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Breastfeeding support as predictors of sustainable breastfeeding practices of nursing mothers with common mental disorders in tertiary hospital nurseries in Nigeria: a cross sectional study

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Abstract

Background The postpartum period is associated with an increased risk of maternal mental disorders. The combined effect of having the mother's infant admitted to a tertiary hospital in a low-resource setting and the need to exclusively breastfeed the infant may exaggerate this risk. This study aimed to determine the breastfeeding support provided to mothers whose infants were hospitalised in Nigerian tertiary hospital nurseries and the prevalence of common mental health disorders among this population.

Methods This was a national cross-sectional study involving mothers of hospitalised infants from eleven Nigerian tertiary hospitals between May and August 2022. To assess mothers' mental health and breastfeeding support, we utilised the WHO self-reporting Questionnaire 20 and an adapted WHO/UNICEF ten-step breastfeeding support package.

Results Of the 1,120 mothers recruited from neonatal nurseries in the six geopolitical zones in Nigeria, only 895 had a complete dataset for analysis. The mean age of the mothers was 29.9 ± 6.2; with 54.7% belonging to the low-socioeconomic class. Most of the mothers (835, 93.3%) received antenatal care, and 591: 66.0% were delivered at term. Overall, less than half (427; 47.7%) of the mother received optimal breastfeeding support. One in every four, 216; 24.0% of nursing mothers (95% CI: 21.235 to 26.937%) had common mental disorders (CMD). Pre-pregnant mental health disorders were reported in 41; 4.6% of the nursing mothers. Overall, the lowest performing areas of breastfeeding support were family-centred care (198, 22.1%), practical skill demonstration in the ward (n = 279, 31.2%), and antenatal clinics (n = 294, 32.8%). CMDs were significantly associated with the healthcare provider's practical breastfeeding skill demonstration and the provision of storage facilities for breastmilk and family-centered-care. Across Nigeria's six geopolitical zones, there was an inverse relationship between optimal breastfeeding support

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and the proportion of mothers with CMDs. The northern zone provided better breastfeeding support and had fewer CMDs than the southern region of the country.

Conclusion Common mental disorders are prevalent among nursing mothers in Nigerian tertiary hospital nurseries, and they are inversely related to breastfeeding support. Urgently required in tertiary hospitals for improved and sustainable breastfeeding practices are a focus on family-centred care and enhanced health workers' practical breastfeeding support skills.

Keywords Common mental disorders, Mental disorders, Mental health breastfeeding, Nurseries, Neonatal, Neonates, Mother(s), Nigeria, Tertiary hospital(s)

Introduction

In Africa, the mother is revered as the source of life [1–3]. A mother's health is thus critical, especially during the first few days and years of a newborn's life when the infant relies solely on the mother for survival [3–7]. Breast milk is one of the essentials of life provided by the mother. Breastfeeding has many advantages, one of which is that it provides optimal nutrition for an infant [8]. It strengthens maternal bonds and lowers the risk of respiratory and diarrheal diseases in infants. In addition, it lowers the risk of developing chronic and non-communicable diseases in both mother and infant [8–12]. The antibacterial and bactericidal properties of breast milk, combined with its higher tolerability, make it ideal for newborns in low-income countries with high rates of neonatal sepsis and necrotising enterocolitis [13, 14].

While the benefits of breastfeeding are undeniable with nearly all (97%) Nigerian infants having been breastfed at some point in their lives, there are some concerns. [15, 16]. The advocates for newborn care are bothered by the low rate of exclusive and extended breastfeeding adoption [15, 16]. Exclusive breastfeeding uptake in Nigeria remains at 29%, one of the lowest in Africa, even though it was introduced nearly three decades ago. Furthermore, according to the most recent national demographic and health survey published in 2018, the percentage of infants breastfed within the first hour of life increased marginally by 9%, from 33 to 42%, whereas prelacteal feeds decreased by 7%, from 56 to 49%. [16].: A plausible reason for the slight yet arguably insignificant difference in the 2018 NDHS report may be related to the quality of breastfeeding support and maternal mental health. [17, 18]. Mothers today face a wide range of factors that may have an impact on their mental health and ability to breastfeed effectively [19–22]. In low-income nations, inadequate social and nursing help complicate the burden of dealing with the unforeseen circumstances of birth. Lack of hospital accommodations, lack of provision of adequate dietary intake, extreme poverty, and a health provider's lack of understanding of the mother's mental health risk are all potential stressors of CMDs [23].

The relationship between breastfeeding and the mental health of the mother is bidirectional and multimodal. Maternal mental health is a significant underlying factor associated with barriers to breastfeeding intent, initiation, and continuation [24]. Exclusive, breastfeeding, on the other hand, has been shown to play a protective role in stabilising the mother's mood and thus improving maternal mental health [24]. Breastfeeding self-efficacy, which is the confidence of mothers about their ability to successfully breastfeed has been shown to negatively correlate with the severity of post-partum mental disorders [24, 25].

On the contrary, few studies have demonstrated that women who have mental health disorders before birth and during the immediate neonatal and postnatal period are more likely to develop mental health disorders if they are unable to successfully breastfeed their infants [19, 26].

There is currently limited data on the prevalence, the magnitude of its impact of CMDs in low- and middle-income countries (LMICs) to inform evidence base interventions and focused primary preventive measures [27]. Additionally, it is necessary to ascertain the current status of the WHO's breastfeeding support in LMICs.

This study sought to identify factors predicting the sustainability of breastfeeding practices among nursing mothers with Common Mental Disorders (CMD) in a nation with one of the lowest rates of exclusive breastfeeding. As a part of a comprehensive nationwide investigation, this study stands to provide additional information to existing literature, offering valuable insights into CMDs among breastfeeding mothers and contributing evidence for infant-mother care in the study settings.

