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# Socio-economic factors associated with antenatal care in Nigeria

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## Abstract

There is a dearth of knowledge on how much financial autonomy interacts with affordability and consequently access to ante-natal health care in Nigeria. This study evaluated the relationship between women's financial autonomy and utilization of antenatal care (ANC) services. ANC attendance during pregnancy and the financial autonomy of women aged 15-49 in 42,000 selected households across all 36 states and the FCT, was assessed using data from the 2018 NDHS. Descriptive statistics and bivariate and multivariate logistic regression analyses were carried out and significant predictors were tested at a 95% significance level. The proportion of women considered to have no financial, partial and full autonomies were 63.1%, 32.0% and 4.9% respectively. Living in an urban region was a statistically significant predictor of financial autonomy among women and the odds of financial autonomy increased with the level of education and wealth index. Type of residence and occupation type were also significant predictors of ANC utilization. Full financial autonomy to make financial decisions did not significantly improve the odds of antenatal health care services during pregnancy (OR = 1.03; 95% CI: 0.87 – 1.22). Other factors such as education, employment and wealth index of the women were more significantly associated with antenatal care attendance. A call for improved educational facilities and wealth creation schemes at national and sub-national levels of government is necessary to improve ante-natal care utilization in health care facilities. *(Afr J Reprod Health 2022; 26[8]: 123-133).*

**Keywords**: Financial autonomy, women, antenatal care, national demographic health survey (NDHS), sustainable development goal (SDG)

## Résumé

Il y a un manque de connaissances sur le degré d'interaction de l'autonomie financière avec l'abordabilité et, par conséquent, l'accès aux soins de santé prénatals au Nigéria. Cette étude a évalué la relation entre l'autonomie financière des femmes et l'utilisation des services de soins prénatals (CPN). La fréquentation des soins prénatals pendant la grossesse et l'autonomie financière des femmes âgées de 15 à 49 ans dans 42 000 ménages sélectionnés dans les 36 États et le FCT ont été évaluées à l'aide des données du NDHS 2018. Des statistiques descriptives et des analyses de régression logistique bivariées et multivariées ont été réalisées et des prédicteurs significatifs ont été testés à un seuil de signification de 95 %. La proportion de femmes considérées comme n'ayant pas d'autonomie financière, partielle et totale était respectivement de 63,1 %, 32,0 % et 4,9 %. Le fait de vivre dans une région urbaine et l'exposition antérieure aux messages de planification familiale sont des prédicteurs statistiquement significatifs de l'autonomie financière des femmes. Le type de résidence et le type de profession étaient également des prédicteurs significatifs de l'utilisation des soins prénatals. L'autonomie financière complète pour prendre des décisions financières n'a pas amélioré de manière significative les chances d'avoir accès aux services de soins de santé prénatals pendant la grossesse (OR = 1,03 ; IC à 95 % : 0,87 - 1,22). D'autres facteurs tels que l'éducation, l'emploi et l'indice de richesse des femmes étaient plus significativement associés à la fréquentation des soins prénatals. Un appel à l'amélioration des établissements d'enseignement et des programmes de création de richesses aux niveaux national et infranational du gouvernement est nécessaire pour améliorer l'utilisation des soins prénatals dans les établissements de soins de santé. *(Afr J Reprod Health 2022; 26[8]: 123-133).*

**Mots-clés**: Autonomie financière, femmes, soin prenatal, enquête nationale démographique et de santé (NDHS), objectif de développement durable (ODD)

## Introduction

Nigeria has perhaps one of the worst indices of maternal health globally, with a maternal mortality rate (MMR) of 814 per 100000 live births[1] which accounts for 14% of worldwide maternal deaths[1]. Maternal and child health is a key component of primary health care (PHC) and human

development, and to this end, reducing maternal mortality is a priority to achieve Sustainable Development Goal 3 (SDG 3)[2]. Inadequate antenatal care either in terms of quality or poor attendance rates contributes significantly to the persistently high MMR in Nigeria[3]. A recent review of data from World Health Statistics suggested an inverse association between maternal mortality ratios (MMRs) and the proportion of women aged 15–49 years receiving antenatal care from a skilled health professional[4]. Despite widespread advocacy, the 2013 Nigerian Demographic and Health Survey showed that only 18% of pregnant women received antenatal care (ANC) in the first trimester, while 34% did not attend any ANC visit throughout the entire pregnancy[5]. The Nigerian situation is below par relative to the World Health Organization (WHO) recommendation that pregnant women should have at least 4 ANC visits[6]. Adedokun & Uthman also reported that approximately 62% of Nigerian women did not utilize health services during delivery, implying poor maternal healthcare services utilization among Nigerian women[7].

Maternal mortality refers to deaths due to complications from pregnancy or within 42 days after childbirth. Many of these deaths are preventable by accessing focused antenatal care (ANC) and skilled birth delivery[8]. The overall aim of ANC is to improve maternal and fetal health outcomes[9,10]. ANC activities include patient education, nutrition education, screening and treatment of sexually transmitted infections (such as HIV and syphilis) and other infections. Intermittent preventive treatment for malaria during pregnancy and tetanus toxoid immunization is one of the core services that is provided during the ANC visits. High-risk pregnancies and obstetric complications such as preeclampsia are identified and promptly referred for treatment. Postnatal family planning and birth spacing services are also available[9,10].

