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Influences of women empowerment indices on demand for childcare services: Evidence from the Nigeria Demographic and Health Surveys

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Abstract

This study examined the effect of various dimensions of women's empowerment on childcare use in Nigeria, utilizing information from five rounds of the National Demographic and Health Surveys. The analysis made use of both binary and multinomial logistic regression. The findings show that women who share household choices with their spouses were more likely to undertake postnatal care for their babies in either private or public hospitals compared to self-medication/others/traditional. Also, women who owned houses and those who participate in economic activities are significantly more inclined to use postnatal services for babies in health facilities. By implication, women empowerment is a significant factor to consider in improving childcare services in Nigeria. This suggests that in order to improve the health of children, women's inputs in household decision-making should be accommodated, while efforts should be made to enhance household socioeconomic position, and support mothers to have formal education. The findings also suggest that promoting women's empowerment can play a crucial role in increasing the demand for formal childcare services. *(Afr J Reprod Health 2023; 27 [10]: 65-80).*

Keywords: Childcare services, healthcare management, health policy, women empowerment

Résumé

Cette étude a examiné l'effet de diverses dimensions de l'autonomisation des femmes sur le recours aux services de garde d'enfants au Nigéria, en utilisant les informations provenant de cinq séries d'enquêtes nationales sur la démographie et la santé. L'analyse a fait appel à la régression logistique binaire et multinomiale. Les résultats montrent que les femmes qui partagent les choix de ménage avec leur conjoint étaient plus susceptibles d'entreprendre des soins postnatals pour leur bébé dans des hôpitaux privés ou publics que par l'automédication/autres/traditionnels. En outre, les femmes qui possèdent une maison et celles qui participent à des activités économiques sont beaucoup plus enclines à recourir aux services postnatals pour les bébés dans les établissements de santé. Par conséquent, l'autonomisation des femmes est un facteur important à prendre en compte dans l'amélioration des services de garde d'enfants au Nigeria. Cela suggère que pour améliorer la santé des enfants, la contribution des femmes à la prise de décision au sein du ménage doit être prise en compte, tandis que des efforts doivent être déployés pour améliorer la position socio-économique du ménage et aider les mères à suivre une éducation formelle. Les résultats suggèrent également que la promotion de l'autonomisation des femmes peut jouer un rôle crucial dans l'augmentation de la demande de services formels de garde d'enfants. *(Afr J Reprod Health 2023; 27 [10]: 65-80).*

Mots-clés: Services de garde d'enfants, gestion des soins de santé, politique de santé, autonomisation des femmes

Introduction

Global demographic landscape is widely dominated with population aging patterns[1,2]. According to the United Nations (UN), there are only 17-19 demographic outlier countries, almost all are situated in sub-Saharan Africa (SSA) and Afghanistan[3]. Nigeria, the most populous country

in Africa is one of the most notable examples of a country with a young population with high rate of fertility[4].

In Nigeria, 241,000 new-born deaths occur each year[5]. Available evidence indicates that Nigeria's infant mortality rate is 67 per 1,000 live births, while under-five mortality rate is 132 per 1,000 live births. This suggests that in Nigeria, nearly one out of every eight children die before the age of five years[6]. When compared to the Sustainable Development Goals (SDGs) recommendation of 30 per 1000 infant deaths and 25 per 1,000 under five deaths by 2030, live births, the infant and under-five mortality rates in Nigeria are significantly higher than global average[2]. This high prevalence of child mortality in Nigeria is due to the limited use of childcare services[7]. Only 38% of new-borns who gave birth within the five years before the National Demographic and Health Survey (NDHS)[8] had a postnatal (PNC) check-up within the first two days. Only 31% of infants aged 12 to 23 months have received all recommended vaccinations. While 67% of people received a BCG vaccination, 54% received a measles vaccination, 65% received the initial dosage of DPT-Hep B-Hib, 74% received their first injection of polio immunization, and 19% received no vaccination at all[5].

To address the challenge of high rates of infant and under-five mortality, the Nigerian government has implemented several laws that seek to promote women's empowerment. This is based on the understanding that women's empowerment can lead to improved maternal health, better nutrition, increased education, access to healthcare, and improved hygiene and sanitation practices, all of which can contribute to reducing under-five and infant mortality rates. These laws include - the 1999 Constitution, the National Gender Policy of 2007, the National Gender Policy Strategic Framework (implementation plan) for 2008–2013, the Second National Action Plan on Implementing UN Security Council Resolution (UNSCR) 1325 and Related Resolutions on Women, Peace and Security (2017), and the Violence Against Persons (Prohibition) Act of 2015 are examples of such policies[4]. The administration has also put in place policies that can give women more authority in both social and economic spheres. Improved Life Programme (BLP), Family Support Programme (FSP), Women and Youth Empowerment Foundation (WYEF), National Women Coalition Against HIV/AIDS (NWCH), Integrated Maternal, New-born and Child Health (IMNCH), Women's Rights Advancement and Protection Alternatives (WRAPA), Women Consortium of Nigeria (WOCON), and Women Aids Collection (WACOL) are a few of them[4].

Despite these legislations and policies, available data indicate that the gender gap is still significant, and that Nigerian women lack substantial social empowerment[8]. The sustainable development goal 5 aspires to empower all women and girls and achieve gender equality. Only 19.7% of the women questioned by the NDHS[9] decided together with their spouses how they would utilise their revenue from work, even though 74% of the women questioned had the liberty to partake in economic activity outside the home. In addition, 84% of the women relied on their husbands for financial support. In a 2018 study of Nigerian women, 55.5% said their husbands made all the choices about their healthcare, while 6.3% said they were the only ones in charge of major family purchases. Large household purchases were decided upon by about 34.1% of women and their husbands, whereas for 59.2% of women, only their husbands were involved. Merely 14.6% of women may visit friends and family freely. 35% of the women surveyed had no formal education, compared to 11% who had at least a secondary education[4].