Methods

Study design and settings

This prospective cross-sectional study, was conducted from May to August 2022, involved eleven tertiary hospitals, each representing at least one of Nigeria's six geopolitical zones (Fig. 1). Neonatal nurseries, as defined in this study, refer to designated wards within Nigerian tertiary hospitals providing either Level II (special care nursery)

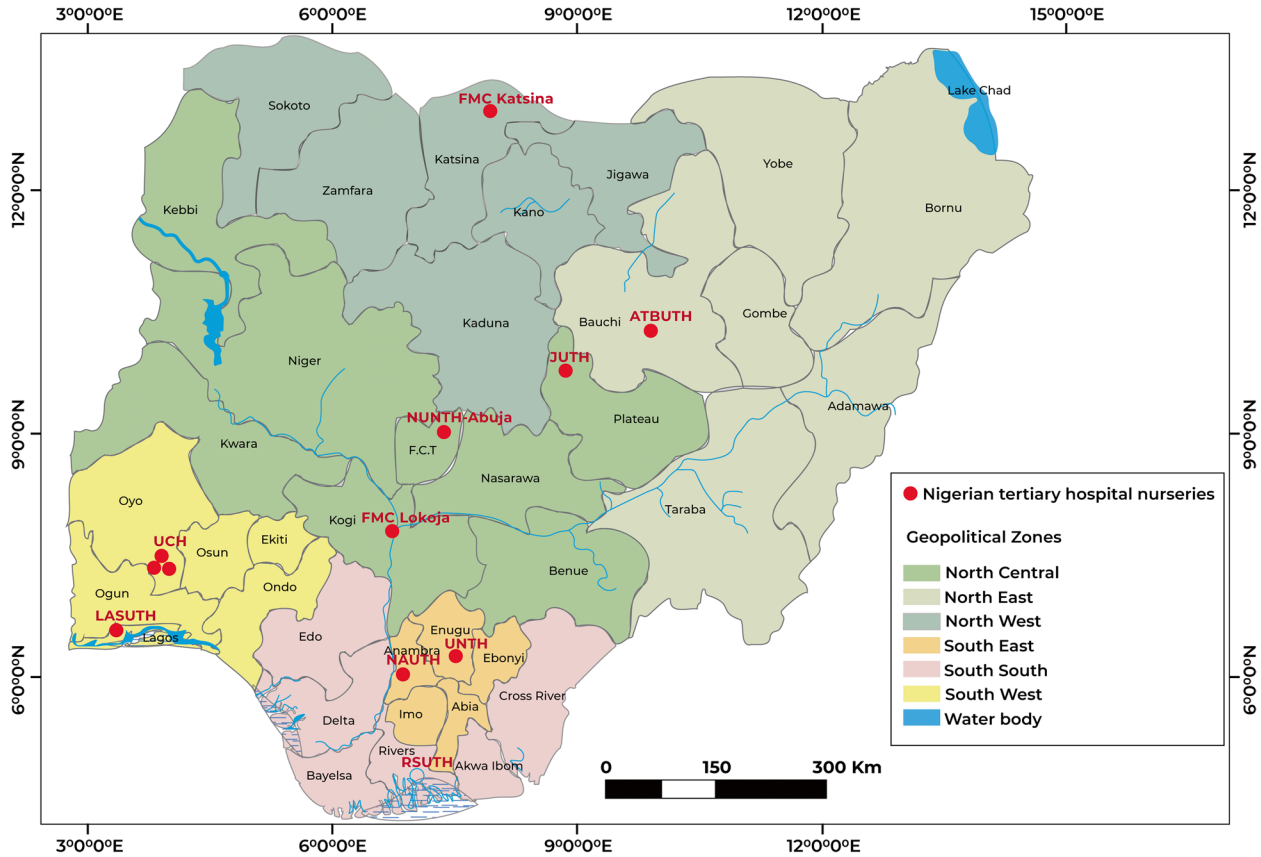

Fig. 1 Map of Nigeria highlighting selected tertiary hospital nurseries in the six geopolitical zones [UCH-University College Hospital, UITH- FMC-Katsina: Federal Medical Centre, Kastina, JUTH- Jos University Teaching Hospital, RSUTH-Rivers State University Teaching Hospital, ATBUTH-Abubakar Tafawa Balewa Teaching Hospital, Bauchi, UNTH-University of Nigeria Teaching Hospital, FMC-Lokoja; Federal Medical Centre, Lokoja, NUTH-Nile University Teaching Hospital Abuja ;(formerly Asokoro District Hospital), LASUTH-, Lagos State University Teaching Hospital, NAUTH-Nnamdi Azikiwe University Teaching Hospital].

or Level III (neonatal intensive care unit (NICU) care based on the WHO/National Comprehensive Newborn Guidelines classification. [28]. This study was conducted in the neonatal nurseries in public tertiary hospitals in Nigeria, which possess the highest bed capacity and staffing levels, overseeing the majority of neonatal hospitalizations. These government-owned teaching hospitals, comprising university teaching hospitals and federal medical centres, boast neonatologists and experts in feto-maternal medicine who actively manage pregnancy complications and preterm deliveries.

These facilities deliver acute care for premature infants (gestational age 20 to 37 post-menstrual weeks), term infants (born at 37 completed weeks), and post-term infants (born at gestational ages ≥ 42 weeks). Annual infant admissions in these hospitals range from 330 to 2,280. Services provided include emergency resuscitation, respiratory and cardiac support (utilising high-flow nasal cannulas and continuous positive airway pressure), and newborn monitoring. However, only a select few hospitals are equipped with ventilators for additional support.

Admitted infants undergo continuous monitoring (using pulse oximeters, multi-parameter monitors, and arterial blood gases [ABG]), along with laboratory and imaging services (including chest X-rays, computerised tomography, and magnetic resonance images). The facilities also offer surgical procedures, nutrition and pharmacy support, and social services for parents/caregivers.

