Regional prevalence and socioeconomic inequalities in infant care practices: evidence from 2018 Nigeria Demographic and Health Survey

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Research

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Abstract

Background: The effects of breastfeeding practices on children's health are undoubtedly of great interest worldwide. However, there is inequalities in the coverage of exclusive breastfeeding (EBF), early initiation of breastfeeding (EIBF) and mother and newborn skin-to-skin contact (SSC) in many resource-constrained settings. The aim of this study was to explore regional prevalence and examine the socioeconomic inequalities in EBF, EIBF and SSC in Nigeria.

Methods: Data on 2,936 infants under six months old were extracted from the 2018 Nigeria Demographic and Health Survey (NDHS) to determine EBF. In addition, data from 21,569 children were analyzed for EIBF and SSC. Concentration index (CI) and concentration curve were used to measure socioeconomic inequalities in EBF, EIBF and SSC.

Results: The prevalence of EBF, EIBF and SSC were 31.8%, 44.2% and 12.1% respectively. Furthermore, Ogun State had the highest prevalence of EBF (71.4%); while Bayelsa State had the highest prevalence of SSC (67.8%) and EIBF (96.2%) respectively. Urban dwellers had higher prevalence of EBF, SSC and EIBF across household wealth quintile and by levels of mothers' education in contrast to their rural counterparts. We quantified the degree of wealth-related and mothers education inequalities in EBF, SSC and EIBF. There were pro-rich EBF (CI = 0.118; $p < 0.001$), EIBF (CI = 0.103; $p = 0.002$) and SSC (CI = 0.152; $p < 0.001$) respectively. Also, EBF (CI = 0.157; $p < 0.001$), EIBF (CI = 0.091; $p < 0.001$) and SSC (CI = 0.156; $p < 0.001$) were significantly more concentrated among mothers with higher educational attainment. The test for differences between urban versus rural was significant in EBF, SSC and EIBF by mothers educational attainment. But this was only significant in EIBF by household wealth respectively.

Conclusion: Socioeconomic status determined breastfeeding practices and SSC in Nigeria. Breastfeeding practices interventions should target all mothers, especially those of low socioeconomic status and to ensure improvements in baby friendly initiatives.

Background

Optimal breastfeeding practices have an age-long recognition for health benefits [1,2]. The World Health Organization (WHO) recommends early initiation of breastfeeding (EIBF) for newborn within 1 hour after birth [3]. In addition, that infants be exclusively breastfed for the first six months of their life [4]. Exclusive breastfeeding (EBF) is defined as the practice where an infant receives only breast milk for the first six months, with no other liquids (not even water) or solid foods, except oral rehydration solutions, drops and syrups [3,5]. EIBF is also associated with mother and newborn skin-to-skin contact (SSC), which reduces the risk of hypothermia [6] and strengthens maternal bonding with children [7]. The findings from a previous educational intervention study, led to the development of a guideline that allowed EIBF and SSC be included in newborn care national policy [8]. In recent years, efforts have been made to improve infant and child feeding practices, including International Code of Marketing of Breast-milk Substitutes [9], Global Strategy for Infant and Young Child Feeding (IYCF) [3] and baby friendly hospital

initiative (BFHI) [10]. In recent years, WHO provided a set of indicators to evaluate child feeding and determine the progress of breastfeeding advancement efforts. Since then, there has been major attention in infant and child feeding structure and in the knowledge about what comprises ideal breastfeeding practices [4].

WHO defined SSC as when the newborn is placed prone on the mother's abdomen or chest in direct ventral-to-ventral SSC. Immediate SSC is done immediately after delivery, less than 10 minutes after birth. Early SSC is defined as beginning any time from delivery to 23 hours after birth and should be uninterrupted for at least 60 minutes [11]. SSC improves the newborn maintenance of blood glucose levels, temperature regulation and metabolic adaptation. At birth, the newborn has a reduced capacity to generate heat, resulting from a decline in temperature. It is against this backdrop that maintenance of temperature is required for newborn at delivery. During SSC, there is a transfer of heat from the mother to her child, wherewith the mother's body temperature activates the child's sensory nerves, which in turn results in the child's relaxation, reduces the tone of the sympathetic nerves, dilation of skin vessels and increase in its temperature [12].