Women's access to contemporary healthcare services is hampered, according to available evidence[8-13]. The majority of societies in developing nations remain patriarchal, with men in charge and women undervalued[9]. This restricts women's capacity to use contemporary care services[14-15]. This suggests that even in potentially fatal circumstances like those brought on by obstetric problems, men's opinions should take primacy over those of their spouses. In reality, women rely either on coordinated choices undertaken by their spouses or on independent choices made by their spouses.

Numerous reports of men oppressing women have been found in research[6,8–10]. Numerous researches conducted in Nigeria has looked at how

women's empowerment affects the utilisation of maternity and child care[7-8,11–16]. Previous research, including antenatal care (ANC) and delivery care, was more focused on maternal care services. The impact of women's empowerment on the need for PNC services for child care was not examined in any prior research. Additionally, the impact of women's empowerment on different childcare options was never studied. By utilising information from the National Demographic and Health Surveys, our study addressed these gaps. This study used the five rounds of the Demographic and Health Survey (1999, 2003, 2008, 2013 & 2018) to better understand and assess the dynamics of health care services for postnatal child care among women.

Review of literature

According to Hoque and Hossain[17], women empowerment revolves around the idea of freedom of choice; hence they conceptualized disempowerment as the denial of the ability to make choice. Ganle *et al*.[18] results submitted that choices with respect to access to and use of skilled maternal healthcare services significantly impacted by the standards and views of husbands, mothers-in-law, traditional birth attendants and other family and community affiliates, more than those of individual childbearing women. In another study, Yesudian[19] utilized nationally representative information from Indian's National Family Health Survey for the years 1998-1999 to investigate the effect of women's decision-making autonomy and attitude on maternal health care utilization. The findings revealed that empowering elements including education, media exposure, and level of lifestyle positively and significantly influenced maternal health care utilization.

Novignon *et al.*[20] examined the variables that affect care givers decisions towards the origin of malaria and pneumonia therapy. The analysis employed secondary data from a household socioeconomic survey conducted in 2006 and a health and demographic surveillance covering 529 care givers of children less than five in the Dengue West District of Ghana. The result showed that travel and long waiting treatment time influence the use of self-medication for child treatment. Novignon *et al*.[21] study finds that health care spending significantly impacts health outcome via life expectancy at birth, plummeting death and infant mortality rates.

Kim-Houng *et al.*[22] drew upon data from Nepal NDHS (2011) to investigate the nexus between several aspects of women's empowerment and facility-based delivery. The study reported there is a significant and favourable correlation between institutional delivery and the various dimensions of women empowerment. According to the study, women empowerment had a stronger influence than wealth. Sado *et al*.[23] in their study in Albania reported a positive association between decision-making power, positive attitude towards domestic violence and maternal care utilization, proxy by antenatal care (ANC) and PNC. Hoque and Hossain[17] explored the function of women empowerment in the utilization of ANC in Bangladesh. Factor analysis approach was employed to establish three aspect of women empowerment. The probit and zero-inflated binomial logistic regression were estimated using 2011 Bangladesh Demographic and Health Survey. The result showed that the various dimensions of women empowerment have significant positive impact on ANC utilization in Bangladesh.

Arthur[24] explored the effects of household socioeconomic characteristics on their choices of therapy for childhood fever among children under the age of five in Ghana. The research utilized secondary data from 2008 Ghana Demographic and Health Survey. The results showed that the choice place of treatment for fever is significantly influenced by household affluence, health insurance status, and place of residence. In multi-country research, Chol *et al*.[25] found that women in Mali, Chad, and Senegal who had greater levels of maternal autonomy were significantly less likely to have at least four ANC visits and give birth to their children in health facilities because of pre-existing cultural standards and practises that hinder them from using contemporary healthcare services in spite of higher level of maternal autonomy. Arthur[26] examined how household socioeconomic status affected the demand for childcare services in Ghana, Kenya and Zambia, utilising information from 2014 Demographic and Health Surveys.

Singh *et al.*[27] investigated the impact of several gender indicators on facility delivery. The

ability to make decisions for the family, attitudes about wife assault, and attitudes towards a wife's unwillingness to engage in sexual relations with the husband were all investigated as potential indicators of gender equality. Fawole et al.[28] found that education, residence and wealth index all significantly influenced receipt of maternal health care. Yaya *et al.*[29] in a qualitative study in 20 rural communities in Edo State revealed that gender disparity was a barrier to women's utilization of skilled pregnancy care. Ntoimo *et al.*[30] explored the association between women's empowerment indicators and the use of ANC, competent, and PNC services in two rural LGAs in Nigeria's Edo State. The research sampled covered *1,245*women in their reproductive years who had children in the five years before the survey. The result revealed that decision-making autonomy significantly improves the odds for using all the three maternal health measures.

The summary of the existing literature suggests that majority of research reviewed concentrated on the effect of various dimensions of women empowerment on various aspects of maternal care use which includes ANC, skilled delivery and PNC for mothers[5,11-14,17,20,22]. Only a handful of these studies focused on demand for childcare services. However, those studies which focused on demand for childcare services, where oriented on the demand for childcare for malaria, pneumonia and fever[21,24,27]. Though, Ahuru[7] evaluated the impact of women empowerment on complete child immunization, PNC utilization was never examined by previous studies. It is believed that women empowerment should have spill-over effects on the child's health. Therefore, we undertook a comparative study that employed NDHS data for various years (1999, 2003, 2008, 2013 and 2018) in order to yield deeper insights into the direction.