Study participants

The study included all mothers whose infants were admitted to neonatal nurseries within the first month of life and practised any form of breastfeeding. We excluded mothers who did not provide informed consent; mothers whose infants were fed on only infant formula for medical reasons; mothers who were critically ill including those with overt mental disorders who required hospitalisation; mothers whose babies were admitted for less than 24 h; and babies with

multiple congenital abnormalities, surgical abdomen, or any other contraindication for oral feeds.

Sample size determination

The minimum sample size required for this study was calculated using the 'Raosoft software' (http://www.raosoft.com/samplesize.html). Using a previously determined estimated prevalence of the common mental disorders among breastfeeding mothers of 24.3% at a 95% confidence level, 3% (0.03) tolerable margin of error, and a 10% non-response rate, a sample size of 832 was obtained. [29, 30]. Due to the multisite nature of this study, the total sample size was divided into six geopolitical zones and proportionally to the number of neonatal admissions at the participating tertiary hospitals. The sample size was distributed by selecting 40% of the total number of admission in each participating facility as detailed in the proposal during the 4-month study period. A supplementary document (Supplementary Table 1) contains the proportion of selected mother-newborn pairs admitted during the 4-month study period.

Subjects' enrolment and conduct of the research

Using a multistage sampling technique, we utilized GraphPad Prism 9 (GraphPad Software, 2365 Northside Dr. Suite 560 San Diego, CA 92108) to actively select approximately 30% (11/42) of the designated tertiary hospitals for newborn care in Nigeria (refer to Fig. 1). This percentage is statistically considered to be representative of the total number of tertiary facilities in the country [31]. In brief, using we employed a two-stage sampling technique for sample selection. Initially, utilising stratified lists of hospitals per geopolitical zone, we employed simple random sampling to actively select one tertiary health facility per zone, resulting in a total of six. Subsequently, in the second stage, an additional five tertiary hospitals were randomly chosen from the combined lists across the country, yielding a total of eleven study sites.

For participant selection, we utilised the convenience sampling technique, choosing all eligible consecutive admissions at each site. At each study site, the co-investigator or a trained research assistant personally administered the Google Form questionnaire to pairs of eligible mothers and babies. Recognizing varying literacy levels, House Physicians or Nurses proficient in the local dialect were enlisted to administer the questionnaire to prospective participants in person across the country. However, one center in Northwestern Nigeria was inactive and, consequently, excluded from the final data analysis.

Instrument and measurements

1. The World Health Organisation's (WHO) self-reporting questionnaire (SRQ)-

The World Health Organisation's (WHO) self-reporting questionnaire (SRQ)−20 questionnaire was used to assess CMDs. It is a 20-item questionnaire that asks about depression, anxiety, panic, and somatic symptoms in the preceding four weeks [32]. Each of the 20 items was scored 1 or 0, indicating the presence or absence of symptoms. The sum of the scores yielded an overall SRQ-20 scale that ranged from 0 to 20, with higher scores indicating poor mental health and lower scores indicating good mental health [32]. As suggested by many studies, a cut-off of 7 was used to classify women as having common mental disorders (CMD)' or no CMD [32–35]. The scale was administered in English. Collaborating investigators from the geopolitical zone translated the questionnaire into the major local dialects, face-validated it, and requested that it be reviewed by Psychometricians in regions with low levels of literacy. This instrument's reliability and validity are well established, and it has been used in local studies in Nigeria [36, 37].

2. Standardized questionnaire

i) Sociodemographic, obstetrics and neonatal history

A standardised questionnaire was used in addition to the SRQ-20 to assess the sociodemographic data of the mothers, including their ages, marital status, educational attainment, social economic class, geopolitical zones of residence, marital status, and family settings. This also examined the obstetrics history of the mothers, the care level where ante-natal care was received, and the gestational age at delivery. Inquiries were also made regarding the neonatal history, including the infant's age at admission and length of hospitalisation.

ii) Health worker-specific breastfeeding support questionnaire

Because we were unable to obtain a suitable, validated health worker-specific breastfeeding support questionnaire, we relied on the WHO/UNICEF ten-step breastfeeding support package as well as published literature on health workers' breastfeeding support.

a) Antenatal care breastfeeding support

Regarding the provision of breastfeeding support at the ANC, ten questions were asked to assess the health education content of the WHO/UNICEF ten-step breastfeeding support package, as well as whether additional handbills and breastfeeding videos were provided as educational aids. Mothers were also asked if the information on breastfeeding care and hygiene plans was provided at clinic visits [38]. In addition, both the frequency and duration of breastfeeding were inquired about. Other variables measured by the questionnaire include the provision of information about breastfeeding problems and common remedies to mitigate them. Questions were also asked to find out if the mothers' nipples were checked for retraction and whether these problems were addressed when found. Information was sought to acknowledge whether mothers attending ANC were provided with tangible breastfeeding support information, such as demonstrations of breastfeeding positioning, attachment, and the use of a breast pump.

b) Postnatal breastfeeding support

Breastfeeding support at the neonatal nursery was assessed in three domains. The first level of breastfeeding support focused on breastfeeding education and information. The second domain entailed the provision of assistance through tangible breastfeeding support, and the third domain assessed the level of technical support provided for breastmilk storage.

