployed respondents were twice more likely to choose HDSC because of quality of services than the remaining individuals. Participants of unemployed spouses were twice less likely to choose HSDC because of recommendations than others. Daily household income (P = 0.032) and religion (P = 0.016) were significant predictors of satisfaction. Those in extreme poverty had a lower satisfaction level (P = 0.032) than others. Distance traveled or waiting time did not predict satisfaction level. There were no statistically significant predictors of loyalty. Age was positively correlated with distance traveled (r = 0.130, P = 0.009). Older pregnant women were more likely to travel long distances to access AU services than younger counterparts. The other significant predictors of distance traveled included gravidity (P = 0.032), spouse education (P = 0.026), participants' occupation (P = 0.008),

spouse occupation ($P = 0.001$), and religion (odds ratio = 2.691, $P = 0.027$). Muslim respondents traveled longer than Christians, but income was not a significant predictor of distances traveled.

With technological advancement in mobile health and artificial intelligence, there is an increasing global investment to improve access to antenatal care in rural areas. As ultrasound technology becomes more portable, durable, and affordable, it becomes the diagnostic modality of choice in the developing world.

The central theme in this study focuses on the precise motivators behind attending a subsidized AU center. In this study, most of the participants were self-employed women with 78% of their households living in extreme poverty. The whole family earns <$1.9/day in a community where the norms of polygamy and large family size strain scarce resources. Understanding the role of poverty in selecting care helps to potentially improve these services.

In Sub-Saharan Africa, diagnostic imaging is limited to urban settings, and poverty remains a major barrier to health-care delivery. As expected, in our study, low cost was the most common cited reason (45.9%) for subsidized AU attendance, affirming the relationship between attendance of HDSC and poverty. Financial constraints limit access to AU, as reported by previous studies. Ohagwu *et al*.[3] described financial constraint as "high cost," in Ikeako *et al*.[4] study, over 60% of participants indicated that ultrasound fees were "very costly," and Gladstone *et al*.[5] wondered why money was still a barrier to ultrasound in rural areas despite increasing availability, portability, affordability, and utilization in urban areas. The impact of cost becomes more evident with out-of-pocket payment option as the most common mode of financing health care in Keffi, the study setting, with health insurance scheme remaining a mirage.

These poor expectant mothers travel long distances to avail themselves of essential AU. The study found 36.51 ± 11.30 km as the average distance traveled (5-65 km). The situation is complicated in Nigeria because of escalating prices of petrol, bad road networks, and economic recession during the study. In 2010, Ohagwu *et al*.[3] also observed long distances to ultrasound service centers from rural areas but did not quantify it.

Older pregnant women were more likely to travel long distances to access AU than their younger counterparts. Similarly, increasing parity was also associated with long distance having grand multiparous women travelling longer than their counterparts. Since increasing parity correlates with age and associated fetomaternal complications, the likelihood of older women travelling long distances may be related to multiparity-related complications that require AU.

The association between "distance traveled" and participant/spouse occupation explains that occupational prestige is a predictor of social status and may reflect health-care worker bias as employed individuals are treated better than others. Proximity was the least common reason for choosing HDSC (0.3%), and the reason for not recommending HDSC was long distance. Overall, patients stated that the services were recommended, and they were satisfied with the AU services received.

Given that rural ultrasound services have a critical role in public health, this intervention should be scaled up in resource-poor settings by all stakeholders, including nongovernmental organizations and international bodies. Attention should be focused on appropriate placement of cost-effective, durable technology that will assist local care providers in improving fetomaternal well-being and reducing associated morbidity and mortality.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Idris Muhammad Yakubu, Srikanta Banerjee[1], Nwi-Ue Letam[1]

CBN Diagnostic and Treatment Center, Abuja, Nigeria, [1]Department of Public Health, Walden University, Minneapolis, Minnesota, USA

Address for correspondence: Dr. Idris Muhammad Yakubu, CBN Diagnostic and Treatment Center, Abuja, Nigeria.
E-mail: yidris2000@yahoo.co.uk

References

1. Akinmoladun JA, Anumba DO. Fetal imaging and diagnosis services in developing countries – A call to action. Trop J ObstetGynaecol 2019;36:1-7.
2. Kalu-Umeh NN, Sambo MN, Idris SH, Kurfi AM. Costs and patterns of financing maternal health care services in rural communities in northern Nigeria: Evidence for Designing National Fee Exemption Policy. Int J MCH AIDS 2013;2:163-72.
3. Ohagwu CC, Abu PO, Odo MC, Chiegwu HU. Maternal perception of barriers to utilization of prenatal ultrasound in prenatal care in the Northern part of Nigeria. Clin Mother Child Health 2010;7:1195-9.
4. Ikeako L, Ezegwui H, Onwudiwe E, Enwereji J. Attitude of expectant mothers on the use of ultrasound in pregnancy in a tertiary institution in South East of Nigeria. Ann Med Health Sci Res 2014;4:949-53.
5. Gladstone M, Oliver C, Van den Broek N. Survival, morbidity, growth and developmental delay for babies born preterm in low and middle income countries - A systematic review of outcomes measured. PLoS One 2015;10:e0120566.

Access this article online

Quick Response Code:

Website: www.ijcm.org.in

DOI: 10.4103/ijcm.IJCM_971_20

How to cite this article: Yakubu IM, Banerjee S, Letam NU. Determinants of access to low-cost ultrasound services among pregnant women in rural areas of Keffi, Nigeria. Indian J Community Med 2021;46:570-1.

Received: 25-11-20, **Accepted:** 13-05-21, **Published:** 13-10-21