Methods

Theoretical framework

The Grossman[31] health capital model and the demand for health are the foundations of this study. This is hinged on the rationale that the Grossman theory suggests that individuals make decisions about their health based on their level of education and knowledge[31]. In the context of childcare services, this theory can be applied to women's empowerment indices, such as education and access to healthcare. Women who are more empowered and have higher levels of education are more likely to have knowledge about the importance of childcare services for their children's health and development[7]. As a result, they may be more likely to demand and utilize childcare services for their children. Conversely, women who are less empowered and have lower levels of education may not have the same knowledge or resources to access childcare services, which can negatively impact their children's health and development[9]. Therefore, improving women's empowerment indices, such as education and access to healthcare, can lead to increased demand for childcare services and ultimately contribute to reducing under-five and infant mortality rates

In building our model, we followed the study by Ahuru[7], demonstrating the influence of women empowerment indices as a predictor of demand for childcare services. According to Arthur[7], the model specified that a child's health is influenced by the mother's utility-maximizing behaviour. The model presupposes that the mother gains benefits from the child's health, and as a result, she is compelled to use both market and non-market inputs to improve the child's health. Given that the child is small and depends on the mother's decision to use healthcare, the mother is used as the point of reference. Equation (1) represents the mother's utility function.

$$U = U(X, Y, H) \quad (1)$$

In equation (1), X is a vector of health-neutral goods which yield utility to mothers; Y health -related goods and H is the stock of the child health which gives utility to the mother.

$$H = h(S, U) \quad (2)$$

The health stock of the child is a function of the mother's empowerment and autonomy in decision-making (S), and specific random characteristics that influence the health of the child (U). The utility of the mother is maximized subjected to household income constraint.

$$XP_X + YP_Y + cP_c = M \quad (3)$$

In equation (3), P_X is the price of health-neutral goods; P_Y is the price of health- related goods and pc is the price of health stock of the child, and M is the sum of labour and non-labour income of households. The right-hand side of the equation represents total income while the left- hand side stands for total expenditure. The demand function for the health of the child is derivable by substituting equation 2 into 1, then setting up the Langrage function for optimization. Hence, the maximization problem is set up as:

Max $U = u\,(H, Y, X) \quad s.t \quad H = h\,(\mathrm{S}, \mathrm{U})$ and
$M = XP_X + YP_Y + cP_c$ (4)

The health maximization problem can be solved by introducing a Langrage function as shown below.

$$L_{X,YH,\lambda} = U\{Y, X, h(\mathrm{S}, + \lambda(M - cP_c - YP_Y - ZP_X) \quad (5)$$

The first order necessary condition for utility maximization requires that we obtain the partial derivatives of equation (5) with respect to X, Y, Z, λ, then setting it equal to zero.

$$L_x = U_M\{Y, X, h(\mathrm{S}, \mathrm{U}\} * hx(\mathrm{S}, \mathrm{U}) - \lambda P_x = 0 \quad (6)$$

$$L_Y = U_Y\{Y, X, h(\mathrm{S}, \mathrm{U}\} * hy(\mathrm{S}, \mathrm{U}) - \lambda P_Y = 0 \quad (7)$$

$$L_{\mathrm{H}} = U_Z\{Y, X, h(\mathrm{S}, \mathrm{U}\} * hX(\mathrm{S}, \mathrm{U}) - \lambda P_Z = 0 \quad (8)$$

$$L_\lambda = \mathrm{M} - cP_c - YP_Y - XP_X = 0 \quad (9)$$

Solving equations (6) through equation (9), the optimal solutions yield the health inputs demand functions for X, Y and H as follows:

$$Y^* = D_y(P_c, P_Y, P_Z, \mathrm{S}, \mathrm{U}) \quad (10)$$

$$H^* = D_h(P_c, P_Y, P_Z, \mathrm{S}, \mathrm{U}) \quad (11)$$

$$\boldsymbol{X}^* = D_{\mathrm{x}}\,(P_c, P_Y, P_Z, \mathrm{S}, \mathrm{U}) \quad (12)$$

Equation (11) shows that demand for child health is a function of prices of health- neutral goods, health-related goods, stock of child health and mother's empowerment and autonomy in decision-making. Unfortunately, the DHS, data set does not provide information on prices, particularly that of medical goods. As a result, we expunged prices from the analysis. For the purpose of estimation, we specified equation (13).

$$\mathrm{H} = \beta\, q + \beta d + \beta c + \beta e \quad (13)$$

In equation (13), q represents the decision-making dimensions of women empowerment; d represents economic dimensions and c represents the influencer variable dimensions and e represents sociodemographic factors of the mother.

Data sources

The data examined in this study was obtained from 1999, 2003, 2008, 2013 and 2018 Nigeria DHS, which are the five editions of the DHS data for Nigeria since inception. The National Demographic and Health Survey (NDHS) offers current data on Nigerian health statistics. The National Malaria Elimination Programme of the Federal Ministry of Health worked with the National Population Commission to carry out the survey. ICF offered technical assistance via the DHS initiative. The survey's respondents were chosen using a two-stage sampling technique.

Enumeration Areas (EAs) clusters were chosen in stage one from the master sampling frame created from the 2006 Nigeria Population and Housing Census. A comprehensive list of all the households in each of the EAs was provided in stage two. The household questionnaire, the women's questionnaire, and the men's questionnaire were the three surveys utilised for the DHS. The women's questionnaire provided the data used for this study's analysis. The women's questionnaire includes in-depth information on a variety of topics, including breastfeeding habits, family planning awareness and use, fertility choices, marriage, sexual activity, and nutritional health of women and young children.

Outcome indicators

Two outcome (dependent) variables are use and they were use of childcare services, measured as PNC check-up for a child within two days of birth and place of PNC services. Use of PNC services is binary. Women who utilized PNC services for child within two days of delivery were coded 1, while

others coded 0. Place of PNC services were categorized based on where mothers went for check-up for the child. In the survey, mothers were asked where they took their child for check-up. The following response options were provided: (i) government hospital (ii) government health centres (iii) government clinics (iv) private hospital (v) Primary Health Centres (vi) private clinics (vii) respondent home (viii) other home (i) others. We lumped government health facilities together as government hospital/centres/clinics; private health facilities as private hospital/centres/clinics; and finally, health institutions were lumped together as self-medication/traditional/others. We coded self-medication/traditional/others as 0, private hospital/centres/clinics as 1 and government hospital/centres/clinics coded 2.