The neonatal nursery mothers were asked if educational materials were displayed in the ward and if they were taught about the benefits of breastfeeding by healthcare professionals. Furthermore, mothers were asked if the facility encouraged early initiation of breastfeeding and if they were aware of the benefits of buccal colostrum. The questionnaire also inquired as to whether the mother was aware of a breastfeeding champion in the ward and breastfeeding support groups in the community. Besides, questions were raised regarding the ease with which mothers who were having difficulty breastfeeding were introduced to breastmilk substitutes. To evaluate the provision of family-centred care at the neonatal nursery, three questions were posed. Mothers were asked if the hospital allowed unrestricted access by husbands or parents to mother-infant pairs in the neonatal nursery. The availability of overnight accommodations for family members, should they be required to assist with the care of mother-infant pairs, the mother's freedom to room in for 24 h following neonatal admission, and concerns regarding the provision of sleeping accommodations and rest, as well as hospital meal service for the mother, were sought. Additional questions on the provision of sleeping accommodations and rest, as well as hospital meal service for the mother, were asked. Information was also sought on the provision of kangaroo mother care, tangible support for breastmilk expression, and assistance with breastfeeding problems at the neonatal nursery. Finally, the availability of breastmilk storage facilities at the centres was also asked for. Experts and members of the research team evaluated the derived breastfeeding questions and made additional modifications. The information sheets and questionnaires were translated into their respective local dialects by native speakers who are Medical Doctors and then back-translated into English to ensure that the original meaning was preserved. Before the study commenced, we pilot-tested and validated the questionnaire with 90 mothers-dyads in one of the tertiary neonatal nurseries in southwestern Nigeria. The mother-infant pairs who took part in the pilot study were excluded from the final study. The pilot testing feedback was incorporated into the study's final questionnaire. The details in the questionnaire can be accessed using the link: https://forms.gle/BJmWKdjkzDdt47oXA

Variable description and measurement

Dependent/Outcome variable

In this study of sustainable breastfeeding practices, we consider the presence or absence of common mental disorders (CMD) among breastfeeding mothers at a Nigerian teaching hospital as the dependent variable. This variable has a binary outcome that indicates the presence (CMD present) or absence (CMD absent) of common mental disorders.

Predictor variables

The study explores predictor variables that impact sustainable breastfeeding practices in mothers with common mental disorders during the antenatal and postnatal stages. These predictor variables include

antenatal practical breastfeeding skill demonstration, technical support, postnatal practical breastfeeding skill demonstration, family postnatal support, and postnatal breastfeeding education and promotion. These predictor variables' means and standard deviations were calculated from Likert scale measurements and secondary dichotomization. The dichotomization explanatory variables were further analysed to assess the factors influencing sustainable breastfeeding practices in the specified population.

Sub-variables analysis

We streamlined the predictor variables for analytical efficiency by deriving them from specific sub-variables during antenatal care, such as education and promotion (health talks, distribution of educational materials, counseling on breastfeeding care plans, hygiene education, sessions on breastfeeding problems and remedies, and informing mothers about breastfeeding frequency and duration). Additionally, the Assessment of Breastfeeding Demonstrations covered checking and pulling on retracted nipples, positioning and attachment, and proper breast pump use. At the postnatal stage, the assessment of postnatal maternal breastfeeding support included initiation, education and promotion, protection, family support, rooming in, practical assistance, and technical support. This approach ensures a focused and methodical examination of critical components within the antenatal and postnatal contexts, contributing to a nuanced analysis of predictor variables in the study.

Data management and analysis

The data were collected via Google form, extracted and exported into IBM SPSS Statistics (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.) for analysis. Sociodemographic factors, parity, and details of the antenatal clinic (ANC), including gestational age at delivery, are summarised in the frequency table. Using a cut-off of 7, the SR1-20 was used to classify the mothers into CMD and no CMD groups. The mean score of the response was used to classify breastfeeding support as good/optimal (values corresponding to a mean score of 11.5 ± 5.2 and above) or poor/sub-optimal (values below the mean score of 6.3). The mean score for ANC breastfeeding education, ANC practical breastfeeding skill demonstration, postnatal breastfeeding education, postnatal family support, postnatal breastfeeding protection in form of adhering to international code for marketing breastfeeding substitute, rooming-in, postnatal practical breastfeeding skill demonstration, technical support for breast milk storage, and overall breastfeeding support were determined based on the sum of the aforementioned measures. Scores below the mean score were deemed poor, while scores above the mean score were deemed good or optimal.

Pearson's chi-squared test or Fischer's exact test was used to test for associations between CMD and sociodemographics, antenatal factors (ANC attendance and place), gestational age at delivery, parity, infant's duration on admission, and breastfeeding support. For the Oyedeji social class, the education and occupation/business engagement of both parents were stratified into five categories. Parental occupations range from unemployed to senior public servants, professionals, managers, large-scale traders, businessmen, and contractors, while educational attainment ranges from no formal education to a graduate degree. The mean score of both parents at each stratum was estimated to the nearest integer, and a score was assigned. Furthermore, the five grades are reclassified into three social classes (upper: social classes I & II, middle: social classes III, and low: classes IV & V) [39]. Multivariable analysis was used to determine and report the adjusted odds ratio (AOR) with a 95% confidence interval for predictor variables that were statistically associated with CMD on bivariable analysis. The predictor variables include ANC breastfeeding education, ANC practical breastfeeding skill demonstration, postnatal breastfeeding education, postnatal family support, postnatal breastfeeding protection, rooming in, postnatal practical breastfeeding skill demonstration, and availability of storage facilities for breast milk. The significance level was set at $P < 0.05$.

Results

Of the 1,120 mothers recruited for the study at the tertiary neonatal nurseries in the six geopolitical zones in Nigeria (Supplementary. Table 1) only 895 had a complete dataset for analysis. The 125 excluded participants shared similar social, demographic, and clinical characteristics with those analysed. The mean age of the study participants was 29.9 ± 6.2; (95% CI of mean 36.3–36.8) with 490; 54.7% belonging to the low-socioeconomic class. Most of the mothers (835, 93.3%) received antenatal care, 591: 66.0% were delivered at term and about half were para 2 to 4 (434; 48.5%). Only 88; 9.8% of the participants lacked formal education. Table 1 provides additional sociodemographic information.

The prevalence of CMD) was 24.0% (95% CI: 21.235, 26.937%).

