Humanities & Social Sciences Communications

ARTICLE

https://doi.org/10.1057/s41599-022-01168-7 OPEN

Individual and community-level factors associated with non-institutional delivery of women of childbearing-age in Nigeria

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Maternal health is a major concern in Africa especially due to high level of maternal mortality in the region. A significant cause of high mortality is the unavailability of health facilities and preference for home-based delivery often carried out by unskilled health attendants. Reports reveal that 69% of young women in Nigeria opt for home-based delivery in Nigeria and some of these mothers lose their lives as a result of childbirth complications that are not properly attended to. This trend calls for urgent concern in the nation's health system. Against this backdrop, this study examined the determinants of non-institutional delivery among women of reproductive age in Nigeria using the country's National Demographic Health Survey [NDHS] (2018. Demographic health survey data. NPC and ICF, Abuja, Nigeria and Rockville. MD, USA) The data for this study include 12,567 of women of childbearing-age contained in the NDHS data. To analyse the data, the multilevel binary logistic regression was used to examine the determinants of non-institutional delivery among the women of childbearing-age. The results were presented using adjusted odds ratios (AOR) with 95% confidence interval. The result revealed that 56.8% of women preferred to have their children outside health institutions. The findings further revealed that educated women including urban dwellers, women with some level of formal education, high exposure to news media, high level of income and women with significant level of autonomy were less likely to deliver their babies outside health institutions. Based on the findings of the study, that there is the need to expand educational opportunities for Nigerian women, enhance and strengthen advocacy, and utilise focused group discussions, family outreach programmes and peer education to educate mothers on the benefits of using healthcare facilities during childbirth.

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Introduction

Maternal mortality remains one of the sources of public health challenges, particularly in resource-constrained economies (Aregbesola and Khan, 2019; Azuh et al., 2020; Ekholuenetale et al., 2020; Feng et al., 2021; Gershon et al., 2020; Jakovljevic et al., 2021; Ntoimo et al., 2020). Estimates showed that in 2015, over 300,000 women died from pregnancy-related complications globally, and 201,000 of these deaths representing 66% of global maternal deaths occurred among women in sub-Saharan Africa (SSA) (Ekholuenetale et al., 2020). To address the issues of childbirth mortality, child delivery at healthcare institutions also known as health facility delivery has been embraced as an essential mechanism to achieve a significant decline in the proportion of maternal demise (Ahinkorah, 2020; Solanke, 2021).

Irrespective of the World bank and other stakeholders' efforts to scale down maternal mortality by providing access to modern maternal care services, evidence shows that many women in sub-Sahara Africa still face challenges in accessing modern maternal care (Seidu et al., 2020; Ahuru and Iseghohi, 2019). Indeed, home delivery poses a significant risk to mothers and their new-born babies (Sialubanje et al., 2015). Some of the cause associated with this include: poor breastfeeding practices, the poor practice of immunisation, poor knowledge and practice of postnatal care services.

Nigeria remains one of the nations in Africa with a high level of maternal death. Recent evidence puts its maternal mortality rates (MMR) at 906 out of every 100,000 births, accounting for 19% of the global maternal mortality burden (Ahinkorah et al., 2021). The high MMR in Nigeria has been attributed to the popular practices of childbirth outside health institutions. Insights from the NDHS proves that about 61% of births among women of childbearing age took place at home, and skilled birth attendants did not supervise 60% of these deliveries.

In Nigeria, there are many studies on determinants of health facility delivery. However, literature regarding the causes of non-institutional delivery in Nigeria remain scant, specifically, the available studies (see Aregbesola and Khan, 2019; Solanke, 2021), fails to incorporate community contextual factors in investigating the determinants of maternal mortality. This study explores the determinants of non-institutional delivery among Nigerian women of reproductive age. The focus on women within this age is crucial as the findings could help to reduce cases of non-institutional delivery. This will go a long way to reduce the high maternal mortality in Nigeria and help achieve the Sustainable Development Goals of reducing maternal mortality to less than 70 per 100,000 live births by 2030.

Methods

Data and sample. The data for this study includes a cross-sectional data from the National Demographic Health Survey [NDHS] (2018) available online on the website https://dhsprogramm.com/data/. The data extracted from the NDHS focuses exclusively on women of their reproductive age. From the entire population of the NDHS data, this study extracted a sample comprising about 12,567 individuals of reproductive age (between 15 and 49 years) who had given birth in the past five years prior to the NDHS survey.