In spite of all the beneficial services rendered during the ANC period, the cost is a major factor influencing the health care utilization behaviour of pregnant women in Nigeria[11]. Most women in Nigerian households still exhibit some lack of autonomy as they depend on their spouses for economic and financial decisions, and many lack financial resources[12].

The autonomy of a woman can be described as the capacity of the woman to "manipulate her environment and take decisions concerning herself"[13]. Alabi *et al.* described autonomy in terms of a woman's freedom to see whomever she wants (movement autonomy), make decisions about her health (health autonomy) and her financial independence (economic autonomy)[13]. Women's financial autonomy or economic independence can be described as the freedom to make decisions on their financial issues[14]. Measuring this attribute in women can be quite subjective. Notwithstanding, certain metrics captured in Demographic and Health Surveys reflect the level of a woman's financial autonomy; these include women's participation in decision-making in the purchase of large household purchases and women's level of participation in decision-making about how their income would be spent[15-17].

Wado[15] measured women's general autonomy using their level of participation in decision making, attitude towards domestic violence, and whether getting permission to seek medical care was a big problem. The study found that the features named above were associated with maternal healthcare services utilisation, such as ANC and modern contraceptive use among Ethiopian women. Distance and cost were identified as barriers preventing women from accessing maternal healthcare services, especially in low-resource settings[11]. The 2014 Ghana Demographic and Health Survey indicated that women with health decision-making autonomy tend to deliver in health facilities under the supervision of skilled birth attendants than those who are not autonomous[18]. Considering the aforementioned and what abounds in literature, it is evident that many studies have explored the broader associations between autonomy and healthcare utilization on a general level, however more specifically, the association of financial autonomy on health care utilization has been poorly researched. Using the minimum WHO recommendation for a number of acceptable ANC visits as a proxy for health care

utilization, this study thus assessed the prevalence and association of women's financial autonomy in Nigeria with the utilisation of antenatal healthcare services.

# Methods

## *Study area*

This is a secondary analysis of a survey that was carried out in Nigeria, a country with a population of above 200 million[19]. Nigeria is made up of 36 states and a Federal Capital Territory (FCT). The country is further grouped into six geopolitical zones; North-East, North-West, North-Central, South-East, South-South and South-West. The people in each zone have similar characteristics and are unique in their ways of life, including health-related traits.

This study utilised data from the 2018 Nigeria Demographic and Health Survey (2018 NDHS) implemented by the National Population Commission (NPC)[20]. The study employed a cross-sectional study design to collect information on fertility, awareness and use of family planning methods, breastfeeding practices, nutritional status of women and children, maternal and child health, adult and childhood mortality, women's empowerment, domestic violence, among other variables[20].

Stratified sampling was used for the 2018 NDHS by grouping each of the 36 states and the Federal Capital Territory into urban and rural areas. In each of the 74 sampling strata identified, samples were selected in each stratum through a two-stage selection process. In the first stage, 1,400 enumeration areas were selected, while for the second stage, 30 households were selected in every cluster through equal probability systematic sampling. All women aged 15-49 years in the sample households who were permanent residents of the selected households (and in this study are referred to as our respondents) were screened for analysis. A total number of 42,000 households were selected. However, after excluding non-gravid participants and visitors from the dataset, a final sample of 20,314 respondents (women who had been pregnant in the last five years) were selected for our data analysis[20].

ANC utilisation was re-coded as a dichotomous variable and considered adequate if a participant attended up to 4 ANC visits during pregnancy and inadequate if ANC attendance was less than 4. Financial autonomy was determined by study participants' responses to participation in decision-making on large household purchases. Financial autonomy was recoded into three categories, namely – "*No financial autonomy"* (someone other than the respondent makes decisions on all household purchases); "*Partial financial autonomy"* (respondent decides on most household purchases jointly with partner, husband, spouse or someone else); and "*Full financial autonomy"* (respondent alone makes decisions on all household purchases)[17]. Other independent variables extracted from the dataset included age, region, type of residence, occupation, religion, number of living children, the highest level of education, wealth index, and assessment of family planning information. Our study thus assessed financial autonomy and its relationship with antenatal care (ANC) utilisation among Nigerian women aged 15-49 years. We also assessed the relationship between financial autonomy and the other explanatory variables.

Frequencies and proportions were computed for all of the extracted variables. Chi-square test was used to test for the bivariate relationship between financial autonomy and sociodemographic characteristics (explanatory variables) and ANC utilisation (outcome variable). The explanatory variables were further included in a multivariate logistic regression model to assess how each explanatory variable predicts the outcome variable while controlling for other factors. Financial autonomy was dichotomised by collapsing *"Partial financial autonomy"* and *"Full financial autonomy"* as a single category *"Financial autonomy"*. Then, other explanatory variables were also included in a multivariate logistic regression model to assess their relationship with financial autonomy (binary variable). Significant predictors were tested at a 95% significance level.

## Results

The proportion of women considered to have no financial autonomy, partial financial autonomy, and full financial autonomy was 63.1%, 32.0%, and 4.9% respectively (Figure 1). More than half (57%) of participants had attended the antenatal clinic ≥4 times during their pregnancies in the last five years (Figure 2).

Bivariate analysis shows a statistically significant ($p < 0.001$) association between the number of antenatal clinics attended during pregnancy and each of the independent variables – age, region, type of place of residence, occupation, education, religion, number of living children, and wealth index (Table 1).

Bivariate analysis between financial autonomy and each of the other explanatory variables revealed a statistically significant association at $p < 0.001$.

