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ORIGINAL ARTICLE

Decision Making Autonomy and Maternal Healthcare Utilization among Nigerian Women

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ABSTRACT

Background and Objectives: Low assess to ante-natal care (ANC) services continue to pose a major public health challenge leading to high maternal mortality rates in developing countries. Non-utilization of ANC services among about a quarter of Nigerian women of reproductive age remains a major concern in the actualization of Sustainable Development Goals. Considering the complexity of healthcare utilization in Nigeria, the relationship between a particular health care utilization pattern and women autonomy has not been fully examined. This study examines the patterns of women autonomy and their relationships with ANC utilization in Nigeria.

Methods: This was a cross-sectional analysis of the 2013 nationally representative data from the Nigerian Demographic and Health Survey (NDHS). Factor analysis/score were used to construct women autonomy index, while chi-square and logistic regression were used to establish the relationships between the response and exposure variables.

Results: There is a strong relationship between women decision making autonomy status and ANC services among Nigeria women. The odds of utilizing ANC services among women with more decision making autonomy were significantly 3.79 higher than among women with low decision-making autonomy. The use of ANC increases as age, education and wealth status of respondents increase.

Conclusions and Global Health Implications: These results indicate that women autonomy is undoubtedly a major determinant of ANC utilization in Nigeria.

Key words: Autonomy, Antenatal Care, Logistic Regression Analysis; Factor analysis

1. Introduction

1.1 Background of the study

Poor maternal health care utilization is of great concern in developing countries leading to high maternal and child mortality. Globally, maternal mortality is very high with about 830 women dying every day from pregnancy or childbirth related.[1] In 2010, World Health Organization (WHO) reported that 358,000 maternal mortalities occurred globally, with more than 354,000 occurring in developing countries and about 200,000 deaths in sub-Saharan African countries.[2] This has, however, dropped in 2015 to 303,000 women death globally.[3,1]

Studies have established that maternal mortality and morbidity are inversely proportional to health care services utilization. That is, when healthcare service utilization is low, this will translate into high maternal and child mortalities. Also, where reproductive healthcare utilization is high, maternal and child mortalities would be low.[4] One of the most common indicators of a woman's health and reproductive behavior is the state of her antenatal care utilization rate.[5]

The prevalence of non-utilization of healthcare services among several Nigerian women of reproductive age remains a major concern to all stakeholders in the actualization of Sustainable Development Goals (SDGs) by year 2030. It's been reported that more than 33% of Nigerian pregnant women do not use antenatal care (ANC) service during pregnancy.[4] For instance, the WHO's *World Health Statistics* reported that in 2015 only 61% of Nigerian pregnant women had attended ANC at least once during their pregnancy period and only 51% met the WHO standard of a minimum of 4 visits.[6]

Women autonomy as collected in the Nigeria Demographic and Health Survey (NDHS) is defined as the extent to which women are independent on finances, level of participation in family decision making on matters pertaining to her health and that of the household, and freedom to visit outside of her matrimonial home without having to obtain permission.[7] Recent studies have reported mixed conclusions on the relationship between women's autonomy and reproductive healthcare utilization. In some Asian countries, studies found association between women autonomy and use of reproductive healthcare services.[8,9] On the other hand,[10] one Nepal study concluded that women's participation in decision making was not associated with the use of prenatal and postnatal care, while another in another study, Deo et al[11] found that autonomy is associated with ANC services in Eastern Nepal. However, some studies in Nigeria and sub-Saharan Africa (SSA) found that women autonomy is associated with maternal healthcare services.[12,13,14]

There are a number of other studies that have investigated the factors responsible for poor maternal healthcare services utilization and many of these studies used the classical regression analysis. For instance, a study conducted by Bamiwuye et al[15] used composite score to obtain an overall index for autonomy by adding the dichotomous variables in all the situations for which data were available to have a minimum score of '0' and maximum of '4' with higher scores meaning 'more autonomy'. These were further dichotomized into '0' (less autonomy) and '1' (more autonomy). However, to our knowledge, studies adopting factor analysis are not available. Factor analysis (or principal component factor) is a more robust method that captures the totality of the constituents including their interactions by examining the correlation matrix to capture the underlying factors that explain substantial amount of variations.

1.2 Aims of the study

The aim of this study therefore was to determine the patterns of women decision making autonomy and establish how it relates with maternal healthcare utilization in Nigeria using factor analysis, factor score, and logistic regression with and without adjusting for confounding variables.