Approximately 37% of children under 6 months old are exclusively breastfed in resource-constrained settings; while an estimated 823 000 annual deaths in under 5 children occurs [13]. Sub-optimal breastfeeding has been reported to be responsible for 1.4 million childhood deaths with about 10% of total disease burden among under 5 children [14]. Optimal breastfeeding practices are crucial in improving the health of children, and associated with reduction in the risk of childhood morbidity and mortality [3,15]. EIBF can reduce neonatal mortality. Albeit, the prevalence of EIBF is only about 50% in many resource-constrained settings [16]. The guideline for breastfeeding practices include the initiation of breastfeeding for all newborns within the first hour of life, while EBF is practiced for infants less than 6 months [4,17]. Interestingly, SSC between mother and newborn plays a mediating role in EIBF [6].

High prevalence of hypothermia is recorded in settings with large number of newborn death, where hypothermia has become an issue of major concern to improve newborn survival [18]. In addition, thermal care is crucial as newborns are commonly susceptible to hypothermia without prejudice to tropical climates. Newborns have thin skin, a large body surface area, little insulating fat and easily overwhelmed thermoregulatory mechanisms [19]. In the absence of thermal protection, newborns are unable to maintain body temperature, while preterm babies become most-at-risk of the adverse effects [20]. Several estimates of hypothermia in African settings are limited to hospital studies and ranged between 44- 85 % [21]. Besides the benefits to the newborn, SSC has been linked with many benefits for mothers. For instance, secretion of oxytocin in mothers who receive SSC strengthens uterine contractions, which in turn aids the placenta to separate and the duration of the third stage of labour is shortened [22]. As a simple and cost-effective mechanism, mother and newborn SSC is recommended to improve post-delivery care and potentially save the lives of newborns and mothers [23]. Though WHO

recommends SSC, separation of mothers and newborns exists in many health facilities where newborns are often placed under warmers or in cots [24].

Evidence-based studies have reported that EBF and EIBF are associated with large gains and improve childhood survival, as well as support the recommendations to start breastfeeding immediately after childbirth [25,26]. In spite of the numerous advantages identified regarding optimal breastfeeding practices [27], the rates of EBF and EIBF in several resource-constrained settings remains worrisome. There are staggering reports of EBF uptake in Nigeria, as only a coverage of 16.4% was reported in a previous study [5], while another study reported EBF prevalence of 14% and EIBF prevalence of 38% [28], also the prevalence of newborns who were breastfed within 1 hour of birth was 34.7 % [29]. Moreover, only 10% of newborns in Nigeria received SSC [30]. These reports are worrisome and a major call to improve infants health care.

Breastfeeding practices and SSC benefit newborns in many ways, by providing warmth and nutrients to facilitate growth and enhance the immunity of babies [6,31]. Understanding the patterns of breastfeeding practices is essential to prioritize filling the knowledge gaps for childhood survival [32]. Nonetheless, there is disparities in the coverage of infant care practices across geographical regions, household wealth status and parental educational levels. Studies have reported that women with higher family incomes, those who had higher education levels or whose partners had higher education or executive occupations were more likely to have optimal breastfeeding practices than their counterparts [28,33,34]. Women with no formal education or low household wealth index have worsening breastfeeding indicators, when compared to women with primary and secondary or higher education [35,36]. Similarly, a previous study revealed disparities in EIBF across geographical regions in Nigeria, as North-Central region had the highest EIBF rates [37]. To the best of our knowledge, there is no study in Nigeria that has examined regional prevalence or wealth-related and education inequalities in EBF, EIBF and SSC using socioeconomic analytical tools. In light of the above, we examine regional prevalence and socioeconomic inequalities in breastfeeding practices and SSC in Nigeria.

Methods

Data source

We analyzed a cross-sectional nationally representative data extracted from Nigeria Demographic and Health Survey (NDHS) 2018. MEASURE DHS provided technical input in the process of data collection and supported by the National Population Commission (NPC) [38]. Data on 2,936 children under six months old was extracted for analysis. In addition, data on 21,569 children was analyzed for EIBF and SSC. NDHS is a vital source of data on EBF, EIBF and SSC especially as it consists of a nationally representative sample of households. Demographic and Health Survey (DHS) data was collected through a stratified multistage cluster sampling technique. The procedure for stratification approach divides the population into groups by geographical region and commonly crossed by place of residence - urban-rural.