Predictors of financial autonomy are presented in Table 2 where we examined the relationship between financial autonomy and the other explanatory variables using multivariate logistic regression. Living in an urban region and prior exposure to family planning messages are statistically significant predictors of financial autonomy among women. The odds of financial autonomy increased with the level of education and wealth index. Age as a significant predictor of financial autonomy was only found among respondents aged 35-49years. Among all the variables explored in the logistic regression, the number of living children and respondents aged 15-34 years were not significant predictors of financial autonomy among the respondents.

The independent variables were further included in a multivariate logistic regression model to investigate significant predictors of ≥4 visits at the antenatal clinic (Table 2). Women in the South-West (OR = 2.94, 95% CI: 2.50-3.45), South-East (OR = 1.72, 95% CI: 1.45-2.05) and North-East (OR = 1.17, 95% CI: 1.04 - 1.32) are more likely to complete the minimum 4 ANC visits than women in the North-Central region. The employed population are generally more likely to also complete the minimum 4 ANC attendances than those who are unemployed**.** The odds of having ≥4 ANC attendance increased steadily with the increasing education status of women; lowest with primary education (OR = 1.85, 95% CI: 1.68 - 2.04) and highest with tertiary education (OR = 4.63, 95% CI: 3.72 - 5.76). Muslim women are 1.5 times less likely to complete 4 ANC visits compared to Christian women (OR = 0.68, 95% CI: 0.61 – 0.76) (Table 2). The odds of ≥4 ANC attendance were also found to increase steadily with increasing wealth index. Women in quintile 3 for instance were about twice likely to complete 4 ANC visits compared to women in quintile 1 (OR = 1.92, 95% CI: 1.73 – 2.13). In the same manner, women in quintile 5 were almost 4 times more likely to complete 4 ANC visits compared to women in quintile 1 (OR = 3.70, 95% CI: 3.13 – 4.36). There were not much observed influences of autonomy on attendance visits except for partial financial autonomy which was found to be minimally significant (OR = 1.09, 95% CI: 1.01 – 1.19).

## Discussion

This study assessed the factors and predictors associated with completion of the minimum 4 ANC visits recommended by the World Health Organization (WHO) among women of childbearing age using a nationally representative national demographic health dataset. Findings from this study revealed that several factors favour the attendance of ANC visits (health care utilization) amongst women of childbearing age in Nigeria. Ironically, the variable of interest – financial autonomy is the only variable without any demonstrable effect on ANC visitation.

There have been no major changes in the distribution of financial autonomy among women in the space of the five years interval (2013-2018) between the collection of the NDHS data used in this study and the last one conducted in Nigeria. The study by Solanke *et al*. in 2015 reported similar findings in the proportion of women with no financial autonomy (64.7% vs 63.1% in this study); partial autonomy (30.1% vs 32.0%); and full autonomy (5.2% vs 4.9%)[17]. This reflects a fairly conservative socio-cultural landscape concerning women's empowerment in Nigeria.

