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Araştırma / Research Article

Nijeryalı kadınların aldığı doğum öncesi bakımın yeterliliği ve bazı ilişkili faktörler

Adequacy of antenatal care received by Nigerian women and some related factors

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ÖZET

Amaç: Bu çalışmanın amacı Nijerya'da doğum öncesi bakım (DÖB) yeterliliğini bazı göstergeler kullanarak ölçmek ve DÖB yeterliliğini etkileyen faktörleri belirlemektir. **Yöntem**: Çalışmada 2008 Nijerya Nüfus ve Sağlık Araştırması'nın kesitsel verileri kullanılmıştır. Çalışma grubu araştırma öncesi beş yılda canlı doğum yapan ve en az bir DÖB alan 9604 anneden oluşmaktadır. Bağımlı değişken olarak kullanılan Doğum Öncesi Bakım Yeterliliği (DÖBY) puanı şu şekilde hesaplanmıştır. DÖBY Puanı= Hizmet veren × (Ziyaret sayısı + İlk ziyaret zamanı + DÖB'ın içeriği). Hesaplamada hizmet verenin sağlık personeli olması 1, sağlık personeli dışında birinden hizmet alınması 0 olarak değerlendirilmiştir. DÖB'ın diğer unsurları da yeterli (1) ya da yetersiz (0) olarak değerlendirilmesi ile hesaplanan DÖBY puanı 0-3 arasında değişmektedir. DÖBY puanı ile açıklayıcı değişkenler arasındaki ilişki hem ikili hem çoklu analizlerde SPSS'in kopleks sample modülünde yer alan genel doğrusal model ile incelenmiştir. **Bulgular:** Annelerin büyük bir bölümünün (46.2%) DÖBY puanı 2 olarak hesaplanmıştır. Bu grupta yer alan anneler DÖB hizmetini sağlık personelinden almışlar ve DÖB unsurlarından ikisi yeterli olarak değerlendirilmiştir. İleri yaş, düşük doğum sayısı, kentsel alanda yaşam, yükseköğrenim düzeyi, hemen hergün medya ile iletişim, çalışma, modern korunma yöntemleri konusunda bilgi sahibi olma, hane refah endeksinin yüksek olması ve sağlık kuruluşuna kolay erişim DÖBY puanı ile positif yönde ilişkili bulunmuştur ($p<0.05$). **Sonuç:** Sınuçlar kadının sosyal statüsü artınca DÖBY puanının da arttığını düşündümektedir. DÖB yeterliliğini geliştirmeyi amaçlayan müdahaleler öncelikle düşük sosyo-ekonomik statüye sahip, genç ve kırsal alanda yaşayan anneleri hedeflemelidir. Bu müdahaleler ayrıca çok sayıda doğum yapan, kitle iletişim araçları ile az iletişim kuran, modern korunma yöntemleri ile ilgili bilgisi düşük ve sağlık tesisleri ulaşmada sıkıntı yaşayanları da içermelidir.

ABSTRACT

Aim: The study aim was to apply a set of indicators to measure ANC adequacy in Nigeria and to identify key factors associated with adequacy of ANC utilization. **Methods:** We used cross-sectional data from the 2008 Nigerian Demographic and Health Survey (NDHS). Our study sample consisted of 9604 mothers who had a live birth in the five years preceding the survey and had at least one ANC visit. The outcome variable Adequacy of Recieved ANC (ARANC) score was computed as follows: *ARANC Score=Provider × (Number of visit + Timing of first visit + Content of ANC).* Were utilizing skilled provider was scored 1 and utilizing unskilled provider was scored 0, the remaining ANC attributes were given a score of 1 for adequate utilization and 0 for otherwise, such that, the maximum ARANC score was 3 and the minimum was 0. The SPSS Complex Sample General Linear Model procedure was used for both the bivariate and multivariate analysis to compare association between ARANC score and explanatory variables. **Results:** Most mothers had scores of 2 (46.2%) refering to mothers who had a skilled provider and 2 ANC attributes adequately. Older age, lower number of birth, living in urban area, high educational level, almost daily exposure to mass media, being currently employed, knowledge on modern contraceptive methods, higher household wealth index and easy access to health facility were positively associated with ARANC score ($p<0.05$). **Conclusion:** Interventions aimed at improving adequacy of ANC should target mothers with low socio economic status, younger mothers and rural mothers. In addition, these interventions should also cut across mothers with higher birth order, low exposure to mass media, poor knowledge of modern method of contraceptive and mothers with problem accessing health facilities.