2. Methods

The 2013 NDHS datasets was used for this analysis. NDHS is a nationally representative survey carried out for Nigeria by MEASURE DHS in collaboration with National Population Commission (NPC).[7]

The survey has comparable questions on women decision making autonomy and number of ANC visits. For women decision making autonomy, data in 2013 NDHS was collected on the bases of their participation in three dimensions on issues concerning (i) their own health care, (ii) making major household purchases, and (iii) visits to family or relatives without having to take permission.[8] For ANC visits, data showed a range of visits from 0 to 36 times during the period of pregnancy with at least 4 visits considered for this study as having attended adequate ANC visits in accordance with WHO standard as at the time of the survey without prejudice to the recent WHO recommendation of a minimum of 8 visits.[16,17] In addition, for this study, weights were constructed to correct for imbalance in sampling to ensure national representativeness resulting in a weighted sample of 27,829 women.

2.1 Study variables

The outcome variable (Dependent Variable) is the number of times a woman attended ANC during the last pregnancy. This was categorized as '0' if she attended less than 4 times and '1' if she attended at least 4 times. The principal independent variable (predictor variable) is the decision making status of the woman and was dichotomized as '0' representing 'low autonomy' and '1' representing 'more autonomy'. Other confounding variables of interest examined include: age of respondent and age at 1st marriage, where classified in group as (15-24, 25-34 and 35+), others were marital status (never in union, formerly in union and currently in union); number of children ever born (0-4, 5+) and number children living (0, 1-2, 3-4, 5+), the household wealth status classified as 'low' or 'high', education status (no education, primary education and secondary education and above); place of residence (whether rural or urban); and region (North East, North West, North Central, South East, South West and South South).

2.2 Statistical analysis

Four levels of analyses procedures were adopted:

- Level one, at the univariate level, percentage frequency distribution of the study sample was used to show the distribution of respondents by their characteristics and ANC prevalence.
- Level two, to construct autonomy status, factor analysis/score were used while considering the three dimensions as dichotomous where '1' means participating and '0' not participating. In view of this, we extracted the commonalities, the proportion of the variance explained, the loading of the variables on the factor, the factor score coefficients for each variable and the test of model appropriateness.[18]
- Level three, to establish the relationship of the independent variable (decision making autonomy index derived from factor analysis) with maternal health care utilization, we used chi square at 5% level of significance.
- Level four, logistic regression analysis was used to establish the likelihood effects of principal variable (unadjusted) and (adjusted for confounding factors) with ANC visits. Stata14SE was used for the computation.[19]

2.3 Ethical approval

Being a secondary data survey, the ethical permission to use the data for this study was obtained from Opinion Research Corporation (ORC) Macro International, Incorporated, Calverton, USA with its approval for survey already approved by Ethics Committee of ORC Macro Inc. and by the National Ethics Committee of Federal Ministry of Health, Nigeria.[7]

3. Results

3.1. Factor analysis of autonomy status

Using principal component factor of factor analysis, one factor was extracted accounting for 81% of the total variance. The Bartlett test of sphericity for decision making autonomy among Nigerian women was highly significant ($p<0.000$) with chi-square of 44793 indicating homogeneity of variance by the decision making patterns.

The following equation was used to construct the autonomy score (AS):

$$AS = 0.44F + 0.36H + 0.30V \quad (1)$$

The resulting values which lie between 0 and 1.1 were rescaled and multiplied by 100 to give values

between zero and 100. This was finally dichotomized into 50/50,[5,15] resulting into autonomy index used for the analysis classified as '0' low autonomy and as '1' more autonomy as presented below in Table 1a and 1b.

This puts the prevalence rate of low decision making autonomy among Nigerian women to 60% (table 1b).

3.2. *Distribution of participant's characteristics*

As show in table 2, the mean age of respondents was 28.86 years with standard deviation of 9.68 years. More than 90% of women with age at first marriage between 15 and 24 years participated in the survey. The prevalence of ANC visits meeting the WHO standard (4 times and above during pregnancy) among Nigerian women was slightly above 52%. Over 11,000 of the women in the survey do not have any living child and 22% have more than 4 children. The table also reveals that about three quarters of the women participants are currently in union with about 5% formerly in union, but now no longer in union. An equal number of women who have never had a child also had five or more children.

Table 3 shows that ANC visits at the WHO standard varied with a number of the background variables of participants. Other variables that were significantly associated with ANC include: age in group, number of children ever born, household wealth index, number of children living, level of educational attainment, etc. The proportion of women whose age at first marriage was 35+ years (86%) that met WHO ANC standard was more than those for any other age group. ANC utilization was significantly lower among the rural women (38.9%) than among the urban women (77.6%). ANC utilization significantly increased among women with higher education from 2699 with no formal education to 5377 for those who have completed secondary education and above.