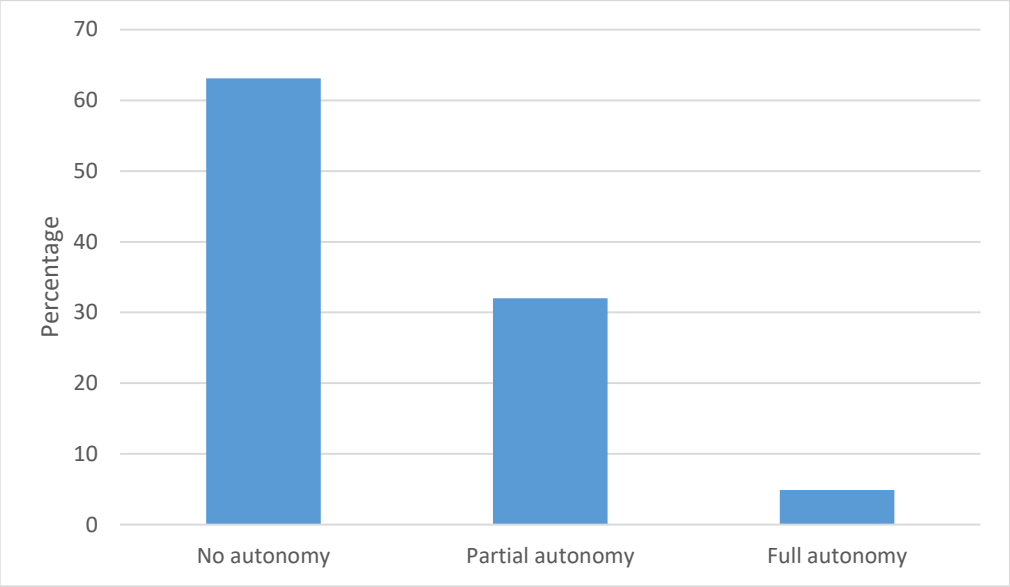


**Figure 1:** Levels of financial autonomy among Nigerian women

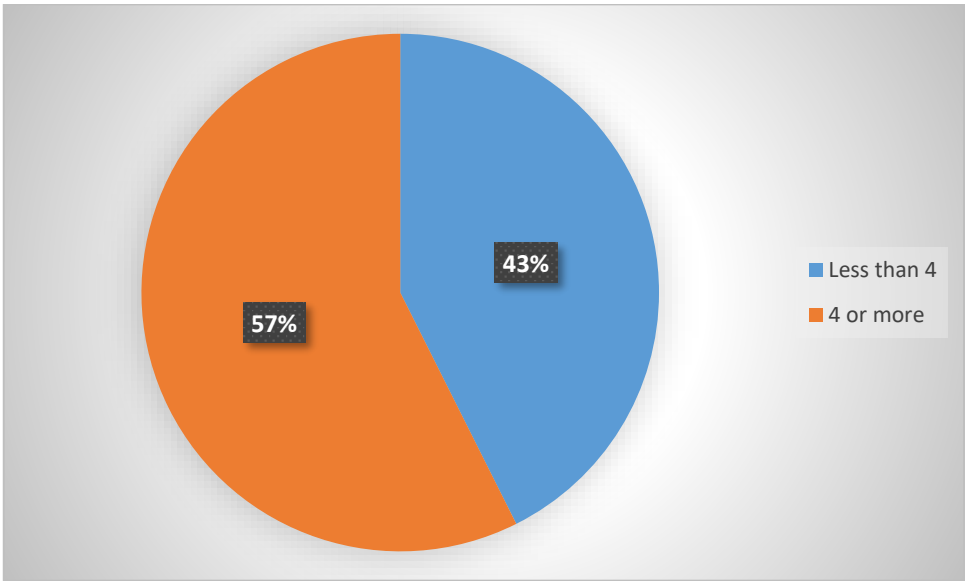


**Figure 2:** Number of antenatal visits during pregnancy

As highlighted in the results, the access and utilization of health care services were observed to improve with increasing education. The odds of an improved ANC utilization were found to be about 1.9 times more likely compared to no education and these odds increased steadily with increasing education. Our study finding corroborates what has been documented in literature also[17], where employment and education were major determinants of financial autonomy. Education matters and impacts health through direct effects on the people that engage in it and secondly through the ability to impact the nature of the contexts themselves[21]. Thus, the role of the girl child's education and creation of equal opportunities regardless of gender cannot be overemphasized in

**Table 1:** Associated factors influencing the number of antenatal visits during pregnancy

| | Number of antenatal visits during pregnancy n (%) | | | |
|---|---|---|---|---|
| | Less than 4 | 4 or more | Chi-square ($\chi^2$) | p-value |
| **Age (N=20,314)** | | | 198.49 | <0.001* |
| 15-19 | 623 (57.6) | 458 (42.4) | | |
| 20-24 | 1765 (46.5) | 2032 (53.5) | | |
| 25-29 | 2232 (42.1) | 3068 (57.9) | | |
| 30-34 | 1679 (37.2) | 2834 (62.8) | | |
| 35-39 | 1345 (39.9) | 2030 (60.1) | | |
| 40-44 | 699 (43.5) | 907 (56.5) | | |
| 45-49 | 313 (48.8) | 329 (51.2) | | |
| **Region (N=20,314)** | | | 3050.47 | <0.001* |
| North Central | 1296 (45.5) | 1551 (54.5) | | |
| North East | 2056 (56.7) | 1572 (43.3) | | |
| North West | 4312 (58.0) | 3127 (42.0) | | |
| South East | 280 (14.9) | 1605 (85.1) | | |
| South South | 432 (25.6) | 1257 (74.4) | | |
| South West | 280 (9.9) | 2546 (90.1) | | |
| **Type of place of residence (N=20,314)** | | | 1857.85 | <0.001* |
| Urban | 1854 (23.7) | 5965 (76.3) | | |
| Rural | 6802 (54.4) | 5693 (45.6) | | |
| **Occupation (N=20,314)** | | | 1112.45 | <0.001* |
| Unemployed | 3276 (56.9) | 2479 (43.1) | | |
| Professional/Clerical | 195 (16.2) | 1012 (83.8) | | |
| Sales/Services | 3508 (36.6) | 6076 (63.4) | | |
| Agriculture | 1463 (49.5) | 1494 (50.5) | | |
| Manual, Household, Domestic | 216 (26.6) | 595 (73.4) | | |
| **Highest educational level (N=20,314)** | | | 4202.21 | <0.001* |
| No education | 6190 (65.6) | 3246 (34.4) | | |
| Primary | 1074 (36.1) | 1902 (63.9) | | |
| Secondary | 1256 (20.4) | 4894 (79.6) | | |
| Higher | 135 (7.7) | 1617 (92.3) | | |
| **Religion (N=20,314)** | | | 1951.10 | <0.001* |
| Christianity | 5691 (77.8) | 1622 (22.2) | | |
| Islam | 5924 (45.9) | 6975 (54.1) | | |
| Traditional Religion | 44 (43.1) | 58 (56.9) | | |
| **Number of living children (N=20,314)** | | | 305.01 | <0.001* |
| None | 127 (50.2) | 126 (49.8) | | |
| 1 to 3 | 4153 (37.5) | 6930 (62.5) | | |
| 4 to 6 | 3171 (46.8) | 3604 (53.2) | | |
| 7+ | 1204 (54.7) | 999 (45.3) | | |
| **Have you heard or seen any family planning messages? (N=20,314)** | | | 1162.15 | <0.001* |
| No | 5816 (47.6) | 6396 (52.4) | | |
| Yes | 5802 (71.6) | 2300 (28.4) | | |
| **Wealth index (N=20,314)** | | | 3759.87 | <0.001* |
| Poorest | 1375 (30.4) | 3150 (69.6) | | |
| Poorer | 1917 (42.0) | 2643 (58.0) | | |
| Middle | 2488 (60.9) | 1596 (39.1) | | |
| Richer | 2805 (75.6) | 903 (24.4) | | |
| Richest | 3073 (89.5) | 364 (10.5) | | |
| **Financial autonomy (N=20,314)** | | | 1177.73 | <0.001* |
| No autonomy | 6628 (51.7) | 6188 (48.3) | | |
| Partial autonomy | 1757 (27.0) | 4747 (73.0) | | |
| Full autonomy | 270 (27.2) | 724 (72.8) | | |