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INTRODUCTION

About 80 per cent of maternal deaths are due to causes that are directly related to child birth and pregnancy and it is estimated that 24% of this pregnancy related deaths occur during pregnancy while 16% occur during delivery (1). Antenatal care (ANC) an integral component of maternal and child care is part of a global strategy aimed at reducing the risk of maternal morbidity and maternal deaths (2). Theoretically, ANC reduce's maternal morbidity and deaths through early detection and treatment of pregnancy-related illness or through the detection of women at risk of complications and ensuring that they deliver in a suitably equipped facility (3). In addition, ANC has also been linked to high birth weight and reduced neonatal tetanus (4-5).

The assessment of adequacy of ANC utilization is heavily shaped by the way ANC utilization is measured. ANC indicators used in previous studies to measure adequacy of ANC included; number

of ANC visits, content of ANC and duration of pregnancy at entry to ANC (6-8). However, other studies have gone further to use complex indices which combines number of ANC visits and one or more ANC indicators (9-10).

In Nigeria, there is a paucity of research on overall ANC adequacy that combine ANC utilization attributes such as service providers, number of visits, timing of ANC visit and ANC content. This is particularly important if Nigeria is to play a role in achieving the Sustainable Development Goal (SDG) of reducing global maternal mortality ratio (MMR) to less than 70 per 100,000 live births in 2030 (11). According to a previous study, Nigeria has one of the worst MMR in the world at 560 per 100,000 live birth (12), In addition, neonatal mortality is equally high in Nigeria, and it is approximately 38 per 1000 live births (13). An accurate assessment of ANC adequacy will play a critical role in the development of public health interventions aimed at improving ANC accessibility and ultimately improving birth outcomes in the country.

Literatures have shown that there are potential variables that are likely to either aid the expectant mother in the use of ANC or hinder her such as level of education of the mother, age, employment status, place of residence, media exposure and health service accessability (14-21). The objectives of this study were to apply a set of indicators to measure ANC adequacy in Nigeria and to identify key factors associated with adequacy of ANC utilization.

MATERIAL AND METHOD

Sample

The 2008 NDHS sample was selected using a stratified two-stage cluster design consisting of 888 clusters, 286 in the urban and 602 in the rural areas. Further details of the sampling techniques and data collection method can be found in the DHS manual [22]. Analysis for this study was restricted to mothers who had at least one live birth and ANC visits in the last five years preceeding the survey.

Definition of variables

The outcome variable was Adequacy of Received ANC (ARANC) score. This was created from the following ANC utilization attributes namely; ANC provider, number of ANC visits, timing of first visit and content of ANC.

ANC utilization attributes

(1) ANC Providers: We defined ANC services as any pregnancy-related services provided by a skilled health personnel, doctor, nurse/midwife, auxiliary nurse/midwife (22). ANC services provided by a skilled health personnel were scored 1 whereas ANC services provided by a non skilled health professionals such as traditional birth attendants were scored 0.

(2) Number of visit: Based on the Nigerian ANC policy, ANC visit was divided into two types of visits, adequate visit (4 and more visits) and inadequate visit (1 to 3 visits). These were later scored as follow; Adequate visit=1, Not adequate=0

(3) Timing of first visit: Nigeria ANC policy recommends that the first visit should occur by the end of 16 weeks (22). Adequate timing of first visit (<4 month) was scored as one and timing of first visit at 4 and above month was scored as 0.