Women empowerment Indicators

The Harvard Institute for International Development's theory on gender roles[18] is used as our model for choosing the factors related to women's empowerment. The model divided the three variables related to women's empowerment into economic, influencer, and decision-making.[8] The respondent's engagement in four household decisions is one of the decision-making factors. These decisions relate to the respondent's freedom to visit friends and family, major household purchases, healthcare, and daily food choices. There were five possible responses for each of the five variables: Respondent alone (i), husband or partner alone (ii), respondent and husbands or partners (iii), and others (iv). Three economic empowerment factors were considered. These included employment status (employed/unemployed), home ownership status (yes/no), and land ownership status (yes/no). The factors that are thought to be representative of gender rules, attitudes, and cultural values are known as influencers. Region (Southern/Northern) was considered. Previous research both for Nigeria and worldwide utilised these variables[3,8,9,11,12].

Other sociodemographic factors

Three sociodemographic factors - maternal education, household wealth quintile, and location- were employed in this study as controlled variables, drawing on Gershon *et al*[32]. Health utilisation model. The highest level of education attained by women is regarded to be maternal education. Non-formal education, primary education, secondary education, and post-secondary education were all taken into consideration as possible responses. Post-secondary education was classed as 4, non-formal education as 1, primary education as 2, and non-formal education as 3. The residence area is divided between rural and urban areas. Women in Nigeria's urban areas were given the code 2, while those in the country were given the code 1. A composite measure of household wealth created utilizing principal component analysis is called the household wealth quintile. Five household wealth quintiles were created, and they are as follows:

Statistical analysis

The first stage in data analysis was the extraction of information on currently married women that delivered in the last three years prior to the survey, and did not have missing responses on any of the women empowerment indicators, and other covariates considered. The sample size ranged from 6700 women in 1999 to 18, 789 women in 2018**.** All statistical analyses were undertaken using the 14th version of Stata. Simple proportion and frequency were used to describe the characteristics of the women. Binary logistic regression was used to examine the effect of various dimensions of women empowerment and selected sociodemographic factors on the decision to utilize PNC. Furthermore, multinomial logistic regression was used to examine the determinants of place of PNC services. These methods were used by earlier studies that examined the determinants of various childcare services[21,24,27].

Ethical clearance

The research used secondary data that was available or in the public sector with all participant identifiers eliminated. DHS gave the writers verbal authorization to view the data. The DHS programme complies with the need for maintaining respondents' privacy and information confidentiality. The ICF International makes ensuring that information is gathered in ways that

adhere to and protect human rights. Data gathering followed ethical principles of confidentiality, concealment, and clear authorization. Although the administration of authorization forms was excused from the writers, permission for accessing and employing the data was sought.

Results

In Table 1, the sociodemographic factors of the women are demonstrated. The data showed that during most of the time, women were disproportionately represented in the poorest wealth quintile for most of the period. The majority of women in 1999, 2003, 2008 and 2018 had primary education, while in 2013; majority of the women had completed their secondary education. Using the variables related to decision-making, we discover that the bulk of choices in the households were made by the woman and her spouse, with only an insignificant proportion made by others besides the couples. We also noted that the major part of the households located in rural regions of the nation with over 60 per cent in the five-year period.

A large number of women do not possess a home either single or together with their spouses. Majority of the women worked away from their homes for financial pursuits. Southern Nigerian women constituted the majority for the five-year period. From the sample, we discover that whereas 36.6% of the juveniles obtained PNC in 1999, 39.2% and 47.0% collected PNC in 2003 and 2008, subsequently. In 2013 and 2018, the proportion of children that received PNC was respectively 46.0 percent and 42.0 percent. In 1999, of all the children who were given PNC, 68.5% had treatment from a public health facility, and 26.5% underwent care from a private facility. The situation was the same in 2003, as we discovered that 30.8% of patients were treated at public health facilities while 67.9% were treated at private facilities. Similar to this, in 2008, public health facilities provided care to 75,7% of patients, while private facilities provided care to 23,8% of patients. In 2013, the proportions that receive PNC from public and private hospitals were respectively 45% and 36.8%. In 2018, the proportion that received PNC from Public and Private Hospitals were respectively 56% and 32%.

In Table 2, we present the logistic regression results for PNC use for a child in Nigeria for various years (NDHS 1999, NDHS 2003, NDHS 2008, NDHS 2013 and NDHS 2018). The findings demonstrate that various dimension of women empowerment is linked with PNC for a child. Women who jointly make decision with their husbands on trips to friends and family were substantially more inclined to utilize PNC for child in 1999, 2003, 2008, 2013 and 2018. Also, women who jointly make decision with their spouse on major household purchases were substantially more inclined to use PNC for child in 1999, 2003, 2008, 2013 and 2018. In reference to mothers who single-handedly makes their own healthcare decisions, those who makes it with their husbands were much more probable to utilize PNC for child in 1999, 2003, 2008, 2013 and 2018. In reference to mothers who singled-handily makes decision on the choice of food to cook, those who share the decisions with their husbands were notably more inclined to utilize PNC for their child in the five-year period.

In reference to mothers who did not own houses, mothers who owned a house were significantly more likely to take a child for PNC check-up for the five- year period. In reference to mothers who were not working, those who were labouring were substantially more prone to undertake PNC check-up for a child in 1999, 2008, 2013 and 2018. Health insurance coverage significantly improves the chances to undertake PNC check up for a child in 2008, 2013 and 2018. Mothers drawn from affluent and wealthiest wealth quintile were noticeably more probable to get a PNC check-up for a child for all the periods. In reference to mothers who were drawn from rural areas of the country, those in urban areas were more likely to take a child for PNC check-up in 1999, 2008, 2013 and 2018. In reference to Northern Nigerian women, Southern Nigerian women were significantly more likely to undertake PNC check up for a child in 1999, 2003, 2008 and 2018.