Table 1a: Results of the constructing the autonomy index

Decision on	Factor loading	Factor score	Communalities
Finance (F)	0.92	0,44	0.84
Health (H)	0.90	0.36	0.81
Visits (V)	0.88	0.30	0.78
% of Variance 81			
KMO 0.736			
Bartlett Test of Sphericity: *P-Value=0.000 Chi-Sq. 44793			
Number of Observation. 27274			

Table 1b: Level of autonomy

Description	N	%
Low autonomy	16,568	59.53
More autonomy	11,262	40.47

3.3 Logistic regression analysis

3.3.1 Unadjusted odds ratio (UOR)

Table 4 shows the logistic regression odds ratio of individual estimates (unadjusted) of the ANC utilization among Nigerian women by the principal variable (decision making autonomy). The odds of ANC utilization increase by a woman's level of decision making autonomy. The unadjusted odds of women with more autonomy are significantly 3.8 times more likely to complete at least 4 ANC services than those women with low autonomy.

3.3.2. Adjusted odds ratio(AOR)

After adjusting for several confounding factors, the odds of completing 4 ANC visits for women with 'more autonomy' dropped significantly from 3.79 times to 1.24 times for women with 'low autonomy' (table 5). The odds of attending at least 4 ANC increased significantly as the age in group, educational level, and wealth status increased.

4. Dicussion

4.1 Discussion

We applied factor analysis to construct the Autonomy Index (AI) for the respondents using the principal component factor option. We used the scores (expressed in 10 scales) for the three dimensions of women decision making autonomy (deciding on their own health care; making major household purchases, and visits to family or relatives) as collected in 2013 NDHS. These variables were further converted into dichotomous variables of '0' & '1', where '1' means having the item and '0' not having it.

Table 2: Social demographic characteristics of study participants

Variables	Number	Percentage
ANC visit status		
Did not meet WHO standard(<4)	9,464	47.5
Met WHO standard (>3)	10,457	52.5
Level of autonomy		
Low autonomy	16,568	59.53
More autonomy	11,262	40.47
Age at first marriage		
15–24 years	26,762	90.4
25–34 years	2,728	9.2
35 years+	130	0.4
Number of living children		
0	11,750	30.2
1–2	9,737	25.0
3–4	8,876	22.8
5+	8,584	22.0
Union or marital status		
Never in union	9,325	23.9
Currently in union	2,7830	71.5
Formerly in union	1,793	4.6
Total children ever born		
0–4 children	27541	70.7
5+children	11,406	29.3
Region		
North central	5572	14.3
North east	5766	14.8
North west	11876	30.5
South east	4476	11.5
South South	4942	12.7
South west	6314	16.2
Place of residence		
Urban	16414	42.1
Rural	22533	57.9
Level of education		
No education	14723	37.8
Primary education	6733	17.3
Secondary+	17485	11.9
Age in group		
15-24 years	14576	37.4
25–34 years	12611	32.4
35 years+	11760	30.2

Table 3: Relationship between participant's characteristics and ANC visit

Variables	ANC Visits		Chi-Square (P-Value)
	Less than 4	More than 3	
Level of autonomy			
Low autonomy	7,084	4,704	1744.67
More autonomy	2,019	5,085	(0.000) ***
Wealth status			
Poor	8281	4693	3919.67
Not poor	1183	5764	(0.000) ***
Age at first marriage			
15–24 years	9071	8782	717.79
25–34 years	2523	1333	(0.000) ***
35 years+	6	38	
Total children ever born			
0–4 Children	5393	7064	3394
5+Children	4071	3394	(0.000) ***
Place of residence			
Urban	1567	5420	2677.92
Rural	7897	5037	(0.000) ***
Level of education			
No education	6963	2699	4871.34
Primary education	1414	2381	(0.000) ***
Secondary+	1088	5377	
Age in group			
15-24 years	2854	2376	142.54
25–34 years	4163	5194	(0.000)***
35 years+	2448	2887	

Table 4: Logistic regression analysis for ANC Visits and autonomy status

Variables	UOR	CI	P-Value
Autonomy status			
Low autonomy	1.000		
More autonomy	3.792	(3.39 4.24)	0.000***

The kmo of 0.736 measures the adequacy of sample-size of women decision making autonomy indicating that a higher correlation existed between different decision making autonomy statuses to warrant using factor analysis.[20] The finding that only about 40% Nigerian women has autonomy in

Table 5: Logistic regression analysis for ANC Visits and autonomy status (Adjusted odds ratio)