A multi-level stratification approach is used to divide the population into first-level strata and to subdivide the first-level strata into second-level strata, and so on. A two-level stratification in DHS is region and urban/rural stratification. DHS data is available in the public domain and accessed at; <http://dhsprogram.com/data/available-datasets.cfm>. The details of DHS data has been report in a previous study [39].

Response rate

NDHS 2018 selected a total of 41,668 households for the sample, of which 40,666 were occupied. Of the occupied households, 40,427 were successfully interviewed, yielding a response rate of 99%. In the households interviewed, 42,121 women age 15-49 were identified for individual interviews; interviews were completed with 41,821 women, yielding a response rate of 99% [40].

Selection and measurement of variables

Outcome

- a) Early initiation of breastfeeding: This is a measure of children who were put to breast within 1 hour of delivery.
- b) Exclusive breastfeeding: This is a measure of infants less than 6 months of age who were fed exclusively with breastmilk. This indicator was based on the diets of infants younger than 6 months during the 24 hour before the survey.
- c) Skin-to-skin contact was measured dichotomously; *“Was child put on mother's chest and bare skin after birth”* yes versus no

Explanatory factors

Women's educational attainment was measured as; no formal education, primary, secondary and higher.

Household wealth quintile was computed by DHS using principal components analysis (PCA) to assign the wealth indicator weights. In their computation, they assigned scores and standardized the wealth indicator variable using household assets including; wall, floor, roof and wall type; whether a household had improved versus unimproved sanitation amenities and water source; whether a household had essential assets such as electricity, radio, television, cooking fuel, refrigerator, furniture amongst others. Furthermore, the factor loadings and z-scores were calculated. For each household, they multiplied the indicator values by the factor loadings and summed to produce the household's wealth index value. The standardized z-score was disentangled to classify the overall scores to wealth quintiles; poorest, poorer, middle, richer and richest [41]. Household wealth quintiles and mothers' educational attainment were used as measures of socioeconomic status similar to previous studies [42–44].

Residential status was classified as urban versus rural.

Geographical region and states were measured thus; **North Central:** Benue, Federal Capital Territory, Kogi, Kwara, Nasarawa, Niger, Plateau; **North East:** Adamawa, Bauchi, Borno, Gombe, Taraba, Yobe; **North West:** Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, Zamfara; **South East:** Abia, Anambra, Ebonyi, Enugu, Imo; **South South:** Akwa-Ibom, Bayelsa, Cross River, Edo, Delta, Rivers; **South West:** Ekiti, Lagos, Ogun, Ondo, Osun, Oyo.

Ethical consideration

This study was based on an analysis of population-based data that exist in public domain and available online with all identifier information removed. The authors were granted access to use the data by MEASURE DHS/ICF International. DHS Program is consistent with the standards for ensuring the protection of respondents' privacy. ICF International ensures that the survey complies with the U.S. Department of Health and Human Services regulations for the respect of human subjects. The DHS project sought and obtained the required ethical approval from the National Health Research Ethics Committee (NHREC) in Nigeria before the surveys were conducted. No further approval was required for this study. More details about data and ethical standards are available at <http://goo.gl/ny8T6X>.

Statistical analysis

Stata survey module ('svy') was used with adjustment for the sample design. Percentage and Chi-square test were used for summary statistics and bivariate analysis respectively. To determine socioeconomic inequalities in EBF, EIBF and SSC, we used concentration index and present it graphically with the concentration curve. When the concentration index value is positive or the curve lies below the diagonal line (line of equality), it indicates that EBF, EIBF and SSC coverage is greater among high socioeconomic groups. Conversely, when concentration index value is negative or the curve is above the line of equality, it indicates that EBF, EIBF and SSC coverage is higher among low socioeconomic groups. The concentration index was used to decipher socioeconomic inequalities using Erreygers adjustment in line with previous studies [45,46]. Statistical significance was determined at $p < 0.05$. Stata Version 14 (StataCorp., College Station, TX, USA) was used for data analysis.

Results

In Figure 1 we presented the prevalence of EBF (31.8%), EIBF (44.2%) and SSC (12.1%) respectively.