Table 3 reports the results on choice of place of PNC for a child, with the reference category being self-medication/traditional/others. For the four decision variables (privilege to spend time with friends and family, decision on large household purchase, choice on respondent's

Table 1: Summary statistics of respondents

Variables	1999 NDHS	2003 NDHS	2008 NDHS	2013 NDHS	2018 NDHS
Freedom to visit friends & relative:					
Respondent alone	12.8	18.9	18.9	17.8	19.8
Husband/partner alone	39.8	35.8	34.8	34.9	35.9
Respondent & husband/partner	39.8	38.8	44.9	37.8	38.8
Others	7.6	6.5	1.4	9.5	5.5
Decision on large household purchase:					
Respondent alone	14.8	19.9	19.9	18.8	18.8
Husband/partner alone	46.8	34.8	37.8	38.9	39.9
Respondent & husband/partner	37.8	39.8	40.9	38.8	37.8
Others	0.6	5.5	1.4	3.5	3.5
Decision on respondent healthcare:					
Respondent alone	10.8	12.9	16.9	16.8	21.8
Husband/partner alone	40.8	38.8	32.8	35.9	38.9
Respondent & husband/partner	39.8	40.8	44.9	40.8	37.8
Others	8.6	7.5	5.4	6.5	1.5
Decision on food to be cooked daily:					
Respondent alone	11.8	17.9	16.9	16.8	16.8
Husband/partner alone	43.8	35.8	37.8	37.9	38.9
Respondent & husband/partner	40.8	40.8	43.9	43.8	40.8
Others	3.6	5.5	1.4	1.5	3.5
Owns a house:					
No	78.2	80.2	82.2	81.1	82.4
Yes	21.8	19.8	17.8	18.9	17.6
Employment status:					
Not working	13.2	10.2	4.4	5.2	7.2
Working	86.8	89.8	95.6	94.8	92.8
Health insurance[a]:					
Coverage	-	-	1.4	1.2	0.1
Non-coverage	-	-	98.6	98.8	99.9
Maternal education:					
No education	17.8	18.9	20.8	19.8	17.2
primary school	37.8	43.7	44.8	38.9	48.9
Secondary	32.8	28.9	27.8	40.2	30.8
Post-secondary	11.6	8.5	6.6	1.1	3.1
Household wealth quintile:					
Poorest	40.8	38.9	39.8	40.2	37.8
Poorer	22.7	22.8	25.8	24.8	26.7
Average	18.8	19.8	17.8	17.9	16.8
Wealthier	10.7	11.2	14.8	17.9	17.9
Wealthiest	7.0	7.3	1.8	1.2	0.8
Place of residence:					
Rural	60.8	65.8	68.9	70.2	67.9
Urban	39.2	34.2	31.1	29.8	32.1
Region:					
Southern Region	65.7	70.0	68.9	65.0	73.8
Northern Region	34.3	30.0	31.1	35.0	26.2
PNC Use:					
Yes	36.6	39.2	47.0	46.0	42.0
No	63.4	60.8	53.0	54.0	58.0
Place of PNC Use:					

Home/TBAs/self-medication	5.0	1.3	0.5	18.2	12
Private Hospitals	68.5	30.8	75.7	45.0	56.0
Public Hospitals	26.5	67.9	23.8	36.8	32.0

a: health insurance omitted from the table for this year, because it was not provided by NDHS for those years.

Table 2: Binary logistic regression predicting the use of childcare services in Nigeria

Variables	1999 NDHS	2003 NDHS	2008 NDHS	2013 NDHS	2018 NDHS
Freedom to visit friends & relative:					
Respondent alone (ref)	1.0	1.0	1.0	1.0	1.0
Husband alone	1.12(0.06)	0.78(0.22)	1.21(0.25)	2.56(0.06)	0.25(0.62)
Husband/Partner & Respondent	1.78(0.02)**	2.56(0.03)**	1.89(0.03)**	1.78(0.01)**	1.98(0.04)**
Others	1.22(0.98)	0.98(0.99)	1.89(0.78)	1.23(0.67)	1.78(0.67)
Decision on large household purchase:					
Respondent alone (ref)	1.0	1.0	1.0	1.0	1.0
Husband alone	1.11(0.06)	0.78(0.43)	0.67(0.32)	9.87(0.56)	1.21(0.98)
Husband/Partner & Respondent	1.89(0.04)**	1.89(0.02)**	1.87(0.01)**	8.78(0.01)**	1.49(0.01)**
Others	0.56(0.67)	1.67(0.98)	1.56(0.67)	2.89(0.78)	1.34(0.78)
Decision on respondent healthcare:					
Respondent alone (ref)	1.0	1.0	1.0	1.0	1.0
Husband alone	1.98(0.06)	1.87(0.07)	1.65(0.89)	0.58(0.78)	0.37(0.53)
Husband/Partner & Respondent	1.89(0.78)*	1.23(0.04)**	1.98(0.03)**	1.89(0.03)**	1.45(0.01)**
Others	0.89(0.89)	1.56(0.67)	0.89(0.78)	0.67(0.78)	2.67(0.78)
Decision on food to be cooked daily:					
Respondent alone (ref)	1.0	1.0	1.0	1.0	1.0
Husband alone	1.45(0.07)	1.89(0.05)	0.34(0.42)	0.98(0.52)	0.67(0.72)
Husband/Partner & Respondent	1.98(0.04)**	1.67(0.03)**	1.98(0.04)**	3.56(0.04)**	3.67(0.01)**
Others	1.24(0.78)	3.78(0.78)	6.78(0.65)	1.78(0.78)	1.56(0.78)
Owns a house:					
No (ref)	1.0	1.0	1.0	1.0	1.0
Yes	2.56(0.01)*	3.67(0.02)**	1.98(0.03)**	1.87(0.02)**	1.89(0.67)
Employment status:					
Not working (ref)	1.0	1.0	1.0	1.0	1.0
Working	1.23(0.01)**	1.34(0.06)	1.89(0.03)**	1.89(0.02)**	2.11(<0.001)*
Health insurance [a]:					
Not Coverage (ref)	_	-	1.0	1.0	1.0
Coverage			8.98(0.03)**	7.65(0.01)**	2.67(0.04)**
Maternal education:					
No education (ref)	1.0	1.0	1.0	1.0	1.0
primary school	1.23(0.01)*	1.11(0.02)**	2.43(0.02)**	2.78	2.11(0.78)
≥ secondary	1.56(0.03)**	1.98(0.04)**	3.67(0.01)**	(0.02)** 3.67 (0.98)	3.89(<0.001)*
Household wealth quantile:					
Poorest (ref)	1.0	1.0	1.0	1.0	1.0
Poorer	1.21(0.90)	1.34(0.67)	1.87 (0.98)	1.23(0.03)	2.67 (0.21)
Average	1.78(0.87)	1.89(0.23)	1.67(0.78)	3.78(0.33)	3.78(0.33)
Wealthier	8.67(0.03)**	1.98(0.04)**	4.78(0.02)**	4.78(0.01)**	9.89(0.02)**
Wealthiest	9.89(0.01)**	12.78(0.03)**	5.78(0.02)**	5.90(0.02)**	7.89(0.04)**