At the antenatal clinic, even though 640 (71.5%) of the pregnant women who attended an antenatal clinic (ANC) received health talks, and educational materials such as pamphlets or videos on breastfeeding, only 391 (43.7%) were counselled to develop a breastfeeding plan. Less than half (399; 44.6%) of pregnant women at ANC received instruction on common breastfeeding problems

Table 1 General characteristics of the study population

Social demographic and clinical history	Subcategory	Frequency n = 895	Percent
Age group (years)	15–20	69	7.7
	> 20—< 35	597	66.7
	≥ 35	229	25.6
Parity	1	339	37.9
	2–4	434	48.5
	≥ 5	122	13.6
ANC	No	60	6.7
	Yes	835	93.3
Place of ANC	Maternity home	14	1.7
	Private hospital	44	5.3
	Primary health facility	267	32.0
	Secondary health facility	221	26.5
	Tertiary health facility	289	34.5
Gestational age at delivery	Preterm	304	34.0
	Term	591	66.0
Baby's duration on admission (days)	1–3	208	23.2
	4–7	386	43.1
	> 7	301	33.6
Educational level	No formal education	88	9.8
	Primary	44	4.9
	Secondary	314	35.1
	Tertiary	449	50.2
SEC	Upper	127	14.2
	Middle	278	31.1
	Lower	490	54.7
Geopolitical zones	North-west	124	13.9
	North-east	75	8.4
	North-central	281	31.4
	South-east	93	10.4
	South-south	103	11.5
	South-west	219	24.5
Marital status	Married	854	95.4
	Single	41	4.6
Family settings	Monogamous	779	87.0
	Polygamous	116	13.0

ANC antenatal clinic attendance, *SEC* Socioeconomic class Mean age 29.9 ± 6.2

and potential solutions. Only two out of every five pregnant women at ANC received information on breastfeeding frequency and duration.

Only 253(28.3%) pregnant women observed demonstrations of how to treat retracted nipples. Approximately two-thirds of the mothers were instructed on how to position and latch the infant for breastfeeding. At ANC, only one-fifth of women were taught how to use a breast pump. Additional information is shown in Table 2.

At the neonatal nurseries, about half of the neonatal nurseries (459; 51.3%) had breastfeeding posters displayed at strategic points for mothers of admitted babies at tertiary neonatal nurseries to view. Seven hundred and thirty-three mothers (81.9%) were educated on the benefits of breastfeeding. About two-thirds, 535(59.8%) of mothers whose babies were admitted were being informed of the benefits of buccal colostrum. Out of every five breastfeeding mothers, one to two; 157 (17.5%) were aware of the availability of breastfeeding champions in the neonatal wards, while 173; 19.3% were aware of the existence of other breastfeeding support groups in the facility of care. In terms of breastfeeding

Table 2 Antenatal Clinic Breastfeeding Support

Questions	Responses	
	Yes n (%)	No n (%)
Education/Promotion		
Health talks, distribution of educational materials such as handbills or breastfeeding videos	640(71.5%)	255 (28.5)
Counselling on the formation of a breastfeeding care plan	391(43.7%)	504(56.3)
Breastfeeding hygiene education	600(67.0)	295(33.0)
Session on breastfeeding problems and common remedies	399(44.6)	496(55.4)
informed of the frequency of breastfeeding	391(43.7)	504(56.3)
informed about the duration of breastfeeding	368(41.1)	527(58.9)
Breastfeeding Demonstrations		
Demonstrated how to check and pull on the retracted nipples	253(28.3)	642(71.7)
Demonstrate positioning and attachment	587 (65.6)	308 (34.4%)
Demonstrate how to use a breast pump	196(21.9)	699(79.1)

support, about two-thirds, 557 (62.2%) were introduced to breastmilk substitutes when they experienced difficulties breastfeeding. Regarding family support, three out of every four mothers 676 (75.5%) reported that their husbands were allowed to have access to their babies during admission, while in less than one-tenth of cases 70 (7.8%), other family members were permitted to assist mother-infant pairs overnight in the ward.

Six hundred sixty-two mothers (74%) disclosed that they were permitted to room-in with their infant during hospitalization, and 676 (75%) were provided with sleeping accommodations. In the majority, 820 (91.6%), of neonatal nurseries in Nigeria, no provision was made for mothers' feeding. Babies were placed skin to skin at birth in less than half of the mothers (365; 40.8%). In terms of practical breastmilk expression demonstrations in nurseries, 544 (60.8%) of women observed how to directly express breastmilk. Only one in five mothers 177 (19.8) reported getting help when breastfeeding was difficult. Breastfeeding champions only assisted 80 (8.9%) mothers at the neonatal nurseries; Table 3 contains additional information.

In determining who provided breastfeeding support to mothers, 253 (59.2%) were nurses. Breastfeeding champions (10.5%) provided more support than doctors alone. Family members (9.9%) provided as much breastfeeding support as the doctor (9.9%).

Health assistants provided the least amount of breastfeeding support (2.95%). Table 4 provides additional information.

Assessing the health workers' quality of breastfeeding support at neonatal nurseries, revealed that overall, only (427; 47.7%) of nursing mothers received optimal breastfeeding support. Technical support in form of the provision of breastmilk storage was the support mostly offered (574; 64.1%), followed by rooming-in (531;59.3%) and breastfeeding education (421;47.0%) in the antenatal clinic. Family-supported care (family-centred care) (198; 22.1%), practical skills demonstration in the ward ($n=279$; 31.2%), and antenatal clinics ($n=294$; 32.8%) were the top three areas of poor performance. Table 4 contains additional information.

The association between breastfeeding support and common mental disorders (Table 5) showed that practical skill of the healthcare provider [197/279 (70.6%); $x^2=6.118$ ($p=0.013$)] and assistance in preserving mothers' breastmilk to enable them to take a break from the ward [422/574 (73.5%); $x^2=4.818$ ($p=0.021$)] were found to be associated with CMDs on Bivariate analysis.