(4) Contents of ANC: Components included the following items; Blood pressure measurement, provision of iron tablet or syrup, intestinal parasite drug, informed about signs of pregnancy complication, weighed, urine and blood sample taken for screening purposes as well as having at least two tetanus immunization during pregnancy (22). Each item had a score of 1 or 0, 1 denotes that the respondent recieved the specified content item whereas 0 signifies otherwise. The contents of ANC were later summed up such that the maximum score a mother could have was 8 and the minimum score was 0. The total scores were later recoded as follows; mothers with high content scores of 6 and above (greater than 75%) were given a value of 1 whereas mothers with middle or low content score (5-0) were assigned a value of 0. Similar method of classifiying content of ANC have earlier being used in a previous study (23). We assumed that each of the component of ANC is equally important in the current study, mothers with high content of ANC were classified into the adequate category.

The outcome variable ARANC score was calculated as follows:

ARANC Score=Provider × (Number of visit + Timing of first visit + Content of ANC).

The ARANC score ranged from 0-3. Score of "3" refers to mothers who utilized a skilled provider and had an adequate ANC visit, adequate initiation of ANC, and a high content of ANC, whereas a score of "2" refers to mothers who utilized a skilled provider and had two ANC utilization attributes adequately. A score of "1" refers to respondents who utilized a

skilled provider and had just one ANC utilization attribute adequately. Since we defined ANC service as any pregnancy-related services provided by a skilled health personnel, ANC services provided by non-skilled personnel to mothers were considered as not being adequate and classified into the "0" category. "0" also represented mothers who utilized a skilled provider but had no ANC utilization attributes adequately.

Independent Variables.

Explanatory variables included; mothers age which was recoded into "15-24" "25-34" and "35 and above", place of residence was as reported in the 2008 NDHS ("urban"-"rural"). Birth order was recoded into "1st", "2nd","3rd" ,"4th, "5th and above birth order". Mother educational attainment was recoded into "no education", "primary", "secondary" and "post secondary", exposure to any mass media was created from the variables frequency of listening to radio, television or newspaper and was recoded into "almost daily" or "not at all/infrequently", Knowledge of modern contraceptive method was recoded into "yes" or "no". Ever usage of modern method of contraceptives was also recoded into "yes" or "no", DHS wealth index was recoded into three categories; by recoding poorest and poorer into poor and richer and richest into rich; while the middle was left as middle class. This classification was based on the African context where an individual is seen as either belonging to the rich, poor or middle class. Distance to health facility was recoded into "not a big problem" and "a big problem". Respondent current working status was reported as "no" or "yes".

Data Analysis.

In the bivariate analysis, the Complex Sample General Linear Model procedure was used to compare mean ARANC score with explanatory variables, results were presented as mean (standard error) (24). For the multivariate analysis, we also utilized the SPSS General Linear Model Complex Samples command. The procedure adjusted for sample weight, strata and cluster.

Ethics

The study was a secondary analysis of freely available data, as such, no formal ethical clearance was required. Permission to use and analyse the dataset was obtained by registering the study on the Demographic and Health Survey (DHS) website.

RESULTS

Characteristics of the sample

A total of 9651 mothers who had a live birth in the five years preceding the survey and had at least one ANC visit were considered for the analysis, after accounting for sampling weight this corresponded to a total sample of 9604 mothers. Approximately 92% of mothers with at least 1 ANC visit utilized a skilled provider. Among mothers who utilized a skilled provider, a larger proportion had adequate number of visits (83.1%), however, timing of first visit for mothers who utilized a skilled provider was adequate for only one-fourth of mothers. Majority (66.5%) of mothers with ANC visits from a skilled provider also had high content of ANC (Table 1).

Table 1. Distribution of respondents according to ANC utilization attributes.