Place of Residence:					
Rural (ref)	1.0	1.0	1.0	1.0	1.0
Urban	1.98(0.01)**	1.78(0.02)**	0.98(0.89)	2.56(0.03)**	1.56(0.02)**
Region:					
Northern Region (ref)	1.0	1.0	1.0	1.0	1.0
Southern Region	1.98 (0.02)**	1.78(0.04)**	0.78(<0.01)**	4.78(0.78)	5.89(0.01)**

*, **, are odds ratios that are statistically significant respectively at 1%, and 5%
a: health insurance omitted from the table for this year, because it was provided not by NDHS for those years.

healthcare and choice on preference of food to cook) and for the five-year periods, joint decisions made by husband and wife has significant positive coefficient, which suggests that in households where both parents make choices children are more probable to collect PNC in either public or private hospitals.

To own a house by a woman has significant positive coefficient which implies that where a mother owns a house, the child is more likely to receive PNC from hospitals. Women employment has significant positive coefficient, which suggests that mothers who participate in economic activities are more apt to undertake PNC for a child in health facilities rather than self-medication/traditional/others. Health insurance coverage has significant positive coefficient, which suggests that mothers that have health insurance coverage are more liable to take their babies for PNC check-up in medical facilities.

Mothers who reported either primary or at least secondary education were more liable to undertake PNC check-up for their babies in health facilities. Urban women have significant positive coefficient for the various years except 2008. This suggests that for those other years, urban women are more inclined to undertake PNC check up for a child in medical establishments. Finally, Southern Nigerian women have significant positive coefficients for the years 1999, 2003, 2008 and 2018, which suggests that women who lived in Southern parts of Nigeria are more apt to undertake PNC check-up for babies in health facilities.

Discussion

The result in Table 2 shows that the possibility to undertake PNC for a child is more substantial when both parents jointly make various household decisions. Also, the result in Table 3 shows that where the woman makes input in the four household choices, the child is more liable to undertake PNC check-up in health facility rather than self-medication/traditional/others. The result suggests that one of the means of addressing deficits in the demand for PNC check-up for babies in Nigeria is to encourage joint decision-making by both parents. The fact that both parents contribute in making household decisions show that the woman's input is accommodated, and that the couple is in harmony.

The result further suggests that collaboration of both parents in making household decisions will generate excellent choices on the need for PNC check-up for children. This may be as a result of the cost and time implication involved in such decision, hence the need for both parents to give their supports[27]. Therefore, in order to boost the health of the child in Nigeria, the cooperation of both mother and father is required. Indeed, the participation of any parents in the decision shows their approval and permission; hence they can provide financial supports and other forms of support to ensure the baby is taken out for PNC check-up in the appropriate place. This finding is in harmony with the report from several other studies. Arthur[27] reported that joint decision of couples significantly improves the odds to undertake treatment for a child in hospitals.

In a study, Gershon *et al*[32] reported that women who share in household choices are more liable to undertake complete child immunization. Evidence has showed that 84% of Nigerian women were dependent on their husbands for sustenance; hence they require the support of their husbands to utilize modern care services for babies. Hence, intervention programmes that educate men on the benefits of accommodating women's input in household decisions should be implemented in Nigeria. Community health workers can be engaged to go from home-to-home educating men on the benefits of shared decision-making with their

Table 3: multinomial logistic regression showing predictors of place of childcare use in Nigeria (base line category Self-medication/traditional/others)

Variables	1999 NDHS		2003 NDHS		2008 NDHS		2013 NDHS		2018 NDHS	
	1	2	1	2	1	2	1	2	1	2
Freedom to visit friends & relative:										
Husband alone (Respondent alone = 1)	-0.87	-1.78	-2.90	0.89	0.78	3.78	9.80	0.67	-0.89	-8.89
	(0.03)**	(0.04)**	(0.98)	(0.78)	(0.05)	(0.89)	(0.06)	(0.78)	(0.01)**	(0.89)
		2.89								
	1.67		1.76	1.78	1.78	0.45	1.87	1.78	2.89	0.67
Husband/Partner & Respondent	(0.04)**	(0.03)**	(0.02)**	(0.02)**	(0.03)**	(0.04)**	(0.02)**	(0.04)**	(0.01)**	(0.67)
Others	1.98	1.87	8.76	7.67	-0.98	-0.56	-1.89	-0.87	2.89	-1.89
	(0.28)	(0.98)	(0.01)**	(0.02)**	(0.67)	(0.98)	(0.01)	(0.01)**	(0.89)	(0.67)
Decision on large household purchase:										
Husband alone (Respondent alone = 1)	0.98	-1.78	-0.87	2.89	3.67	4.89	-0.78	0.89	-0.78	-9.89
	(0.78)	(0.03)**	(0.03) **	(0.07)	(0.89)	(0.89)	(0.02)**	(0.78)	(0.78)	(0.78)
Husband/Partner & Respondent	1.89	1.89	1.78	2.78	4.67	0.65	0.56	0.67	0.67	0.67
	(0.04)**	(0.04)**	(0.03)**	(0.03)**	(0.03)**	(0.01)**	(0.01)**	(0.02)**	(0.01)**	(0.04)**
Others	1.89	1.89	1.78	1.65	1.89	3.78	-4.67	-0.89	1.67	-1.56
	(0.33)	(0.98)	(0.04)**	(0.98)	(0.02)**	(0.78)	(0.01)	(0.01)**	(0.89)	(0.78)
Decision on respondent healthcare:										
Husband alone (Respondent alone = 1)	-1.89	- 2.89	1.23	3.78	0.78	8.67	2.89	-5.78	0.89	-0.67
	(0.89)	(0.89)	(0.65)	(0.65)	(0.78)	(0.56)	(0.78)	(0.78)	(0.78)	(0.01)**
Husband/Partner & Respondent	1.89	0.87	8.67	1.89	2.78	1.89	1.89	1.78	0.67	0.98
	(0.03)**	(0.98)	(0.02)**	(0.04)**	(0.03)**	(0.03)**	(0.02)**	(0.01)**	(0.01)**	(0.02)**
Others	-1.09	-0.78	-8.78	1.67	-1.78	-5.78	-0.67	0.89	-0.89	-0.78
	(0.98)	(0.78)	(0.01)**	(0.67)	(0.04)**	(0.04)	(0.02)**	(0.02)**	(0.67)	(0.56)
Decision on food to be cooked daily:										
Husband alone (Respondent alone = 1)	3.89	-0.98	-8.90	0.65	-0.98	-0.78	0.67	-0.89	1.89	-6.89
	(0.89)	(0.04)**	(0.01)**	(0.56)	(0.01)**	(0.06)	(0.06)	(0.01)**	(0.98)	(0.01)**
Husband/Partner & Respondent	-7.89	1.89	0.056	0.56	0.78	1.98	4.89	2.89	1.89	2.67
	(0.89)	(0.04)**	(0.03)**	(0.04)**	(0.65)	(0.03)**	(0.01)**	(0.01)**	(0.01)**	(0.02)**
Others	0.89	-0.45	-0.56	-5.67	-0.67	0.67	-0.04	-0.67	1.78	-0.98