	Odds ratio	CI	P-Value
Autonomy level			
Low autonomy	1.000		
More autonomy	1.240	(1.101 1.396)	0.000***
Age in group			
15–24 years	1.000		
25–34 years	1.151	(0.010 1.311)	0.035*
35+years	1.282	(1.081 1.522)	0.004***
Education level			
No education	1.000		
Primary education	1.935	(1.662 2.242)	0.000***
Secondary+	2.959	(2.497 3.506)	0.000***
Place of residence			
Urban	1.000		
Rural	0.818	(0.681 0.982)	0.032*
Wealth status			
Poorest	1.000		
Poor	1.892	(1.564 2.289)	0.000***
Middle	3.416	(2.743 4.253)	0.000***
Richer	5.072	(3.961 6.492)	0.000***
Richest	8.260	(6.194 11.016)	0.000***
Region			
North central	1.000		
North east	0.978	(0.759 1.266)	0.876(NS)
North west	0.649	(0.510 0.825)	0.000***
South south	2.598	(1.917 3.521)	0.000***
South west	0.688	(0.537 0.881)	0.003***
South east	2.856	(1.891 4.313)	0.000***
Children ever born			
0	1.000		
1–2	1.031	(0.890 1.195)	0.685(NS)
3–4	0.963	(0.857 1.082)	0.523(NS)
5+	1.000		
Age at 1st marriage			
15–24 years	1.000		
25–34 years	1.238	(1.026 1.494)	0.026*
35+years	2.196	(0.751 6.418)	0.150(NS)

deciding on issues that pertain to her health, large purchases for family and visit outside the home either singly or jointly with her husband is relatively low. Furthermore, the principal exposure variable, women autonomy was found to be significantly associated with ANC utilization in Nigeria. This agrees with similar studies in Nigeria[12, 13] and in some Asian countries,[8, 9] using different analytical approaches,but the result was at variance with other findings in Nepal.[10] The significance of women autonomy as a risk factor for ANC utilization even after adjusting for other confounding factors makes it very relevant especially in resource limited settings like Nigeria.

4.2 Limitations

However, the interpretations of the results from this study are subject to a number of limitations. First, the study is cross sectional and as such causal effects could not be determined. Second, the study did not examine the independent predictor effects of other significant independent variables. Third, in view of the multi ethnic diversities of Nigeria, cultural impediments to ANC were not examined. Fourth, the constituents of women decision status as collected by NDHS were in 3 dimensions. These could have been more to further justify the use of factor analysis. Overall, the strength of the results from the study draws upon the nationally representativeness of the large sample size of the NDHS. Future studies should identify more research gap in the areas of identifying cultural impediments in the use of ANC in Nigeria. For example, interactions of both maternal and paternal variables can be investigated and how much both household and paternal variables can explain the relationships between maternal characteristics and ANC.

5. Conclusion and Global Health Implications

This study used factor analysis to construct autonomy index for women in Nigeria and have demonstrated that it is as good as any other analytical methods.[15] Women autonomy is undoubtedly a major determinant of ANC utilization in Nigeria. The result further demonstrated that the usage of ANC increases as age of respondents, education status, wealth index and age at 1st marriage increase. In view of the above, it suggest the need for the implementations of policies and programs that will enhance women autonomy status in the following

areas: (1) women empowerment programs that will increase their income generating power especially the rural women, (2) encouraging parents to educate their girl-child rather than forcing them into early child marriage, (3) increasing the focus of men to be more responsive in their wives needs to access ANC during pregnancy and postpartum periods. This is important because paternal attitude has been found to be an important factor that influences many women in seeking quality care,[21] and (4) increasing access to quality ANC centers especially in the rural areas.

Compliance with ethical standards

Conflicts of Interest: *The authors declared no conflicts of interest relevant to this study.* ***Funding/Support:*** *The authors declared that no funding was received to carry out this research.* ***Acknowledgement:*** *We deeply acknowledge Measure DHS and National Population Commission for the permission granted us to use the data for this study.* ***Ethics Approval:*** *Ethical permission to use the data for this study was obtained from Opinion Research Corporation (ORC) Macro International, Incorporated, Calverton, USA; the Nigeria Demographic and Health survey (NDHS) was approved by Ethics Committee of ORC Macro Inc. and by the National Ethics Committee of Federal Ministry of Health, Nigeria.*

Key Messages

- The prevalence of Antenatal Care (ANC) visits of minimum 4 times during pregnancy among Nigerian women was slightly above 52 percent.
- For women in Nigeria, decision making autonomy is a major determinant of ANC utilization.
- The usage of ANC among Nigerian women increases as their ages increase.