On multivariable logistic regression of factors associated with CMDs and breastfeeding support (Table 6). Lack of breast milk storage facilities [AOR = 1.565; (95% CI: 1.087, 2.253), $p=0.016$], receiving suboptimal postnatal breastfeeding support [AOR = 1.649; (95% CI: 1.132, 2.401), $p=0.009$] both confers a 1.6-fold increase in the odds of the mother developing CMDs, as does providing poor family-centered care [AOR = 1.493; (95% CI: 1.019, 2.186), $p=0.040$] after adjusting for confounders.

Figure 2. Regional distribution of Common Mental Disorders and Breastfeeding Support.An inverse relationship was observed betweenoptimal breastfeeding support and the proportion of mothers with CMDs across Nigeria's six geopolitical zones. The northern zone provided better breastfeeding support with fewer incidences of CMDs than the southern part of the country. The lowest perceived breastfeeding support and greatest CMDs were seen in the south-southern zone. The differences in the distribution of CMDs and optimal breastfeeding support across the geopolitical zones were statistically significant (Bartlett's statistic (corrected 0 = 6.256, *P* value = 0.0438). Other details are shown in the bar chart in Figure 2.

Table 3 Postnatal maternal breastfeeding support

Breastfeeding support	Responses	
	Yes n (%)	No n (%)
Breastfeeding initiation, education/promotion		
Exhibition of Educational Materials in the Ward	459(51.3)	435(48.6)
Instructions on the benefits breastfeeding	733(81.9)	161 (18.0)
Instructions on early breastfeeding initiation and the benefits of buccal colostrum[#]	535(59.8)	359(40.1)
Awareness of the availability of breastfeeding Champion* in the ward	157(17.5%)	737(82.3)
Availability of breastfeeding support groups	173(19.3)	721(80.6)
Breastfeeding Protection		
Introduction of formula feeds as a result of breastfeeding challenges	557 (62.2)	337(37.7)
Family Support		
Husband has access to his child's care in the nursery	676 (75.5)	218 (24.4)
Availability of space in the hospital for other family members to assist the mother overnight	70(7.8)	825 (92.2)
Rooming in	198 (22.1)	697(77.9)
Mothers have full access to their baby (ies)	662 (74.0)	232(25.9)
A sleeping area for mothers	676(75.5)	219(24.5)
The healthcare facility provides food for the mother (breakfast, lunch, dinner, and snacks)	74 (8.3)	820 (91.6)
Practical Breastfeeding assistance		
Baby(ies) placed skin to skin after delivery	544(60.8)	350(39.1)
Direct expression of breast milk was aided	365(40.8)	529(59.1)
Received support to resolve breastfeeding problem	177(19.8)	718(80.2)
Technical support		
Availability of storage facilities for breastmilk	574(64.1)	320(35.8)

* An experienced mother who serves as a role model assists other mothers with breastfeeding difficulties. [#]Administration of 0.2 ml of colostrum into the buccal cavity

Table 4 Health workers' quality of breastfeeding support at neonatal nurseries

Breastfeeding support	Subcategory n = 895	Frequency	Percentage
ANC Breastfeeding Education	Good Breastfeeding Education	421	47.0
	Poor Breastfeeding Education	474	53.0
ANC practical Breastfeeding Skill demonstration	Good practical Breastfeeding Skill	294	32.8
	Poor practical Breastfeeding Skill	601	67.2
Postnatal Breastfeeding education/promotion	Good Breastfeeding initiation, education/promotion	389	43.5
	Poor Breastfeeding initiation, education/promotion	506	56.5
Postnatal Family Support	Good Family Support	198	22.1
	Poor Family Support	697	77.9
Postnatal Breastfeeding Protection	Good Breastfeeding Protection	338	37.8
	Poor Breastfeeding Protection	557	62.2
Rooming In	Rooming in	531	59.3
	No Rooming in	364	40.7
Postnatal practical Breastfeeding Skill demonstration	Well assisted	279	31.2
	Poorly assisted	616	68.8
Technical Support	Technical Support present	574	64.1
	No Technical Support	321	35.9
Overall Breastfeeding support	Optimal Support	427	47.7
	Poor support	468	52.3

Table 5 Association between breastfeeding support and common mental disorders

Breastfeeding support	Subcategory *n* = 895	No CMDs *n* = 679	CMDs *n* = 216	X^2	P
ANC Breastfeeding Education	Poor Breastfeeding Education	366 (77.2)	108(22.8)	1.002	0.317
	Good Breastfeeding Education	313(74.3)	108(25.7)		
ANC practical Breastfeeding Skill demonstration	Poor practical Breastfeeding Skill demonstration	466(77.5)	135(22.5)	2.792	0.095
	Good practical Breastfeeding Skill demonstration	213(72.4)	81(27.6)		
Postnatal Breastfeeding Education	Poor postnatal Education	390(77.1)	116(22.9)	0.93	0.335
	Good Postnatal education	289(74.3)	100(25.7)		
Postnatal Family Support	Poor Family Support	536(76.9)	161(23.1)	1.844	0.175
	Good Family Support	143(72.2)	55(27.8)		
Postnatal Breastfeeding Protection	No introduction of formula	256(75.7)	82(24.3)	0.005	0.945
	Introduction of formula	423(75.9)	134(24.1)		
Rooming In	No Rooming IN	272(74.7)	92(25.3)	0.432	0.509
	Rooming In	407(76.6)	124(23.4)		
Postnatal practical Breastfeeding Skill demonstration	Poor Practical Support	482(78.2)	134(21.8)	6.118	**0.013**
	Good Practical Support	197(70.6)	82(29.4)		
Technical Support	No storage facilities for breast milk	257(80.1)	64(19.9)	4.818	**0.021**
	Provision of storage facilities for breast milk	422(73.5)	152(26.5)		
Overall Breastfeeding support	Overall Poor support	357(76.3)	111(23.7)	0.093	0.761
	Over all optimal Support	322(75.4)	105(24.6)		