Variables	Distribution of respondents who had at least 1 ANC visit irrespective of provider according to ANC utilization attributes (N=9604).[5]			Distribution of respondents who had at least 1 ANC visit and utilized a skilled ANC provider according to ANC utilization attributes (N=8849).[5]		
		N	%		N	%
ANC provider	[1]Skilled provider	8849	92.2			
	Unskilled provider	753	7.8			
Number of visits	[2]Adequate	7905	82.3	[2]Adequate	7358	83.1
	Not adequate	1699	17.7	Not adequate	1491	16.9
Timing of first	[3]Adequate	2466	25.7	[3]Adequate	2270	25.7
	Not adequate	7103	74.2	Not adequate	6558	74.3
Content of ANC	[4]High content	5702	63.1	[4]High content	5525	66.5
	Middle/low content	3336	36.9	Middle/low content	2788	33.5

Note: [1] Skilled provider= Doctor, midwive/nurses, auxiliary nurse/midwife. [2] Adequate=4 visits or more. [3] Adequate = <4 month. [4] High Content= 6. And above items (greater than 75%). Contents include took iron tablet/syrup; informed of signs of pregnancy complication, weight, blood pressure measured, blood sample taken, urine sample taken, took intestinal parasite drug, had at least two doses of TT during pregnancy. [5] Not all total numbers for variables equal to N.
Results are based on sample weights, derived from women's individual weights

The distribution of mothers according to ARANC score revealed that among mothers who utilized a skilled provider, a larger proportion had 2 adequate ANC attributes (46.2%) following were those with 1 adequate ANC attribute. Only 15.5% of mothers who utilized a skilled provider had the maximum 3 ANC attribute adequately. On the other hand, approximately 16.3% of mothers had no adequate ANC attribute. Among this category of mothers, 48.9% utilized a skilled provider while 51.1% utilized unskilled providers (Figure 1).

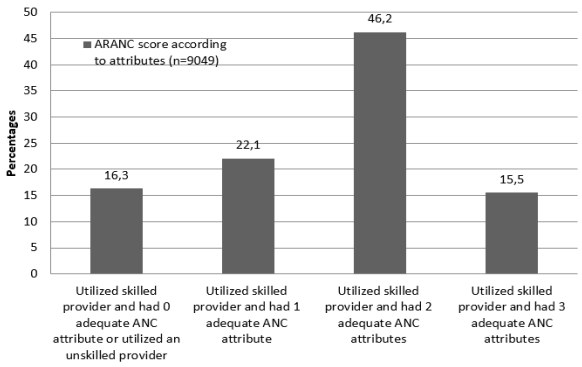

Figure 1. ARANC score according to ANC attributes
Note: 555 mothers were excluded in computing the score due to missing variables in one or more of the ANC utilization attribute. High content of ANC was classified into the adequate category in computing the score.

Bivariate analysis

Mothers age was significantly associated with ARANC score ($P < 0.0001$). Other variables that were significantly associated with ARANC score included; residence, birth order, mothers education, employment status, knowledge of modern contraceptives methods, ever usage of modern methods of contraceptive, household wealth index and distance to health facility (Table 2).

Multivariate analysis

Results from the multivariate analysis (Table 3) indicated that age, residence, birth order, maternal education, media exposure, employment status, knowledge of modern contraceptive, wealth index, and distance to health facility were the determinants of ARANC score.

Table 2. Association between ARANC score and selected characteristics of the respondents

Characteristics		N	Mean (SE)	p
Age(yr)	15-24	2108	1.418 (0.026)	<0.0001
	25-34	4552	1.681 (0.020)	
	35+	2389	1.639 (0.025)	
Residence	Urban	3858	1.854 (0.024)	<0.0001
	Rural	5191	1.426 (0.023)	
Birth order	1st	1739	1.645 (0.030)	<0.0001
	2nd	1600	1.693 (0.028)	
	3rd	1498	1.672 (0.028)	
	4th	1265	1.647 (0.032)	
	5th and above	2948	1.492 (0.022)	
Educational level	No education	2312	1.241 (0.029)	<0.0001
	Primary	2526	1.516 (0.025)	
	Secondary	3370	1.786 (0.020)	
	Post-secondary	840	2.188 (0.026)	
Exposure to mass media	Not at all/ Infrequently	4776	1.422 (0.021)	<0.0001
	Almost daily	4193	1.824 (0.020)	
Employment status	Yes	6521	1.668 (0.018)	<0.0001
	No	2476	1.452 (0.028)	
Knowledge of modern contraceptives methods	Yes	7648	1.681 (0.017)	<0.0001
	No	1401	1.213 (0.034)	
Ever use of modern methods of contraceptive	Yes	3159	1.803 (0.022)	<0.0001
	No	5890	1.504 (0.019)	
Household wealth index	Rich	4675	1.913 (0.016)	<0.0001
	Middle	1917	1.461 (0.029)	
	Poor	2457	1.145 (0.028)	
Distance to health facility	Big problem	2825	1.401 (0.027)	<0.0001
	Not big problem	6196	1.703 (0.018)	