References

1. World Health Organization. *Maternal mortality-Factsheets* http://www.who.int/en/news-room/fact-sheets/detail/maternal-mortality accessed May 1, 2018
2. World Health Organization. Trends in Maternal Mortality, 1990 to 2008 Estimates. WHO, UNICEF, UNFPA and The World Bank. Geneva: World Health Organization; 2010
3. Alkema L, Chou D, Hogan D, Zhang S, Moller AB, Gemmill A, et al. Global, regional, and national levels and trends in maternal mortality between 1990 and 2015, with scenario-based projections to 2030: a systematic analysis by the UN Maternal Mortality Estimation Inter-Agency Group. *Lancet.* 2016; 387 (10017):462-74.
4. Fagbamigbe AF & Idemudia ES. Barriers to Antenatal Care use in Nigeria: Evidences from Non-Users and Implications for Maternal Health Programming. *BMC Pregnancy and Childbirth* 2015, 15:95
5. Nisar N, White F. Factors affecting utilization of Antenatal Care among reproductive age group Women (15-49 years) in an urban squatter settlement of Karachi, *Journal of Pakistan Medical Association,* 2003 Feb; 53(2):47-53.
6. World Statistics 2015. *WHO Library Cataloguing-in-Publication Data*, http://apps.who.int/iris/bitstream/handle/10665/170250/9789240694439_eng.pdf?sequence=1 accessed May 1, 2018.
7. National Population Commission and ICF Macro. Nigeria Demographic and Health Survey 2013. Abuja, Nigeria: National Population Commission and ICF Macro, 2014
8. Beegle, K., Frankenberg, E. & Thomas, D. Bargaining Power within Couples and use of Prenatal and Delivery Care in Indonesia. *Stud Fam Plann,* 2001, 32, 130-46.
9. Balk, D. Individual and Community Aspects of Women's Status and Fertility in Rural Bangladesh. *Population Studies*, 1994, 48(1): 21-45.
10. Furuta M & Salway S. Women's Position within the Household as a Determinant of Maternal Health Care Use in Nepal. *Int Fam Plan Perspect.* 2006 Mar; 32(1):17-27.
11. Deo KK, Paudel YR, Khatri RB, Bhaskar RK, Paudel R, Mehata S and Wagle RR. Barriers to Utilization of Antenatal Care Services in Eastern Nepal, *Front Public Health.* 2015; 3: 197. doi: 10.3389/fpubh.2015.00197
12. Fapohunda BM, Orobaton NG. When Women Deliver with No One Present in Nigeria: Who, What, Where and So What? July 25, 2013. https://doi.org/10.1371/journal.pone.0069569 accessed May 1, 2018.
13. Sadiq AM The Use of Maternal Health Services in Nigeria: Does Ethnicity and Religious Beliefs Matter? *MOJ Public Health*, 2017; 6(6).
14. Tiruneh FN, Chuang K and Chuang Y. Women's autonomy and maternal healthcare service

utilization in Ethiopia *BMC Health Service Research*, 2017 17:718. DOI 10.1186/s12913-017-2670-9

15. Bamiwuye SO De Wet N Adedini SA Linkages between Autonomy, Poverty and Contraceptive Use in Two sub-Saharan African Countries. *African Population Studies*. 27(2), October 2013
16. Slinkard SA, Pharr JR, Bruno T, Patel D, Ogidi A Obiefune M, Ezeanolue EE. Determinants of Infant Mortality in Southeast Nigeria: Results from the Healthy Beginning Initiative, 2013-2014. *Int J MCH AIDS,* 2018; 7(1); 1 - 8
17. World Health Organization.WHO recommendations on antenatal care for a positive pregnancy experience. c2016. http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/anc-positive-pregnancy-experience/en accessed July 19, 2018.
18. Gabr HMKM. Investigating Poverty and Labour Force Participation among Older Population in Egypt: Multilevel Simultaneous Equations Modeling Approach. A thesis submitted to The University of Birmingham for the degree of Ph.D in Statistics, School of Mathematics, The University of Birmingham, January 2016
19. StataCorporation, Stata Statistical Software, College Station, TX, 2014.
20. Venkaiah K, Brahmam GNV and Vijayaraghavan K. Application of Factor Analysis to Identify Dietary Patterns and Use of Factor Scores to Study Their Relationship with Nutritional Status of Adult Rural Populations. *Journal of Health and Population Nutrition* 2011; 29(4):327-338
21. Amutah-Onukagha N, Rodriguez M, Opara I, Gardner M, Assan MA, Hammond R, Plata J, Pierre K, Farag E. Progresses and challenges of utilizing traditional birth attendants in maternal and child health in Nigeria. *Int J MCH AIDS*, 2017, 6(2)130-138