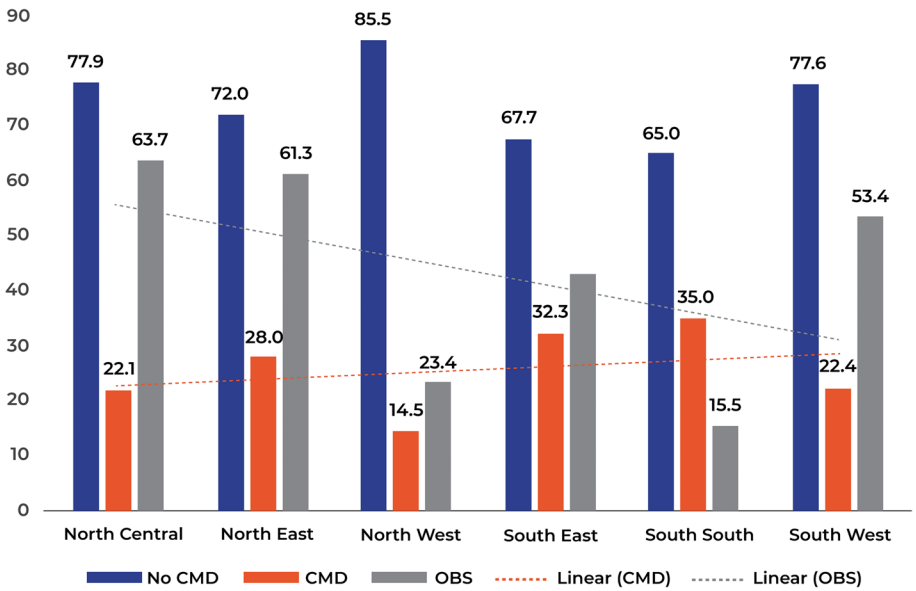

Fig. 2 Regional distribution of Common Mental Disorders and Breastfeeding Support. (Figure 2 depicts the prevalence of common mental disorders and their inverse relationship with optimal breastfeeding support on a group bar-chart with a linear bar across Nigeria's six geographical zones.)

Discussion

This study aims to assess the prevalence of common mental disorders (CMDs) and evaluate breastfeeding support as predictors of sustainable breastfeeding practices among nursing mothers with CMD in Tertiary Hospital Nurseries across Nigeria's six geopolitical zones. Our key findings show that one in four mothers in Nigeria's tertiary hospitals experienced CMDs, with suboptimal breastfeeding support provided to the majority. Family-centred care received the least attention as a predictor of sustainable breastfeeding practices among nursing mothers with CMDs. Regarding sustainable

Table 6 Multivariable analysis (binary logistic regression) of factors associated with CMDs

Variables	Categories	*n* = 216 (%)	OR	95% CI	AOR	95% CI	P
ANC practical breastfeeding Skill demonstration	Optimal practical demonstration	81 (37.5)	1				
	Suboptimal practical demonstration	135 (62.5)	1.313	0.954, 1.807	1.467	0.991, 2.172	0.055
Technical Support	Provision of storage facilities for breast milk	64 (29.6)	1				
	No storage facilities for breast milk	152 (70.4)	1.446	1.039, 2.014	1.565	1.087, 2.253	**0.016**
Postnatal practical Breastfeeding Skill demonstration	Optimal Practical Support demonstration	82 (38.0)	1				
	Suboptimal Practical Support demonstration	134 (62.0)	1.497	1.086, 2.064	1.649	1.132, 2.401	**0.009**
Family post-natal support	Optimal support	55 (25.5)	1				
	Suboptimal support	161 (74.5)	1.280	0.896, 1.842	1.493	1.019, 2.186	**0.040**
Postnatal Breastfeeding educ./promotion	Optimal Breastfeeding initiation, educ./promotion	100 (46.3)	1				
	Suboptimal Breastfeeding initiation, educ./promotion	116 (53.7)	1.163	0.855, 1.582	1.118	0.769, 1.625	0.558
Overall Breastfeeding support	Over all optimal Support	105 (48.6)	1				
	Overall Suboptimal support	111 (51.4)	1.049	0.722, 1.425	1.954	1.210, 3.157	**0.006**

CMDs common mental disorders, *OR* odds ratio, *AOR* adjusted odds ratio, *CI* confidence intervals, *ANC* antenatal care, *educ* education

breastfeeding practices, the skill components of attachment, positioning, hand expression of breast milk, and the use of a breast pump received the lowest ratings in tertiary hospitals.

The observed prevalence of CMDs is significantly higher than the pooled prevalence of CMDs in low- and middle-income countries reported in a systematic review by Fisher et al. [40]. Notably, this finding is unsurprising, considering the limited focus on CMDs in the latest Nigerian National Demographic Health Survey and the global public health breastfeeding promotion's insufficient emphasis on maternal mental health [16, 41].

Countries with prevalence rates similar to our study include India (23%), Indonesia (22.4%), Pakistan (25%), and Bangladesh (33%), while Ethiopia exhibited a higher prevalence of common mental health disorders (59.5%) [40]. Factors like hospitalization stress, infant illness severity, poor health care financing, and healthcare workers' attitudes may have offset the psychological benefits of breastfeeding, contributing to the observed CMDs in one out of every four screened breastfeeding mothers [40].

In contrast, the reported prevalence of CMD in higher-income countries (6.5%–12.9%) was lower [42]. The disparities in CMD prevalence rates across the countries may be due to cultural perceptions, differences in methodology and study design, the characteristics of the various study populations, the assessment tool and the variation in the quality of breastfeeding support received by mothers [43].