The results from Table 1 showed that Benue (65.3%), Ondo and Osun (66.7%), Ekiti (69.6%), and Ogun (71.4%) had the leading prevalence of EBF respectively. Furthermore, Oyo (45.4%) and Bayelsa (67.8%) reported the highest prevalence of SSC in Nigeria. In addition, Niger (74.9%), Kogi (78.4%), Ogun (78.6%) and Bayelsa (96.2%) reported the highest prevalence of EIBF respectively. Similar differences were obtained across geographical zones.

Table 1. Summary statistics from 36 States + Federal Capital Territory on exclusive breastfeeding, early initiation of breastfeeding and skin-to-skin contact between mother and newborn; NDHS, 2018

State	Exclusive breastfeeding		Skin-to-skin contact		Early initiation of breastfeeding	
	n	%	n	%	n	%
North Central						
Benue	72	65.3	599	20.2	591	64.3
Federal Capital Territory	71	46.5	519	6.7	529	64.7
Kogi	53	18.9	411	8.0	402	78.4
Kwara	54	51.9	466	5.2	456	61.6
Nasarawa	72	48.6	537	13.0	527	23.5
Niger	120	12.5	786	3.7	754	74.9
Plateau	63	46.0	521	1.7	515	52.4
Total estimate	505	39.0	3839	8.4	3774	60.3
<i>P</i>		<0.001*		<0.001*		<0.001*
North East						
Adamawa	86	16.3	620	32.7	606	20.3
Bauchi	129	24.8	893	15.1	882	14.0
Borno	67	7.5	670	6.4	663	51.3
Gombe	124	30.7	816	22.9	798	20.7
Taraba	104	30.8	709	2.5	698	11.6
Yobe	101	40.6	766	9.1	734	51.8
Total estimate	611	26.5	4474	14.7	4381	27.7
<i>P</i>		<0.001*		<0.001*		<0.001*
North West						
Jigawa	118	9.3	901	37.6	879	11.3
Kaduna	147	19.7	895	6.4	866	34.5
Kano	168	12.5	1247	8.2	1210	40.4
Katsina	146	25.3	929	17.1	914	39.9
Kebbi	96	14.6	824	5.5	794	28.2
Sokoto	104	20.2	703	0.4	672	14.3
Zamfara	128	39.8	804	2.5	790	52.9
Total estimate	907	20.3	6303	11.5	6125	32.5
<i>P</i>		<0.001*		<0.001*		<0.001*
South East						
Abia	55	21.8	386	6.5	387	47.8
Anambra	93	34.4	536	9.0	537	39.3
Ebonyi	93	47.3	609	7.6	603	
Enugu	49	24.5	360	2.2	349	47.0
Imo	52	15.4	438	2.7	422	47.4
Total estimate	342	31.6	2329	6.0	2298	43.4
<i>P</i>		<0.001*		<0.001*		<0.001*
South South						
Akwa-Ibom	49	30.6	377	13.8	365	57.3
Bayelsa	45	35.6	373	67.8	366	96.2
Cross River	36	41.7	307	11.7	301	65.1
Edo	45	37.8	306	7.5	297	63.0
Delta	40	25.0	328	8.5	335	44.8
Rivers	48	33.3	423	9.5	435	52.6
Total estimate	263	33.8	2114	20.4	2099	63.0
<i>P</i>		<0.001*		<0.001*		<0.001*
South West						
Ekiti	46	69.6	353	8.8	345	52.2
Lagos	59	59.3	555	8.7	577	57.7
Ogun	42	71.4	364	0.8	359	78.6
Ondo	54	66.7	400	7.3	391	48.1

Osun	39	66.7	371	5.7	366	64.5
Oyo	68	51.5	467	45.4	453	73.3
Total estimate	308	63.0	2510	13.7	2491	62.3
<i>P</i>		<0.001*		<0.001*		<0.001*

*Significant at $P < 0.05$; P value was obtained using Chi-square test

In Table 2, we presented the percentages of EBF, SSC and EIBF across household wealth quintile and mother's education. Based on the results, urban dwellers had higher EBF, SSC and EIBF across household wealth quintile and levels of mother's education, in contrast to their rural counterparts. The concentration index quantified the degree of wealth-related and mother's education inequalities in EBF, SSC and EIBF. Overall, the study outcomes were significantly more in higher household wealth, in contrast to the lower household wealth groups; EBF (CI = 0.118; $p < 0.001$), SSC (CI = 0.152; $p < 0.001$) and EIBF (CI = 0.103; $p = 0.002$) respectively. Furthermore, EBF was significantly more from mothers with higher educational attainment, compared with children from mothers with lower educational attainment (CI = 0.157; $p < 0.001$), SSC (CI = 0.156; $p < 0.001$) and EIBF (CI = 0.091; $p < 0.001$). The test for differences between children from urban versus rural was significant in EBF, SSC and EIBF for maternal educational attainment. But this was only significant for EIBF for household wealth quintile.