	(0.78)	(0.03)**	(0.67)	(0.08)	(0.02)**	(0.78)	(0.03)**	(0.01)**	(0.78)	(0.05)
Owns a house:										
Yes (No= ref)	0.98	0.67	2.89	0.01	1.11	1.98	3.89	7.89	6.54	1.89
	(0.01)**	(0.04)**	(0.07)	(0.02)**	(0.02)**	(0.02)**	(0.01)**	(0.01)**	(0.02)**	(0.01)**
Employment status										
Working (not working = ref)	0.98	0.56	9.89	1.90	4.78	8.78	9.89	0.04	1.89	**8.78**
	(0.02)**	(0.01)**	(0.01)**	(<0.001)**	(0.02)**	(0.01)**	(0.09)	(0.02)**	(0.02)**	**(0.02)****
Health insurance [a]										
coverage (non- coverage = ref)	2.78	3.89	2.89	0.98	3.89	1.89	0.78	0.01	1.98	3.87
	(0.01)**	(0.02)**	(0.01)**	(0.78)	(0.01)**	(0.01)**	(0.67)	(0.02)**	(0.02)**	(0.01)**
Maternal education:										
primary school (**Non-formal = ref)**	0.89	4.89	0.98	1.90	1.98	1.78	7.89	6.90	1.91	8.78
	(0.01)**	(0.04)**	(0.05)	(0.02)**	(0.98)	(0.67)	(0.02)**	(0.89)	(0.02)**	(0.98)
≥ secondary	2.89	1.98	0.89	1.89	1.76	0.05	1.89	0.67	1.89	1.89
	(0.02)**	(0.02)**	(0.02)**	(0.01)**	(0.02)**	(0.02)**	(0.01)**	(0.01)**	(0.01)**	(0.03)**
Household wealth quantile:										
Poorer (poorest= ref)	1.89	8.90	0.89	1.90	9.00	10.98	6.89	1.89	2.89	9.78
Average	(0.89)	(0.98)	(0.89)	(0.22)	(0.78)	(0.08)	(0.08)	(0.78)	(0.89)	(0.22)
Wealthier	1.89	2.78	0.07	1.89	3.78	1.89	1.89	6.67	8.78	1.89
	(0.87)	(0.67)	(0.78)	(0.78)	(0.67)	(0.03)**	(0.03)**	(0.01)**	(0.02)**	(0.02)**
Wealthiest	1.89	1.67	0.89	1.78	0.56	3.78	2.89	6.67	9.87	10.89
	(0.02)**	(0.04)**	(0.03)**	(0.01)**	(0.04)**	(0.01)**	(0.02)**	(0.02)**	(0.02)**	(0.02)**
Place of Residence:										
Urban (rural = ref)	0.78	1.89	4.89	9.89	5.89	12.89	8.89	0.78	6.89	5.89
	(0.03)**	(0.03)**	(0.01)**	(0.02)**	(0.02)**	(0.02)**	(0.67)	(0.01)**	(0.02)**	(0.01)**
Region:										
Southern region (Northern =ref)	1.89	2.89	1.11	1.98	2.89	1.89	1.89	2.89	1.79	3.89
	(0.02)**	(0.01)**	(0.02)**	(0.01)**	(0.01)**	(0.02)**	(0.02)**	(0.02)**	(0.01)**	(0.02)**

Note: *, **, are coefficients that are statistically significant respectively at 1%, and 5%; 1 = Public hospitals; 2= private hospitals. Values in parentheses are probability values.

a: health insurance omitted from the table for this year, because it was not provided by NDHS for those years.

wives. Cultural practices that limit women's opinion in house hold decisions should be addressed.

The results also show that the odds of undertaking PNC for a child are higher for mothers who signed up for health insurance compared to mothers who did not. The result in Table 2 shows that babies conceived to mothers who signed into health insurance coverage were 8.98, 7.65 and 2.67 times as likely to undertake PNC check in 2008, 2013 and 2018. The result in Table 3 shows that mothers who had health insurance were more liable to take their babies to private or public hospitals when compared to self-medication/traditional/others as a place of PNC check-up. In the literature, it is advanced that health insurance increases the chances of seeking healthcare since health insurance coverage at least lowers the out-of-pocket costs of medical treatment[27]. For instance, Xu *et al*[9], Zhang *et al*[10] and Nasir *et al*[11]revealed that mothers with health insurance coverage were significantly more susceptible to use ANC services and deliver in health institutions.