Variables and measurement

Outcome. The endogenous variable in the study is non-institutional delivery (coded 1 for deliveries outside health institutions and 0 for deliveries in health institutions). Births that occurred out in government own healthcare facilities or personal owned clinics are regarded as health facility delivery (Aregbesola and Khan, 2019; Solanke, 2021).

Individual-level factors. For the analysis in this study the individual level factors include the following parameters:

- Maternal age: 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49.
- Religion: Catholic Christian, other Christians, Islam and African Traditional Religion/others.
- Maternal education: relating to the level of education of the women-non-formal, primary, secondary and post-secondary education educations are highlighted.
- Level of education of the spouse.
- Access to health insurance coverage.
- Employment status.
- Time of initiation of antenatal care: early booking vs late booking.
- Access to of media by the women (1 = yes, and 0 = no). That is, if the women have access to any of the print/electronic media: television/radio/newspaper/magazine.

The parameter relating to a woman's autonomy was generated from a question as to whether the respondent took part in making her own healthcare decision. The following response options were provided: 'respondent alone', 'husband/partner alone', 'respondent and partner/husband' and others. Respondents were considered autonomous if their responses were any one of 'respondent alone' or 'respondent and husband/partner', and non-autonomous otherwise.

Household-level factors. The factors investigated include: the gender of the head of household size of the household (measured as the total persons living in the household). We considered the following groups: 1–4, 5–7 and ≥8 persons. Furthermore, the household wealth index was measured in terms of household assets using principal component analysis (PCA). The households were classified into the following groups: poorest, poorer, average, wealthier and wealthiest.

Community-level factors. To capture these level factors affecting women of childbearing-age, the study applied the enumeration areas (EAs) to capture the localities. This is based on the fact that the data collected by the NDHS was not aggregated at the community level. Therefore, variables at the community level in this study were reported based on the characteristics of the women, especially concerning those associated with non-institutional delivery (Feng et al., 2021).

The community-level factors include

- The location of the household heads (whether rural or urban area).
- Cultural norms about wife-beating within the community (whether up to 50% of the women in the community justified domestic violence against women for any of the reasons).
- if the woman abandons her children, she quarrels with her spouse, or deprives her spouse of his conjugal rights.
- The dissemination of the women who are not educated in the locality (whether 50% of the ladies ever went to school).
- The awareness of poverty in the locality, and.
- Awareness or access to media by women in the community (Ekholuenetale et al., 2020; Seidu et al., 2020).

Statistical analysis. The prevalence of non-facility-based delivery was presented in percentages while chi-square test was used to examine the association between sociodemographic factors and non-facility delivery. Only the logit model accommodates only

Table 1 Distribution of non-utilisation of health facility delivery by sociodemographic characteristics of childbearing women in Nigeria (weighted *N* = 12,567).