Table 3. Factors associated with ARANC score by general linear regression

Variables		Coefficent	CI	p
Age(yr)	15-24	Ref	Ref	Ref
	25-34	0.172	(0.117-0.228)	<0.001
	35+	0.230	(0.154-0.306)	<0.001
Residence	Rural	Ref	Ref	Ref
	Urban	0.089	(0.033-0.144)	0.002
Birth order	1st	0.136	(0.060-0.212)	<0.001
	2nd	0.130	(0.063-0.198)	<0.001
	3rd	0.093	(0.025-0.160)	0.007
	4th	0.058	(-0.009-0.125)	0.088
	5th and above	Ref	Ref	Ref
Educational level	No education	Ref	Ref	Ref
	Primary	0.109	(0.040-0.178)	0.002
	Secondary	0.214	(0.144-0.285)	<0.001
	Post-secondary	0.429	(0.343-0.515)	<0.001
Mass media	Not at all/ infrequently	Ref	Ref	Ref
	Almost daily	0.106	(0.055-0.157)	<0.001
Currently employed	Yes	0.134	(0.086-0.181)	<0.001
	No	Ref	Ref	Ref
Knowledge of modern contraceptive	Yes	0.095	(0.028-0.161)	0.005
	No	Ref	Ref	Ref
Ever use of modern contraceptives methods	Yes	0.008	(-0.035-0.052)	0.706
	No	Ref	Ref	Ref
Household wealth index	Rich	0.452	(0.378-0.525)	<0.001
	Middle	0.222	(0.152-0.291)	<0.001
	Poor	Ref	Ref	Ref
Distance to health facility	Problem to access	Ref	Ref	Ref
	Easy to access	0.092	(0.041-0.143)	<0.001
Intercept		0.629	(0.529-0.728)	<0.001

Note: Ref=Reference category, CI=Confidence Interval.
All explanatory variables were adjusted for in the model.

Mothers aged 25-34 and 34 and above years had on the average 0.172 (95% Confidence Interval (CI) 0.117 to 0.228) and 0.230 (95% CI 0.154 to 0.306) higher ARANC score in comparison to those aged 15-24 years ($p<0.001$ respectively). Furthermore, mothers who lived in rural areas had on the average 0.089 (95% CI 0.033 to 0.144) higher ARANC score in comparison to there opposite counterpart ($p=0.002$). 1st, 2nd, and 3rd, birth order were positively associated with ARANC score as compared to 5th and above birth order and the finding was significant. In addition, compared to mothers with no education, there was a significant positive association between ARANC score and primary, secondary and post secondary educational status. We further observed that mothers who had almost daily exposure to mass media had on the average 0.106 (95% CI 0.055 to 0.157) higher ARANC score in comparison to mothers who had none/infrequent exposure to mass media ($p<0.001$). In this study, mothers who were currently employed had on the average 0.134 (95% CI 0.086 to 0.181) higher ARANC score in comparison to mothers who were not currently employed ($p<0.001$). Having knowledge of modern contraceptives was postively associated with ARANC score as compared to having no knowledge ($p=0.005$). Also, belonging to the rich or middle household wealth index was positively associated with ARANC score as compared to belonging to the poor category ($p<0.001$ respectively). In addition, mothers who had no problem accessing health facility had on the average 0.092 (95% CI 0.041 to 0.143) higher ARANC score in comparison to mothers who had problem accessing health facility ($p<0.001$).