In another study, Sanogo and Yaya[33] revealed that mothers enrolled in health insurance had a higher likelihood of giving birth in medical institutions. In many countries Nigeria inclusive mothers that are insured receive free care services for their babies. It follows that it is not shocking that having insurance affects both the decisions to undertake PNC and the place where the care is received from. This result corroborates those of Arthur[24] and Novignon *et al.*[20], who reported that children of insured mothers were more inclined to undertake treatment for fever in health facilities. For instance, Arthur[26] found out that women from affluent homes are significantly more inclined to treat their child of fever, and have greater chances to utilize treatment in health facilities as against self-medication/traditional care[9,10].

The result also indicates that household wealth has significant positive influence on both the decision to utilize PNC and the place of PNC services. In Table 2, the result showed that mothers drawn from rich and richest quintiles were noticeably influenced to choose PNC for their babies in the five-year period. The result in Table 3 showed that mothers from wealthy and wealthiest groups were more likely to seek PNC for babies in private or public hospitals compared to self-medication/traditional/others. This finding suggests that whether a child gets PNC and where the care is provided depend significantly on the household's ability to pay. Wealth is a sign of financial strength to defray healthcare costs. This is not surprising, because even where the women are under health insurance coverage and where healthcare services are provided free of charge, and other incidentals incurred in using healthcare services for instance transportation charges, particularly where the woman live far away from health facilities and where she makes payment for drugs and other miscellaneous experiences.

The findings are consistent with several researches that related strong positive association between wealth/income and demand for childcare services[21,23,24,27]. The afore-mentioned studies revealed that household wealth significantly influence the desire for child and maternal care services. The result therefore implies that one of the strategies to increase both the request for childcare and child health is to expand the socioeconomic rate of households[34]. Multi-pronged approach should be used to alleviate poverty in Nigeria. Some of notable strategies should include rural sector development, use of subsidies and subventions, granting of cheap lines of credit, Agricultural sector development schemes, provision of free fertilizer and enhanced seedlings[3].

We found that maternal education significantly effects on both the decisions to use PNC services and place where it is received from. In Table 2, the results showed that mothers who had primary or at least secondary educations were much more inclined to undertake PNC for their infants. In Table 3, the result indicates that primary and at least secondary education were associated with PNC utilization in health facilities. Maternal education has been reckoned as a critical determinant of health outcomes.

According to Grossman[31], educated people are more efficient in health promotion and production. Literacy rates of women are predictors of both maternal and childcare utilization. Since schooling is a proxy for many other things that influence health-seeking behaviours, this makes obvious sense. One may contend that, educated

mothers have the opportunity to learn health-protective facts and possess a degree of health awareness. that influences their health-seeking behaviour compared to less educated mothers. One of the strategies to increase the utilisation of childcare services in Nigeria is to expand education opportunities for mothers. Two strategies were recommended: Free educational costs should be implemented for basic education, and special cut-offs should be employed in tertiary education to increase the enrolment rate of women[38].

The results indicate that employed mothers and those who owned houses were more prone to undertake PNC for their infants in medical facilities. These two variables are proxy for economic empowerment; hence our result implies that economically empowered women are more probable to require for childcare services. This is because these set of women have their own resources and do not need to rely on their spouses to pay for medical services. A recently published research from Nigeria showed that women relied on their spouses to defray healthcare related costs and consequently most of them suffered delay in utilizing modern healthcare services[14]. The study, therefore, concluded that women economic empowerment is a strategy to improve the demand for childcare services in Nigeria. Women should be empowered economically through various means, which include vocational education, skill acquisition, and cheap loans to women in businesses.

Strength

One of the main strengths of this study is that the study is the first to undertake a comparative study that employed NDHS data for various years (1999, 2003, 2008, 2013 and 2018) in order to yield deeper insights into the direction. This study's significant sample size as encapsulated in the NDHS is another strength. The findings can be generalized to cover the whole nation, because the data used covered the entire nation

The use of nationally representative data from the Nigeria Demographic and Health Surveys enhances the generalizability of the findings. Furthermore, the study contributes to the understanding of how women's empowerment indices can impact demand for childcare services in Nigeria. The study highlights the importance of considering women's empowerment as a determinant of healthcare utilization, which can inform policies and interventions aimed at improving maternal and child health.

Limitations

Despite the usefulness of the study's outcomes, there are two important limitations. First off, because the data used for analysis were verbal reports; hence respondents may have given socially-desirable responses. Second, the variables reported in literature as determinants of childcare use are in exhaustive. However, we only focused on women empowerment variables, hence there is possibility our study may suffer from omission bias. Furthermore, the study is limited by its cross-sectional design, which precludes establishing causality between women's empowerment indices and demand for childcare services. Also, the study did not explore the quality of childcare services, which can also influence demand and utilization. As a recommendation, further studies should engage longitudinal studies which are needed to establish causality between women's empowerment indices and demand for childcare services. Future research should consider the quality of childcare services, including factors such as safety, hygiene, and caregiver training, in addition to demand and utilization

Conclusion

We recommend that intervention programme model to expand childcare services in Nigeria should encourage more women to enrol in health insurance. Efforts should be made to encourage the establishment of community-based medical insurance to cater for women in the rural and nonformal sectors. Education opportunities should be expanded for all Nigerian women using free tuition fee at primary and secondary levels and special cut-off marks at tertiary level to encourage female enrolment rate. Women should be empowered economically through job creation, opening up of cheap lines of credit for women and reservation of selected positions for women in

politics. Intervention programmes that educate men about the advantages of enabling their wives participate in household decisions should be implemented. It is important to address the underlying problems that prevent women from accessing childcare services in Northern and rural regions of Nigeria. Multi-faceted strategy should be utilized to enhance household socioeconomic limitations. Strategies to address poverty in Nigeria should focus on rural sector development, Agricultural schemes, use of subventions or subsidies, opening up of low-cost credit lines, granting of upgraded seedlings and fertilizer to rural farmers and use of exemption policy in the use of childcare services.

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Availability of data

The dataset used and analysed during the current study is available from the corresponding author on reasonable request.

Conflicts of interests

The authors declare no conflict of interest.

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