Variables	Frequency (*N*)	Percentage	Home delivery (58.6%)	*P*-value
Maternal age				
15–19	1106	8.8	12.8	$P = 0.897$
20–24	2966	23.6	19.8	
25–29	3569	28.4	19.8	
30–34	2526	20.1	28.9	
35–39	1596	12.7	28.7	
40–44	641	5.1	36.9	
45–49	163	1.3	42.8	
Religion				
Catholic	1734	13.8	34.8	$P < 0.001$*
Other Christians	3041	24.2	45.9	
Islam	7578	60.3	64.3	
African traditional worshippers/ others	214	1.7	37.8	
Marital status				
Never in Union	339	2.7	45.8	$P = 0.324$
Currently married/living with partners	12,014	95.6	2.1	
Formerly in union	214	1.7	19.2	
Maternal education				
Non-formal	5680	45.2	85.8	$P < 0.001$*
Primary	1986	15.8	28.9	
Secondary	3242	25.8	10.3	
Post-secondary	1659	13.2	2.8	
Partner education				
Non-formal	6007	50.0	92.8	$P < 0.001$*
Primary	1814	15.1	67.8	
Secondary	3460	28.8	8.7	
Post-secondary	733	6.1	2.8	
Child wantedness				
Then	10,757	85.6	3.8	$P = 0.082$*
Later	1257	10.0	11.6	
No more	552	4.4	16.7	
Health insurance coverage				
Yes	239	98.1	9.6	0.003*
No	12,328	1.9	48.9	
Employment status				
Working	7930	36.9	2.7	$P < 0.001$*
Not working	4637	63.1	35.8	
Time of initiation of antenatal care				
Early booking	3531	28.1	2.4	$P < 0.001$*
Late booking	9036	71.9	40.8	
Family type				
Monogamy	8872	73.8	11.8	$P < 0.001$*
Polygamy	3142	26.2	24.5	
Female literacy				
I cannot read at all	7540	60.0	56.8	$P < 0.001$*
Able to read part of a sentence	2111	16.8	23.7	
Able to read the whole sentence	2916	23.2	1.9	
Media exposure				
Yes	7540	60.0	2.1	$P < 0.001$*
No	5027	40.0	49.8	
Woman's autonomy				
Yes	5127	40.8	6.9	$P < 0.001$*
No	7440	59.2	45.7	
Sex of household head				
Male	11,599	92.3	2.1	$P < 0.001$*
Female	968	7.7	9.8	
Household wealth quintile				
Poorest	2677	21.3	56.9	$P < 0.001$*
Poorer	2714	21.6	36.9	
Average	2627	20.9	12.8	
Wealthier	2413	19.2	3.8	
Wealthiest	2149	17.1	1.9	
Household size				
1–4	3644	29.0	1.9	$P < 0.001$*
5–7	5643	44.9	3.8	
≥8	3280	26.1	19.8	
Residential status				
Urban	4160	33.1	11.8	$P < 0.001$*
Rural	8407	66.9	56.9	
Cultural norm for wife-beating				
Yes	8382	66.7	12.8	$P < 0.001$*
No	4185	33.3	3.8	
Community-level poverty				
Low	6309	50.2	3.5	$P < 0.001$*
High	6258	49.8	40.9	
Community-level media use				
Low	6309	50.2	78.6	$P < 0.001$*
High	6258	49.8	5.1	
Community-level woman's autonomy				
Low	6484	51.6	75.4	$P < 0.001$*
High	6082	52.9	9.1	

Source: Authors.
*Statistically significant at 10%.

significant variables at the 10% level (see Table 1). In addition, the study deployed a multilevel binary logistic regression in examining the fixed and random effects considering the objectives of study. We further modelled a three-way model of binary responses based on the objective.

These include level 1 (individual-level factors), level 2 (household level factors) and level 3 (community-level factors). Overall, we estimated five models. The first is an empty or null model without explanatory variables (random intercept). The second model controlled only for individual-level factors. The third model controlled for household level factors. The fourth model controlled for community-level factors, and finally, model five simultaneously controlled for individual, household and community-level factors. We presented the adjusted odds ratio and 95% confidence intervals (see Table 2). These models were fitted with the Stata command to identify statistically significant variables in explaining non-facility delivery (Ahuru and Iseghohi, 2019).

Results

Sample characteristics. The result obtained for the proportion of non-usage of health facility delivery by the characteristics of the women within the reproductive age is shown in Table 1. From the analysis, 58.6% of childbearing mothers in Nigeria delivered their babies outside of health institutions. The result showed that

Table 2 Predictors of non-utilisation of health facility delivery among childbearing women in Nigeria.