** Significant Associations (p < 0.05)*

**Table 2:** Predictors of financial autonomy amongst women

| | Odds Ratio (95% C.I) | p-value |
|---|---|---|
| **Age** | | |
| 15-19 | 1 | |
| 20-24 | 0.99 (0.82-1.19) | 0.889 |
| 25-29 | 1.06 (0.88-1.27) | 0.544 |
| 30-34 | 1.11 (0.91-1.34) | 0.314 |
| 35-39 | 1.25 (1.02-1.53) | 0.033* |
| 40-44 | 1.48 (1.18-1.86) | 0.001* |
| 45-49 | 1.78 (1.35-2.33) | <0.001* |
| **Region** | | |
| North Central | 1 | |
| North East | 1.14 (1.01-1.29) | 0.031* |
| North West | 0.52 (0.46-0.58) | <0.001* |
| South East | 2.15 (1.86-2.49) | <0.001* |
| South South | 2.01 (1.74-2.33) | <0.001* |
| South West | 1.46 (1.29-1.65) | <0.001* |
| **Type of residence** | | |
| Urban | 1 | |
| Rural | 0.86 (0.79-0.94) | <0.001* |
| **Occupation** | | |
| Unemployed | 1 | |
| Professional/Clerical | 2.84 (2.41-3.34) | <0.001* |
| Sales/Services | 2.93 (2.67-3.22) | <0.001* |
| Agriculture | 3.90 (3.44-4.41) | <0.001* |
| Manual, Household, Domestic | 3.00 (2.50-3.59) | <0.001* |
| **Level of education** | | |
| No education | 1 | |
| Primary | 1.51 (1.36-1.68) | <0.001* |
| Secondary | 1.54 (1.38-1.72) | <0.001* |
| Tertiary | 1.96 (1.66-2.30) | <0.001* |
| **Religion** | | |
| Christianity | 1 | |
| Islam | 0.55 (0.50-0.61) | <0.001* |
| Traditional Religion | 1.90 (1.11-3.26) | 0.019* |
| **Number of living children** | | |
| None | 1 | |
| 1 to 3 | 1.19 (0.83-1.71) | 0.343 |
| 4 to 6 | 1.12 (0.78-1.62) | 0.541 |
| 7+ | 0.94 (0.64-1.38) | 0.752 |
| **Wealth index** | | |
| Quintile 1 (Poorest) | 1 | |
| Quintile 2 (Poorer) | 1.43 (1.27-1.60) | <0.001* |
| Quintile 3 (Middle) | 1.46 (1.29-1.64) | <0.001* |
| Quintile 4 (Richer) | 1.65 (1.44-1.89) | <0.001* |
| Quintile 5 (Richest) | 1.94 (1.66-2.27) | <0.001* |
| **Have you heard or seen any family planning messages?** | | |
| No | 1 | |
| Yes | 1.22 (1.13-1.31) | <0.001* |

**Statistically significant at p < 0.05; OR=Odds Ratio; 95%CI = 95% Confidence Interval*

women's empowerment especially since gender-education dynamics disproportionately favour the female child in some Northern Nigerian regions[17,22].

Women's occupation type also reveals interesting findings. While controlling for level of education and wealth index, manual, household and domestic workers are more likely to have ≥4 ANC attendance than the women in the other categories. We postulate that the nature of their jobs (i.e. manual, household and domestic) affords them more flexibility concerning time to make an adequate number of antenatal clinic attendance compared to the other job types. On the other hand, the clerical/professional jobs (also popularly referred to as white-collar jobs) are usually more regimented thus impeding the ease at which women in such jobs can attend the clinics. Debates on the relativity of how white-collar jobs and blue-collar jobs influence health care utilization abound in literature which shows considerably variance[23]. In some studies, women whose spouses engaged in white collar jobs were found to utilize more maternal health services[24] while in another study, white collar jobs were not found to be associated with any advantage over stay-at-home mothers[25]. The Nigerian Labour Act 2004 however, makes provision for pregnant women to begin their maternity leave six weeks from their due date and end six weeks after the child's birth[26]. Nonetheless, not much is known about how well this is implemented in institutions across the nation; or the adequacy of the policy itself in catering to women's antenatal clinic attendance. An enquiry into the workplace culture and support for pregnant women in Nigeria is a potential area of research in further studies.