DISCUSSION

This study attempted to measure ANC adequacy levels among Nigerian mothers who had at least 1 ANC visit using four indicators; service provider, number of ANC visits, timing of first visit and ANC content during the ANC visits. Appoximately 92% of Nigerian mothers who had at least 1 ANC visit utilized a skilled provider, while 83.1% of the study sample had adequate number of visits. These figures are quite below the recommended standard that all pregnant women should have at least four ANC by or under the supervision of a skilled health personel (25). In a study done in Nepal, the type of health worker providing ANC was a very strong predictor for the receipt of good quality ANC. According to the study, women who received ANC from skilled providers, where more likely to receive good quality health care as compared to women who received ANC from unskilled personel (26).

In Nigeria, timing of first visit was observed to be indequate for approximately 74% of mothers who had at least one ANC visit from a skilled provider. Late timing of the first antenatal visit are undesirable because they limit the amount and quality of care that a pregnant woman receives (27).This is particularly important in Nigeria, a large country where physical barriers are a challenge to the health care delivery system and were early detection of problems during pregnancy might lead to more timely treatment and referrals in the case of complications (22).

Among mothers who utilized a skilled provider and had a minimum of 1 ANC visit, we observed that just about 66.5% had a high content of ANC despite the fact that different components of ANC improve maternal and child health in different ways (28). In consonance, a previous study done in a secondary health care facilities in Nigeria also observed that the contents of antenatal care services were deficient in the capacity required for prevention, early detection and prompt treatment of health conditions such as severe anaemia, detection of long-standing pre-eclampsia and prevention of complications of malaria in pregnancy (29).

In the current study, only 15.5% of mothers who utilized a skilled provider had the maximum 3 ANC attributes adequately, on the other hand, 16.3% of mothers had no adequate ANC attribute, among this group of mothers, 48.9% utilized a skilled provider while 51.1% utilized unskilled providers. The figures observed in this study with regards to maximum utilization of the 3 ANC attributes by mothers who utilized a skilled provider is quite low. We postulated that the reasons for this low figure could be as follows; satisfacation with service provider, waiting time, low manpower, and financial ability of mothers to afford ANC services from skilled providers (30-32), however, these possibilities are subject to detailed study for clarifications.

We observed statistically significant associations between socio-demographic/economic factors with ARANC score and the most notable effects were observed among household wealth index and education.

Household wealth index is an important indicator of women socioeconomic status (SES). In consonance with a study done in Kenya that showed a positive correlation between higher wealth index and health service utilization (14), our study also showed that belonging to the rich and middle class was positively associated with ARANC score as compared to being poor.

Futhermore, education another indicator of SES was a significant predictor of ARANC score. Our finding was similar with some other studies that showed education as a significant predictor of ANC utilization (15, 33). We observed that higher educational status was positively associated with ARANC score as compared to no educational status. This finding might be explained by the fact that educated women are more knowledgeable with regards to ANC and they may have access to written information as compared to their opposite counterpart (33).

Employment status, also another SES indicator like household wealth and education was in addition a significant predictor of ARANC score in this study. Other studies have shown a significant correlation between employment status and access to maternal health services (16, 33). The findings in this study with respect to employment status was in consonance with a study done by Heaman et al (16), they observed that women who were employed utilized ANC more adequately as compared to those who were not.

The current study revealed a positive association between ARANC score and increasing age group. However, there are some debates in the literatures concerning mother's age and ANC utilization, while some authors state that older women were more likely to utilize ANC (17, 34), others are of the opinion that younger women utilize ANC more than older women (35-36). In the Nigerian context, cultural influences could play a role in determing adequacy of ANC among age groups. In some part of Nigeria for instance, young pregnant women are expected to be

modest by not drawing attention to their pregnancy and are often kept indoor which could influence their ANC utilization (37) and vis a vis the adequacy of care they receive.