Variables	Model 0 aOR (95% CI)	Model 1 aOR (95% CI)	Model 2 aOR(95% CI)	Model 3 aOR (95% CI)	Model 4 aOR (95% CI)
Religion					
Catholic		1.0			1.0
Other Christians		0.98 (0.1–1.2)			1.23 (0.0–0.9)
Islam		0.56 (0.1–2.1)			1.78 (0.5–7.8)
African traditional worshippers/others		1.21 (0.1–1.8)			2.21 (0.0–6.8)
Maternal education					
Non-formal		1.0			1.0
Primary		0.45 (0.1–2.3)			0.34 (0.0–1.2)*
Secondary		0.98 (0.1–0.9)*			0.56 (0.0–0.0)*
Post-secondary		0.21 (0.0–0.1)*			0.45 (0.0–0.9)*
Paternal education					
Non-formal		1.0			1.0
Primary		1.23 (0.0–1.2)			0.12 (0.0–0.5)*
Secondary		1.78 (0.0–0.0)*			0.34 (0.0–0.0)*
Post-secondary		2.89 (0.0–1.0)*			0.21 (0.0–0.9)*
Child wantedness					
Then		1.0			1.0
Later		1.23 (0.0–9.8)			1.23 (0.0–0.9)
No more		1.76 (0.0–1.25)			1.78 (0.0–0.9)
Health insurance coverage					
Yes		1.0			1.0
No		1.25 (0.0–9.8)			1.24 (0.0–0.8)
Employment status					
Working		1.0			1.0
Not working		0.98 (0.0–2.6)			1.23 (0.0–9.8)
Time of initiation of antenatal care					
Early booking		1.0			1.0
Late booking		2.89 (0.0–1.2)			1.56 (0.9–8.9)
Family type					
Monogamy		1.0			1.0
Polygamy		3.45 (0.0–1.1)			1.45 (0.0–6.7)
Female literacy					
I cannot read at all		1.0			1.0
Able to read part of a sentence		1.89 (0.0–1.78)			1.65 (0.3–0.8)
Able to read the whole sentence		0.21 (0.2–0.8)			1.98 (0.0–1.56)
Media exposure					
Yes		1.0			1.0
No		1.1 (0.0–1.2)			2.89 (0.0–0.5)*
Woman's autonomy					
Yes		1.0			1.0
No		2.3 (0.0–1.2)			0.89 (0.0–0.6)
Sex of household head					
Male		1.0			
Female		2.3 (0.0–2.6)			
Household wealth quintile					
Poorest			1.0		1.0
Poorer			0.56 (0.0–0.3)*		1.98 (0.0–1.0)
Average			0.89 (0.0–0.1)*		0.98 (0.0–1.98)
Wealthier			0.21 (0.0–0.0)*		2.34 (0.0–1.23)
Wealthiest			0.56 (0.0–0.9)*		0.48 (0.0–0.0)*
Household size					
1–4			1.0		1.0
5–7			1.23 (0.0–1.2)		1.23 (0.9–9.8)
≥8			3.45 (0.0–1.3)		1.76 (0.8–1.78)
Residential status					
Urban				1.0	1.0
Rural				9.87 (0.0–0.1)	2.75 (0.0–0.9)*
Cultural norm for wife-beating					
Yes				1.0	1.0
No				2.23 (0.0–0.8)	1.23 (0.8–7.6)
Community-level poverty					
Low				1.0	1.0
High				1.89 (0.0–0.9)	2.21 (0.0–0.0)*
Community-level media use					

Table 2 (continued)

Variables	Model 0 aOR (95% CI)	Model 1 aOR (95% CI)	Model 2 aOR(95% CI)	Model 3 aOR (95% CI)	Model 4 aOR (95% CI)
Low				1.0	1.0
High				0.45 (0.0–0.0)	0.98 (0.0–0.0)*
Community-level woman's autonomy					
Low				1.0	1.0
High				0.38 (0.0–0.0)	0.35 (0.0–0.0)*
Random effects					
ICC	0.54	0.51	0.59	0.64	0.59
AIC	2345	3567	2111	1987	987
BIC	−1789	−2345	−1987	−2456	−3456
Log-likelihood	334($P < 0.001$)	456($P < 0.001$)	789($P < 0.001$)	879.65($P < 0.001$)	987.56($P < 0.001$)
Sample size	12,567	12,567	12,567	12,567	12,567

* Significant at 5%.

64.3% of Islamic women, including 85.8% of mothers who had non-formal education, and 50% of mothers whose partners had non-formal education delivered their babies outside health institutions. Home delivery was noted to be high among respondents that were not enroled in the health insurance scheme, unemployed mothers, and those who booked antenatal care at a later stage. In addition, a significant number of mothers in polygamous marriages, comprising women without any form of formal education, those who had no media exposure, women with no autonomy in decision making, those from the poorest wealth quintiles, those whose family size were ≥8 and mothers residing in rural parts of the country had a high prevalence of using home-based delivery. Also, home delivery was high among mothers drawn from communities with high cultural prevalence for domestic violence, low access to media, high level of poverty, and restricted autonomy for women in decision making process.

The measure of Variation (random-effects model). With the result of the random effect, the entire model (Model 5) (see Table 2), which controls for individual, household and community-level factors, had the lowest Akaike Information Criterion (987) with Bayesian Information Criterion of −3456, hence, considered as the best fit suitable for predicting health facility delivery among the women (Ekholuenetale et al., 2020).