In this study, Tudor Hart's inverse care law[27] is somewhat evident in the association of wealth index and maternal health care (MHC) utilisation. The inequalities in the distribution of wealth reflect on women's access to maternal healthcare services. The poorest women who need MHC most are least likely to access them, whereas increasing the wealth index positively predicts an increased likelihood of MHC use. Our study revealed that adherents of the Islamic faith are less

**Table 3:** Predictors of ANC visits amongst women

| | Odds (95% C.I) | Ratiop-value |
|---|---|---|
| **Age** | | |
| 15-19 | 1 | |
| 20-24 | 1.12 (0.96-1.30) | 0.158 |
| 25-29 | 1.04 (0.89-1.21) | 0.649 |
| 30-34 | 1.26 (1.07-1.49) | 0.007* |
| 35-39 | 1.12 (0.94-1.34) | 0.209 |
| 40-44 | 1.24 (1.01-1.52) | 0.040* |
| 45-49 | 1.22 (0.95-1.55) | 0.122 |
| **Region** | | |
| North Central | 1 | |
| North East | 1.17 (1.04-1.32) | 0.009* |
| North West | 1.08 (0.96-1.21) | 0.189 |
| South East | 1.72 (1.45-2.05) | <0.001* |
| South South | 0.90 (0.77-1.06) | 0.211 |
| South West | 2.94 (2.50-3.45) | <0.001* |
| **Type of residence** | | |
| Urban | 1 | |
| Rural | 0.90 (0.82-0.98) | 0.012* |
| **Occupation** | | |
| Unemployed | 1 | |
| Professional/Clerical | 1.27 (1.04-1.55) | 0.019* |
| Sales/Services | 1.47 (1.35-1.59) | <0.001* |
| Agriculture | 1.17 (1.04-1.31) | 0.011* |
| Manual, Household, Domestic | 1.81 (1.49-2.20) | <0.001* |
| **Level of education** | | |
| No education | 1 | |
| Primary | 1.85 (1.68-2.04) | <0.001* |
| Secondary | 2.45 (2.20-2.72) | <0.001* |
| Tertiary | 4.63 (3.72-5.76) | <0.001* |
| **Religion** | | |
| Christianity | 1 | |
| Islam | 0.68 (0.61-0.76) | <0.001* |
| Traditional Religion | 0.61 (0.35-1.06) | 0.078 |
| **Number of living children** | | |
| None | 1 | |
| 1 to 3 | 0.89 (0.67-1.20) | 0.448 |
| 4 to 6 | 0.71 (0.52-0.95) | 0.023* |
| 7+ | 0.74 (0.54-1.02) | 0.063 |
| **Wealth index** | | |
| Quintile 1 (Poorest) | 1 | |
| Quintile 2 (Poorer) | 1.33 (1.21-1.46) | <0.001* |
| Quintile 3 (Middle) | 1.92 (1.73-2.13) | <0.001* |
| Quintile 4 (Richer) | 2.38 (2.10-2.70) | <0.001* |
| Quintile 5 (Richest) | 3.70 (3.13-4.36) | <0.001* |
| **Have you heard or seen any family planning messages?** | | |
| No | 1 | |
| Yes | 1.55 (1.44-1.66) | <0.001* |
| **Financial autonomy** | | |
| No autonomy | 1 | |
| Partial autonomy | 1.09 (1.01-1.19) | 0.036* |
| Full autonomy | 1.03 (0.87-1.22) | 0.742 |

**Statistically significant at p < 0.05; OR=Odds Ratio; 95%CI = 95% Confidence Interval*

likely to use MHC than Christians. The practice of purdah (an accepted religious practice of Muslims and Hindus) may logically explain the relatively low utilization of health care services and is complicated by the patriarchal society where a visit to facilities has to be pre-endorsed and accompanied by spouses of such women[22]. This practice may restrict their access to maternal healthcare services[28]. The Northern region (mainly the North-West and North-East) is associated with a lower proportion of financially autonomous women than the South[17,28].

Our findings agree with a previous study by Chol *et al* (2019) in 31 sub-Saharan African (SSA) countries, which revealed a weak association between women's autonomy in making decisions about major household purchases and having an adequate number of ANC attendance[16]. In our study, partial financial autonomy appears to be a weak predictor of adequate antenatal clinic attendance, while there is not enough evidence that full autonomy determines maternal healthcare services utilisation in Nigeria. Our findings refute Chol *et al*. (2019) who found that financial autonomy had the strongest effect on maternal health-seeking behaviour in Southern Africa[16]. In Senegal, women who make decisions on household purchases were less likely to use skilled birth attendants than those who do not[16]. Likewise, in Mali, women who make independent decisions on how their earnings were spent were less likely to have ≥4 ANC[16]. As such, findings in Sierra Leone and Mali presented an inverse association compared to our study findings. Socio-cultural differences in the various populations across the 4 countries might be a good influence on the decision-making factors for the different populations. A call for further studies that examine the underlying socio-cultural dynamics of decision-making amongst women of childbearing age is also desired.

Women's status and decision-making power in the household have been established as important determinants of maternal health care use in Nepal[29] and Indonesia[30]. However, in studies from India, control over one's finances did not significantly predict maternal health-seeking

behaviour. Both studies from India used a different measure of financial autonomy: whether a woman had a means of income and whether she could spend her money without consulting anyone[31,32]. Similarly, a study in Ghana revealed that those who have the final say on large household purchases and those who have the final say on visits were less likely to deliver in health facilities than those without decision-making autonomy[18]. Autonomy has several synonyms in the literature as it is quite difficult to define. Its varied definition across countries and culture[16,28] presents a challenge in constructing an index for measuring it. It is quite challenging to measure a multidimensional entity as autonomy[33]. As regards financial autonomy, there is no consensus on a one-size-fits-all measurement. Certain studies use a woman's ability to earn and independently determine her spending as a measure of financial autonomy. Other studies like ours use a woman's decision-making ability in major household purchases in measuring financial autonomy or a combination of both[15,16,31,32,34].