According to previous studies, distance to health center from home and place of residence are important indicators of physical access to ANC by pregnant women (38, 39). Materia et al (38) observed that distance being a problem was negatively associated with use of ANC. Okafor et al (39) in addition reported that the use of ANC decreased significantly with increase in distance. In this study, our findings revealed that easy access to health facility was positively associated with ARANC score.

In addition, we observed that mothers who resided in urban areas had significantly higher ARANC score as compared to mothers who lived in rural areas. Similarly, Toan et al (18) using ANC visits, timing of ANC and ANC service contents to categorize adequacy of ANC found in their study that adequacy of ANC was significantly higher among urban women as compared to women residing in rural areas. Our study findings indirectly support the fact that health service provision in Nigeria still has an urban bias. A local study demonstrated this inequality in the number of skilled providers as well as facilities present in rural area (40).

The findings of this study on birth order capture both the woman's previous experience with pregnancy and birth as well as family size effects (41). Studies have shown a negative association between birth order and ANC utilization (41-42). The current study showed that lower birth order as compared to 5th and above was positively associated with ARANC score. Yu et al (9) using the R-GINDEX which incorporate 3 variables (trimester when prenatal care began, number of visits, and the gestational age of the infant at birth) found that higher birth order was associated with inadequate prenatal care utilization. The relationship observed may be explained as follows; higher birth order make women believe ANC is not necessary as they tend to rely on their past experience (42) and some women might be occupied with the responsibilities of catering for other children as such, find it difficult to utilize ANC services adequately (43).

The media is an important source for information on the availability and importance of health care services. The media could also be used to bring about changes in people's attitudes towards the use of modern medical services. Kulkarni et al (20) in there study revealed that women exposure to mass media was an important factor that influenced the use of ANC, also, Tarekegn et al. found that listening to radio programs and frequency of television watching had a significant association with the utilization of ANC services (33). This study, showed a positive association between ARANC score and exposure to mass media on almost daily basis.

Also, ANC is expected to facilitate a greater degree of closeness between ANC utilization and awareness about the various methods of family planning. A woman's desire for additional children can reflect her future childbearing intentions and therefore be another parameter of contraceptive behavior suggesting a family-limiting tendency among couples (21). In this study, knowledge of modern method of contraceptive was positively associated with adequacy of ANC.

Policy and practice implication

If Nigeria is to reduce its maternal and neonatal mortality rates, maternal morbidities as well as improve on women's health, strategies should be formulated that will improve adequate ANC utilization. This can be attained by increasing women status such as improving on educational level and providing gainful employement. The differential in ARANC score between rural-urban areas and the findings with regards to distance to health facilities are important factors associated with adequate utilization of ANC services, as such, the government should expand on its health facilities as well as skilled health care providers most especially in rural areas. Frequent visits to pregnant women by skilled personels until ANC services become easily accessible to them might be an option open to policy makers. There is also a need to improve ANC adequacy among the poor by making skilled care available at a cost that poor families can afford. In addition, ANC interventions should also target mothers with higher birth order on the need to use adequate ANC. It is also important to educate younger mothers on the benefits of ANC. Alot could also be achieved by increasing awareness on ANC utilization through the mass media. Furthermore, the result of our findings might also be an indirect pointer for increasing the skills and knowledge of existing cadres of skilled staff to be able to provide ANC through 'in-service' or 'on-the-job' training, however, this is subject to verification from a more detailed studies.

Limitations

The study was based on secondary data and is subject to recall bias which is often associated with

retrospective collection of data. Futhermore, our study is from a cross-sectional survey and thus can establish associations but cannot establish causality. Using provider as a scalar, also has its limitations as non-skilled providers might not necessary provide lower quality ANC as compared to skilled provider.

CONCLUSION

The evidence from this study suggest that public health policies aimed at increasing adeqaucy of ANC utilization in women who utilized skilled providers as well as encouraging skilled ANC service utilization should target at risk group discovered in our study such as; younger mothers, rural mothers, mothers with higher birth order, mothers with lower educational status, mothers with low exposure to mass media, unemployed mothers, mothers with low knowledge of modern method of contraceptive, poor mothers and mothers with distance problem to health facilities.

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