The measure of Association (fixed effect models). Table 2 presents the fixed effect results on determinants of non-institutional delivery. The fixed effect result showed that the significant predictors of non-institutional delivery were maternal education, partner education, household wealth quintile, residential status, community-level poverty, community-level media use and community-level woman's autonomy.

Individual factors. In reference to respondents who had non-formal educational qualifications, those who reported primary educational qualifications (AOR = 0.34; 95% CI: 0.0–1.2), secondary educational qualifications (AOR = 0.34; 95% CI: 0.0–0.0) and post-secondary educational qualifications (AOR = 0.45; 95% CI: 0.0–0.5) were significantly less likely to deliver their babies outside health institutions. In reference to mothers whose partners have non-formal education, those whose partners had primary education (AOR = 0.12; 95% CI: 0.0–0.5); secondary education (AOR = 0.34; 95% CI: 0.0–0.0), and post-secondary education (AOR = 0.21; 95% CI: 0.0–0.9) were significantly less likely to deliver their babies outside health institutions. In reference to respondents who had media exposure, those who had no media exposure (AOR = 2.89; 95% CI: 0.0–0.5) were significantly more likely to deliver outside health institutions.

Household and community contextual factors. From the study, women who belonged to the wealthiest quintiles (AOR = 0.48; 95% CI: 0.0–0.0) were significantly less likely to deliver their babies outside health institutions.

The data from the geographical location of the women, i.e. rural vs. urban dwellers revealed that rural women (AOR = 2.75; 95% CI: 0.0–0.9) were approximately three times more likely to deliver their babies outside health institutions. In addition, women drawn from communities with high poverty rankings (AOR = 2.21 95% CI; 0.0–0.0) were significantly more likely to deliver their babies in health institutions compared to mothers drawn from communities with low poverty rankings. About the respondents drawn from communities with low media use, those with high media use (AOR = 0.98; 95% CI: 0.0–0.0) were less likely to deliver their babies outside health facilities. Regarding respondents drawn from communities with low women's autonomy, those with high women's autonomy (AOR = 0.35; 95% CI: 0.0–0.0) were less likely to deliver their babies outside health facilities.

Discussion of the results

The finding of this study regarding the preference for home-based delivery is consistent with previous findings from other countries showed 41.9% preference for home delivery for Nepalese women (Dhakal et al. 2018); 21.6% for Tanzanian women (Lilungulu et al., 2016); 28.5% for Cambodian women (Bwalya et al., 2017) and 23% for Ghanaian women (Gudu and Addo, 2017). The high rate of non-institutional delivery recorded in this study has implications for maternal and childcare utilisation in Nigeria. the first, the percentage of women who give birth at health institutions in Nigeria is low thereby, increasing the risk of maternal and child mortality in Nigeria. it is therefore, recommended that an intervention programme to improve coverage of health facility delivery in Nigeria be implemented to scale down maternal mortality to <70 per 100,000 live births, which is the SDG's 3.1 target for 2030 (Yaya and Sanogo, 2020).

The result further reveals that low level of education, poor socioeconomic conditions and rural dwellings were linked to a higher likelihood of non-institutional delivery. Previous studies have reported that lower poor socioeconomic status (Gentle et al., 2019; Yaya et al., 2019), the lack of good education (Abebe et al., 2012), and rural dwelling (Gentle et al., 2019) were determinants of non-institutional delivery. In many previous studies, the common reasons for progressive birth at home were mainly

financial and regional constraints affecting the ability to access standard health services (Fagbamigbe and Idemudia, 2015).

Other studies report that uneducated women from poor homes residing in rural and remote areas lack sufficient information about the dangers related to the delivery that takes place outside health centres, and as such, they do not find the need to deliver their babies in health institutions (Kifle et al., 2018). The result of the association between the health facility and household socioeconomic conditions suggests that improving coverage of health facility delivery depends on household socioeconomic conditions. This can be achieved through collaboration between government and non-governmental organisations. The government should consider expanding education opportunities for women and enhancing vocational skill training among women.