Table 2. Prevalence and concentration index of exclusive breastfeeding, early initiation of breastfeeding and skin-to-skin contact between mother and newborn in Nigeria

	Exclusive breastfeeding			Skin-to-skin contact			Early initiation of breastfeeding		
	Urban	Rural	Total	Urban	Rural	Total	Urban	Rural	Total
Household wealth quintile									
Poorest (%)	51.1	24.8	26.6	5.2	8.1	7.9	46.7	31.5	32.8
Poorer (%)	28.0	23.7	24.3	9.4	10.7	10.5	45.0	38.2	39.2
Middle (%)	37.4	26.8	30.7	12.5	12.5	12.5	46.5	48.8	47.9
Richer (%)	37.6	41.7	39.3	15.4	13.4	14.6	49.7	53.5	51.2
Richest (%)	47.9	34.8	45.0	18.0	17.4	17.9	55.5	55.0	55.4
Overall (%)	40.4	27.4	31.8	14.5	10.8	12.1	50.3	40.8	44.2
Concentration index	0.061	0.083	0.118	0.125	0.121	0.152	0.042	0.114	0.103
Standard error	0.021	0.021	0.015	0.015	0.013	0.010	0.006	0.006	0.004
<i>P</i> -value ^α	0.004*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Rural-urban comparison									
z-stat	0.73			-0.18			8.55		
Difference in concentration index values	0.022			-0.004			0.073		
<i>P</i> -value ^β	0.464			0.855			<0.001*		
Mother's education									
No formal education (%)	30.7	21.3	22.9	11.6	8.2	8.8	43.7	34.3	35.9
Primary (%)	32.0	27.0	28.6	12.3	11.4	11.8	50.2	44.5	46.5
Secondary (%)	45.8	37.2	41.5	14.2	15.6	14.9	51.7	51.7	51.7
Higher (%)	45.8	52.5	48.1	21.7	17.1	20.4	54.9	51.8	54.0
Overall (%)	40.4	27.4	31.8	14.5	10.8	12.1	50.3	40.8	44.2
Concentration index	0.086	0.149	0.157	0.109	0.157	0.156	0.037	0.097	0.091
Standard error	0.021	0.019	0.014	0.015	0.012	0.010	0.006	0.005	0.004
<i>P</i> -value ^α	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Rural-urban comparison									
z-stat	2.26			2.46			7.43		
Difference in concentration index values	0.063			0.048			0.060		
<i>P</i> -value ^β	0.033*			0.014*			<0.001*		

*Significant at $p < 0.05$; SE standard error; P -value^α and P -value^β were obtained using Concentration Index for overall inequalities across socioeconomic groups and measuring rural versus urban differences, respectively

Figure 2-4 showed the household wealth related inequalities for EBF, SSC and EIBF. The more the curves sags away from the line of equality, the greater the degree of inequality. The inequalities in household wealth level was more among EBF, SSC and EIBF rural children, as the areas between the curve and the line of inequality was maximal. This is consistent with the results obtained in the concentration index model.

Figure 5-7 showed mother's educational attainment inequalities for EBF, SSC and EIBF. The farther the curves draws away from the line of equality, the higher the degree of inequality. The inequalities in mother's educational attainment varied among children by breastfeeding practices and SSC, as the areas between the curve and the line of inequality was maximal. This clearly showed EBF, SSC and EIBF were higher among those with improved educational attainment.