The study finding linking the age 35-49 years as significant predictors of financial autonomy is not surprising. By virtue of maturity that comes with increased age, women in this age bracket are able to take on more informed decisions for themselves. A recent study in Ethiopia also found that women in this age bracket were significantly more likely to utilize long-lasting permanent contraceptive methods compared to other age groups[35]. The significance of this age category and its critical role in empowerment and decision-making abilities has also been explored widely in literature[36,37].

Our study findings must be interpreted based on the following limitations. Because it is a cross-sectional study, the authors cannot establish causality. Longitudinal studies are always better suited for this purpose and are recommended as future research areas. Although we could only establish a weak association between partial financial autonomy and antenatal healthcare services utilisation, the available evidence extracted from the dataset was insufficient for further analysis. Since data was also a secondary dataset, the ability to recapture field data was also restricted. Nevertheless, despite the limitations itemized above, our study utilized a large representative sample size which is a major strength. The use of a large dataset confers external validity and generalizability of study findings.

## Ethics approval and consent to participate

Ethical approval was granted by the University of Ibadan/UCH, Ibadan Research Ethics Committees (UI/EC/20/0396) and written approval were granted by the Demographic and Health Surveys (DHS) Program.

## Conclusions

Financial autonomy is important in health-seeking behaviours and health care utilization not just in women of child-bearing age but also amongst all age groups. Other factors found to be significant in this study, wealth quintile, education, job type, religion, and residence type should all be considered when governmental policies that seek to empower women are planned. More efforts should be directed at promoting wealth creation and economic empowerment of Nigerian women. The holistic establishment of sustainable maternal health interventions that target women with poor decision-making abilities and poor financial autonomy is desired in the near future and should be supported by an unwavering political will. Without political will, the achievement of the Sustainable Development Goal 3 (SDG 3) will remain an unrealistic dream. Educating the girl child will prove as a step in the right direction at strengthening the decision-making ability of women.

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## Authors' contributions

The study was conceptualised by TI, BAA, TAO and OMM. BAA, TAO and OMM conducted the

data analysis. TI and BAA wrote the first draft of the manuscript. All authors jointly reviewed and approved the manuscript for publication.

## Data availability

The dataset (NDHS 2018) is available on the Nigerian Demographic Health Survey 2018 website. https//www.dhsprogram.com/.

## Conflicts of interest

The authors declare no conflicts of interest.

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## References

1. WHO, UNICEF, UNFPA, World Bank Group, United Nations Population Division. Trends in maternal mortality: 1990 to 2015. Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. World Health Organization; 2015.
2. World Health Organization. WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience. World Health Organization; Geneva, Switzerland: 2016.
3. Eleje GU, Onwusulu DN and Ezeama CO. Perceptions of focused prenatal care among women attending two tertiary centres in Nigeria. Int J Gynaecol Obstet. 2015;131(2):174–177.
4. World health statistics 2019: Monitoring health for the SDGs, sustainable development goals. Geneva: World Health Organization; 2019. Licence: CC BY-NC-SA 3.0 IGO.
5. Ehiemere IO, Ezeugwu RN, Maduakolam IO and Ilo IJ. Maternal health-seeking behaviour and pregnancy outcome in rural communities in Enugu State, South-East Nigeria. Int J Dev Res 2017;7.
6. World Health Organization, Department of Reproductive Health and Research. WHO antenatal care randomised trial. Manual for the implementation of the new model. Geneva: World Health Organization; 2001.
7. Adedokun ST and Uthman OA. Women who have not utilised health Services for Delivery in Nigeria: Who are they and where do they live? BMC Pregnancy Childbirth 2019; 19:93. https://doi.org/10.1186/s12884-019-2242-6.
8. Ibrahim DO. Social-Economic Determinants of Maternal Mortality in Rural Communities of Oyo State, Nigeria. International Journal of Scientific and Research Publications. 2016;6(9):280–5.
9. Ekabua J, Ekabua K and Njoku C. Proposed Framework for Making Focused Antenatal Care Services Accessible: A Review of the Nigerian Setting. ISRN Obstet Gynecol 2011; 2011:1–5. https://doi.org/10.5402/2011/253964.
10. Onoh R, Umeora O, Agwu U, Ezegwui H, Ezeonu P and Onyebuchi A. Pattern and Determinants of Antenatal Booking at Abakaliki Southeast Nigeria. Ann Med Heal Sci Res. 2012; 2:169–75.
11. Fagbamigbe AF and Idemudia ES. Barriers to antenatal care use in Nigeria: Evidence from non-users and implications for maternal health programming. BMC Pregnancy Childbirth 2015; 15:95. https://doi.org/10.1186/s12884-015-0527-y.
12. British Council (2012). Gender in Nigeria Report 2012 Improving the lives of Girls and Women in Nigeria: Issues, Policies and Actions (2nd edition). Abuja: British Council Nigeria
13. Alabi O, Odimegwu CO, De-Wet N and Akinyemi JO. Does female autonomy affect contraceptive use among women in northern Nigeria? Afr J Reprod Health 2019; 23:92–100. women's/doi.org/10.29063/ajrh2019/v23i2.9.
14. Naa Dodua Dodoo D, Atiglo Y, Adriana AE. Biney, Nurudeen Alhassan, Maame B, Peterson F and Nii-Amoo Dodoo (2019). Does financial autonomy imply reproductive and sexual autonomy? Evidence from urban poor women in Accra, Ghana, African Studies, 78:4, 477-495, DOI: 10.1080/00020184.2019.1584485
15. Wado YD. Women's autonomy and reproductive health-care-seeking behaviour in Ethiopia. Women Heal 2018; 58:729–43. https://doi.org/1Women' s03630242.2017.1353573.