In this study, respondents who were not exposed to media (watching television, listening to the radio, and reading newspaper) were more likely to deliver their babies outside health institutions. Other studies have traced links between media exposure to choosing a place of delivery, with mothers who had no media exposure reporting a high likelihood of delivering their babies outside health institutions (Kifle et al., 2018; Solanke, 2021; Zamawe et al., 2016). The reason for the high rate of home deliveries among women not exposed to media is because media exposure provides awareness and increases the knowledge of pregnancy-related complications (Kifle et al., 2018 Zamawe et al., 2016). It also instils changes in women's behaviours, attitudes, social norms that may enhance access to the health facility during delivery times. There is, therefore, the need to enhance women's access to media. Community-based health information systems can be deployed in Nigeria as a platform to communicate behavioural health changes to women. Also, efforts should be made to ensure that women obtain the needed information they desire from the media.

We noted that respondents residing in rural parts of the country were more likely to deliver their babies outside health institutions when compared to those residing in urban parts. This finding is in line with the results of past studies for Nigeria (Dankwah et al. 2019). This disparity in health behaviour is a result of the differences in socioeconomic development, educational attainments, accessibility to health facilities (Erinosho, 1998). Another reason is inequalities in the distribution of health resources between rural and urban parts of Nigeria (Ahuru and Iseghohi, 2019). In Nigeria, health facilities and personnel are disproportionately located in urban areas. Also, rural areas are not adequately financed, making it impossible to attract and retain competent health personnel (Ekholueneta et al., 2020). In addition, rural women may be more influenced by cultural beliefs and social norms that encourage home deliveries. We noted that along with individual/household factors, community factors play a significant role in influencing the choice of home delivery among Nigerian women. This confirms the propositions made by previous studies (Mekonnen et al., 2019; Yebyo et al., 2015) and reiterates the importance of community factors concerning home delivery.

Similar to other studies (Ahuru and Iseghohi, 2019; Azuh et al., 2020, Feng et al., 2021; Gershon et al., 2020; Jakovljevic et al., 2021; Mekonne et al., 2016; Yadav and Kesarwani, 2016), we found that respondents located in communities with high poverty rankings are more likely to deliver their babies at home owing to the reality that home delivery may be the norm in communities with high concentrations of poverty. This may influence the whole women in the community to deliver their babies outside health institutions. Also, in communities with high concentration of poverty, there might be unavailability of health or absence of infrastructures in most cases that might prompt women to deliver at home.

Access to media outlets such as television and newspapers in the community also plays an influential role in deterring the preference for home delivery. Studies have reported the effectiveness of media concentration in communities in discouraging home delivery (Solanke, 2021; Sui et al., 2021). Increased media exposure increases discussion of maternal health issues within the community. This result conforms with the findings of the studies conducted in Nigeria (Azuh et al., 2020; Gershon et al., 2020; Solanke, 2021; Sui et al., 2021) and Bangladesh (Huda et al., 2019), which reported that women residing in communities with a high proportion of exposure to electronic and print media are less likely to deliver their babies outside health institutions.

Conclusion

This study has identified low socioeconomic status, poor educational attainment, low exposure to media, urban dweller, residing in communities with high poverty rankings, low media use and low woman's autonomy as predictors of home deliveries among reproductive-age women in Nigeria. Enhancing health facility delivery among women is a necessary agenda for Nigeria to achieve the SGDs 3.1, which aims at scaling down maternal mortality to <70 deaths per 100,000 live births in 2030. The findings call for the need to strengthen advocacy and educational strategies like focused group discussions, peer teachings, mentor-mentee programmes at both national and community levels to enhance facility delivery in Nigeria. Also, there is the need to improve policies relating to maternal care utilisation by reducing costs associated with delivery in health facilities and setting up more health facilities in communities. We recommend that further studies use qualitative research methods to yield more profound insights into the factors associated with home delivery among Nigerian women.

Data availability

The complete data set is hosted on https://dhsprogramm.com/data/.

Received: 25 January 2022; Accepted: 14 April 2022;
Published online: 15 June 2022

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Author contributions

All authors approved the final draft and uploaded it to the journal.

Ethical approval

Not required for this study. This is because the NDHS data used for this study is freely available online. In addition, this article does not contain any studies with human participants performed by any of the authors.

Informed consent

Not required for this study. This is because this article does not contain any studies with human participants performed by any authors.

Competing interests

The authors declare no competing interests.

Additional information

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