Discussion

The findings from this study bring to limelight the practices to reduce high newborn or infant mortality, such as EBF, EIBF and SSC which are still under-utilized and remained a worrisome issue in Nigeria. Despite the known benefits of EBF, the findings of this study showed that only about one-third of women (31.8%) and less than half of them (44.2%) practiced EBF and EIBF respectively. However, these showed some improvement over results of previous studies. For example, using 2003 data, an average EBF of about 16.4% was reported in Nigeria [5], but in another study using 2008 data, EBF was 14% and EIBF was about 38.0% [28]. In the results from 2013 data, the proportion of infants who initiated breastfeeding early was 34.7 % [29]. These levels including the findings of this study are far less than the program target of 90% of women to exclusively breastfeed their infants in the first 6 months of life, a practice that is associated with 10% reduction of under 5 deaths [47]. The low coverage among educated women may be attributed to current economic challenges in Nigeria, where mothers may be forced to return to full time work very quickly after childbirth which can result to sub-optimal breastfeeding practices [48].

The impact of SSC in providing an appropriate and affordable yet high quality alternative to technology is well known. Moreover, it can easily be implemented, even in primary health care centres in many resource-constrained settings and has the potential to save newborns' and mothers' lives amongst other benefits [6]. Unfortunately, only approximately one-tenth of women (12.1%) reportedly practiced it in Nigeria as found in this study. This finding is similar to a previous report of 10% SSC coverage in Nigeria [30]. In the Gambia, 35.7% national prevalence of SSC was reported [49]. In Tanzania, SSC was rarely practiced (less than 1%) [50]. In Uganda and Mali, only 2% of mother and newborn SSC was reported respectively [51,52]. In Ethiopia, approximately 9% and 13% immediate mother and newborn SSC after delivery were reported [53,54]. In Ghana, the coverage of mother and newborn SSC was only about 10% [55]. These results showed that SSC coverage in sub-Saharan Africa countries is very low.

In a previous study in various African sites including Nigeria, on the beliefs and practices related to neonatal thermal care, a lack of opportunities for SSC, beliefs that the *vernix caseosa* was related to poor maternal behaviours to practice SSC were reported as major barriers. Based on the findings, early bathing of newborn was a very common practice especially in Nigerian sites due to a deep-rooted belief that delay to bath the newborn would result in body odour. Worst still, when asked about keeping the baby warm, respondents across study sites rarely mentioned the recommended thermal care practices (SSC), suggesting that these were not perceived as salient [56]. Such norms can clearly be responsible for poor coverage of SSC in the general population.

Clearly, higher socioeconomic status would help to improve EBF, EIBF and SSC by way of enhancing accessibility to health information which could positively influence health care seeking behaviour [57]. In this study, we found that women who had formal education or high household wealth level had higher utilization of EBF, EIBF and SSC. The findings are similar to the report of a previous study which found maternal education to significantly improve SSC and EIBF [8,35,36]. A simple and cost effective educational intervention achieved the inclusion of SSC and EIBF as part of standard care due to the observed significant impact in maternal health care continuum [8]. Mothers from socioeconomically privileged class would have higher coverage of EBF in contrast to their counterparts in lower socioeconomic class. This is in line with a previous study which found a connection between household wealth, maternal education and infant breastfeeding, as only about one-tenth of mothers who practiced EBF came from poor households and without formal education, in contrast to their well-off and educated counterparts with over one-quarter coverage of EBF [5,31,58–60]. Therefore, our evidence of a positive association between maternal education and improvement in EBF is well founded. Women of higher socioeconomic status would find better access or act more positively to health promotion messages due to the availability of resources.

The improvement in breastfeeding practices among educated mothers, indicates the substantial impact of mother's education on infant well-being, health and development. This is consistent with the findings from previous studies whereby elementary education became the basic threshold needed to gain health information, as well as provided women, specifically the disadvantaged, with self-confidence and the autonomy required to act appropriately. Conversely, women with no formal education are known to have poor knowledge and attitude about proper breastfeeding practices. In spite of the role of education in child welfare, frequent contacts with a health care provider would enhance information about proper breastfeeding practices [61]. Therefore, stakeholders in public health are obliged to design interventions or policies to aid mothers of low socioeconomic class for example, those with poor or no formal educational background to access health facility for information (for example, during antenatal visit) to improve proper breastfeeding practices in Nigeria.