16. Chol C, Negin J and Agho KE and Cumming RG. Women's autonomy and utilisation of maternal healthcare services in 31 Sub-Saharan African countries: Results from the demographic and health surveys, 2010-2016. BMJ Open 2019;9. https://doi.org/1Women' BMJ open-2018-023128.
17. Solanke AA and Manukaji I. Determinants of Women's Financial Autonomy in Nigerian Households: Evidence from 2013 Nigeria Demographic and Health Survey. International Journal of Banking and Finance Research 2015; 8: 24-34.
18. Ameyaw EK, Tanle A, Kissah-Korsah K and Amo-Adjei J. Women's Health Decision-Making Autonomy and Skilled Birth Attendance in Ghana. Int J Reprod Med. 2016; 2016:6569514. DOI: 10.1155/2016/6569514. Epub 2016 Dec 26. PMID: 28116348; PMCID: PMC5220507.
19. United Nations Population Division. World Population Prospects: 2019 Revision. 2022 The World Bank Group.
20. National Population Commission - NPC, ICF. Nigeria Demographic and Health Survey 2018. Abuja, Nigeria and Rockville, Maryland, USA: 2019.
21. Feinstein L, Sabates R, Anderson TM, Sorhaindo A and Hammond C. What are the effects of education on health? In Measuring the effects of education on health and civic engagement: Proceedings of the Copenhagen symposium 2006 Mar 23 (pp. 171-354). Paris, France: OECD.
22. Obembe TA, Odebunmi KO and Olalemi AD. Determinants of family size among men in slums of Ibadan, Nigeria. Annals of Ibadan postgraduate medicine. 2018 Jul 17;16(1):12-22.
23. Elser H, Rehkopf DH, Meausoone V, Jewell NP, Eisen EA and Cullen MR. Gender, depression, and blue-collar work: A retrospective cohort study of US aluminium manufacturers. Epidemiology (Cambridge, Mass.). 2019 May;30(3):435.
24. Bishwajit G and Yaya S. Household food insecurity is independently associated with poor utilization of maternal healthcare services in Bangladesh. FACETS. 2017 Dec 4;2(2):969-83.
25. Amir-ud-Din R, Zafar S, Muzammil M, Shabbir R, Malik S and Usman M. Exploring the Relationship Between Maternal Occupation and Under-Five Mortality: Empirical Evidence from 26 Developing Countries. The European Journal of Development Research. 2021 Sep 10:1-27.
26. Employment & Labour Law 2020 | Nigeria | ICLG. Int Comp Leg Guide 2020. https://iclg.com/practice-areas/employment-and-labour-laws-and-regulations/nigeria (accessed December 7, 2021)
27. Hart JT. The Inverse Care Law. Lancet 1971; 297:405–12. https://doi.org/10.1016/S0140-6736(71)92410-X.
28. Umar AS. Women's autonomy and the use of antenatal and delivery services in Nigeria. MOJ Public Heal 2017; 6:273–7 Women's://doi.org/10.15406/mojph.2017.06.00161.
29. Furuta M and Salway S. Women's position within the household as a determinant of maternal health care use in Nepal. Int Fam Plan Perspect 2006; 32:17–27. https://doi.org/10.1363/3201706.
30. Beegle K, Frankenberg E and Thomas D. Bargaining power within couples and use of prenatal and delivery care in Indonesia. Stud Fam Plann 2001; 32:130–46. https:"doi.org/10.1111/j.1728-4465.2001.00130. x.
31. Mistry R, Galal O and Lu M. "Women's autonomy and pregnancy care in rural India: A contextual analysis." Soc Sci Med 2009; 69:926–33. https://doi.org/10.1016/j.socscimed.2009.07.008.
32. Bloom SS, Wypij D and Das Gupta M. Dimensions of Women's Autonomy and the Influence on Maternal Health Care Utilization in a North Indian City. Demography 2001; 38:67–78. https://doi.org/10.1353/dem.2001.0001.
33. Jennings L, Na M, Cherewick M, Hindin M, Mullany B and Ahmed S. Women's empowerment and male involvement in antenatal care: Analyses of Demographic and Health Surveys (DHS) in selected African countries. BMC Pregnancy Childbirth 2014;14. https://doi.org/10.1186/1471-2393-14-297.
34. Viswan SP, Ravindran TKS, Kandala NB, Petzold MG and Fonn S. Sexual autonomy and contraceptive use among women in Nigeria: Findings from the demographic and health survey data. Int J Women's Health 2017; 9:581–90. https://doi.org/10.2147/IJWH.S133760.
35. Bulto G and Demmissie D. Practice and intention to use long acting and permanent contraceptive methods among married women of reproductive age in North West Ethiopia. Gynecol Obstet. 2018;8(459):2161-0932.
36. Fayehun O and Asa S. Abnormal birth weight in urban Nigeria: An examination of related factors. PloS one. 2020 Nov 24;15(11):e0242796.
37. Ibrahim A and Pandey KK. Women's empowerment and child health outcomes: A comparative study between India and Nigeria. Journal of Medical Science and Clinical Research. 2014;2(12):3277-92.