Strength And Limitation

We used large sample data to reach plausible conclusions on infant breastfeeding practices and SSC. Furthermore, this study has become the foremost to examine socioeconomic inequalities in EBF, EIBF and SSC using vital socioeconomic tools. The results from this study fill the knowledge gap for socioeconomic inequalities in EBF, EIBF and SSC. Nonetheless, there is potential recall bias that could lead to overestimation or underestimation of the outcome variables.

Conclusion

There was low coverage of EBF, EIBF and SSC in Nigeria. Moreover, these practices were influenced by mother's educational attainment and their household wealth quintiles. Notably, educated women and the well-off had better coverage of EBF, EIBF and SSC. Based on these findings, we suggest that postnatal

care interventions immediately after childbirth, such as SSC and EIBF as well as EBF should be taught and encouraged by health care professionals especially during antenatal care contacts, at delivery and postpartum stay period. Lack of formal education and poverty would increase the chance of home delivery, which could result in women missing out in skilled maternal and child health care practices. Therefore, women without formal education, the underprivileged as well as those from hard-to-reach communities should be well considered during health care programme design, planning and implementation. Providing the opportunity for community involvement in baby friendly initiatives would lead to higher coverage in skilled care practices, given the large number of Nigerian women who opt for home deliveries and traditional care due to poverty or ignorance and would rarely visit health facilities for counseling on proper child care.

Abbreviations

BFHI: Baby Friendly Hospital Initiative; CI: Concentration Index; EBF: Exclusive Breastfeeding; EIBF: Early Initiation of Breastfeeding; ICF: Inner City Fund; IYCF: Infant and Young Child Feeding; NDHS: Nigeria Demographic and Health Survey; NHREC: National Health Research Ethics Committee; NPC: National Population Commission; PCA: Principal Components Analysis; SE: Standard Error; SSC: mother and newborn skin-to-skin contact; WHO: World Health Organization.

Declarations

Ethics approval and consent to participate

This study is a secondary data analysis of the NDHS, which is publicly available, approval was sought from MEASURE DHS/ICF International and permission was granted for this use. The original DHS data were collected in conformity with international and national ethical guidelines. Written consent was obtained from mothers/caregivers and data were recorded anonymously at the time of data collection during the NDHS 2018. More details regarding DHS data and ethical standards are available at: <http://dhsprogram.com/data/available-datasets.cfm>

Consent for publication

Not applicable

Availability of data and materials

Data for this study were sourced from Demographic and Health surveys (DHS) and available here: <http://dhsprogram.com/data/available-datasets.cfm>.

Competing interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Author contributions

ME and AA contributed to the conceptualisation and manuscript preparation, the study design, review of literature and wrote the results. ME, AA and AB conducted data analysis, discussed the findings and critically reviewed the manuscript for its intellectual content. All authors read and approved the final manuscript.

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Figures

Figure 1

Prevalence of EBF, SSC and EIBF in Nigeria

(a)

Figure 2 Urban-rural difference for exclusive breastfeeding by household wealth level

(b)

Figure 2

a) Urban-rural difference for exclusive breastfeeding by household wealth level b) Exclusive breastfeeding by household wealth level

(a)

Figure 3 Urban-rural difference for skin-to-skin contact by household wealth level

(b)

Figure 3

a) Urban-rural difference for skin-to-skin contact by household wealth level b) Skin-to-skin contact by household wealth level

(a)

Figure 4 Urban-rural difference for early initiation of breastfeeding by household wealth level

(b)

Figure 4 Early initiation of breastfeeding by household wealth level

Figure 4

a) Urban-rural difference for early initiation of breastfeeding by household wealth level b) Early initiation of breastfeeding by household wealth level

(a)

Figure 5 Urban-rural difference for exclusive breastfeeding by educational level

(b)

Figure 5 Exclusive breastfeeding by educational level

Figure 5

a) Urban-rural difference for exclusive breastfeeding by educational level b) Exclusive breastfeeding by educational level

(a)

Figure 6 Urban-rural difference for skin-to-skin contact by educational level

(b)

Figure 6 Skin-to-skin contact by educational level

Figure 6

a) Urban-rural difference for skin-to-skin contact by educational level b) Skin-to-skin contact by educational level

Figure 7 Urban-rural difference for early initiation of breastfeeding by educational level

Figure 7 Early initiation of breastfeeding by educational level

Figure 7

a) Urban-rural difference for early initiation of breastfeeding by educational level b) Early initiation of breastfeeding by educational level