Despite identified deficiencies in perinatal screening for CMDs, concerning is an observed substantial gap between screening and delivering appropriate, cost-effective interventions such as sustainable breastfeeding practices for affected women. As reported by Atif et al. [44]., eight out of ten mothers with CMD did not receive an intervention. This necessitates a call for policy reform and the updating of current breastfeeding support initiatives to address the mental health challenges that mothers face, particularly in low- and middle-income countries. Exclusive breastfeeding has benefits for both the infant and the mother [45, 46]. Breastfeeding has been linked to neurochemical and hormonal changes in the mother's brain that are beneficial to her mental health [47]. This mechanism is mediated by the oxytocin and prolactin released by the mother during breastfeeding. The negative feedback effect on stress hormones and cortisol is a precursor to various forms of common mental disorders (CMDs), such as depression, anxiety, panic, and somatic symptoms [8, 48]. In addition, breastfeeding is a powerful sleep regulator for both mother and infant, which helps to maintain maternal self-reliance, stabilises mothers' moods, and alleviates their anxieties [8, 49, 50].

A future option for research is a comparative cross-sectional study assessing the prevalence of CMDs in breastfeeding mothers with newborns not admitted to hospitals, including those attending immunisation, well-baby clinics, and primary healthcare settings. This could offer an additional perspective on the determinants of sustainable breastfeeding practices among mothers with CMD in the broader Nigerian population. Nonetheless, a prevalence of 24% of any disease condition in any setting is a potential public health concern that requires the implementation of both preventive and treatment

strategies [40]. Good maternal mental health is critical to the survival of the newborn up to the age of five years and beyond, to the family, and to the community as a whole, and cannot be overstated [24, 51, 52]. This study thus validated the existence of a "silent pandemic" of CMDs in our population and calls for action.

The suboptimal implementation of breastfeeding support strategies in our tertiary hospitals, spanning from the antenatal clinic through the postnatal period, reflects disappointingly low findings. This could potentially account for the current low rate of exclusive breastfeeding in our country (29%) [16]. Despite the evidence that the decision to exclusively breastfeed correlates positively with exposure to relevant breastfeeding support strategies as early as possible in pregnancy, our findings show that pregnant women attending tertiary hospitals in Nigeria no longer receive adequate breastfeeding information [15]. Breastfeeding education and support during pregnancy primes mothers and allows them to plan for and prepare for expected breastfeeding difficulties. When mothers understand the fundamentals of breastfeeding, they are better able to cope [15]. It also gives them confidence, a positive attitude, early initiation of breastfeeding and the conviction to continue exclusive breastfeeding for the required six months and beyond. The poor implementation of breastfeeding support initiatives in the antenatal period across most tertiary hospitals stems from factors including late antenatal booking, leading to inadequate exposure to health talks and other support strategies, limited retraining of healthcare workers due to economic distress in the public health sector, a depletion of clinic nurses due to the brain drain phenomenon, and overworked nursing staff [53, 54]. These factors may appear far-fetched, but they have an indirect impact on health-care quality and may be to blame for the poor implementation of breastfeeding support strategies observed in this study.

The study population at the designated sites reported inadequate implementation of practical breastfeeding support strategies in the postnatal period, encompassing assistance with attachment, positioning, breast milk expression, and the use of a breast pump. Despite newborn nurseries in tertiary hospitals being regarded as centers of excellence, the study highlights concern. Tertiary hospital staff, often considered 'role models,' are expected to train lower-cadre health workers in effective breastfeeding support. The finding that lack of skilled breastfeeding support was associated with CMD among breastfeeding mothers was similar across the board in both LMICs and high-income countries [55, 56]. Reports of tertiary hospital workers introducing breast milk substitutes to mothers with feeding difficulties, without medical indication, signal a regression in the Baby Friendly Hospital Initiative (BFHI) in our public health sector. Consequently, there is a pressing need to relaunch and revitalize the BFHI, coupled with the retraining of healthcare workers, considering the unique circumstances of our diverse communities and societies.

It is concerning that, despite mothers with infants admitted to level 2–4 healthcare facilities requiring more psychosocial support than those in lower-level facilities, suboptimal support for sustainable breastfeeding extends beyond practical strategies. It encompasses limited family-centered care and technical support, prompting concerns [57, 58].

Central to inadequate breastfeeding support is an overwhelmingly low implementation of the family support component outlined in the BFHI guidelines. Family support, receiving the least attention among support strategies, was deemed inadequate by nearly 80% of respondents. Family-centered care (FCC), a holistic intervention for sick newborns, relies on the collaboration between the family and medical staff [59, 60]. The cooperative relationship is forged through mutual respect, knowledge exchange, and active family involvement in developing essential infant care skills. Studies in the literature indicate that effective Family-Centered Care (FCC) correlates with a reduced incidence of nosocomial sepsis and significantly higher rates of exclusive breastfeeding before discharge [59, 60]. Contrary to common perception in LMICs, infrastructure limitations and resource constraints at public hospitals had little impact on a positive attitude towards Family-Centered Care (FCC) in newborn care settings. Our study observed that FCC was overlooked in healthcare facilities, increasing the likelihood of mothers developing CMDs by 1.5 times [59, 60]. In light of the importance of the extended family system in our study settings, involving fathers, grandmothers, and other maternal relatives in newborn care underscores the significance of not neglecting Family-Centered Care (FCC). Our findings reveal an inverse relationship between the prevalence of CMDs and the adoption of the FCC model, aligning with reports from other centers. We advocate for the integration of FCC into care packages across all levels of care in Nigeria and other Low and Middle-Income Countries (LMICs), urging relevant stakeholders, including government and hospital administrations, to consider this integration.

This study holds implications for healthcare professionals tending to infants in tertiary hospitals in Low and Middle-Income Countries (LMICs). Addressing Common Mental Disorders in Tertiary Hospital Nurseries in Nigeria necessitates enhanced breastfeeding support, specifically targeting identified predictors for sustainable breastfeeding practices. Policymakers are urged to

integrate these predictors into protocols for managing mothers with hospitalized babies. Moreover, there is a crucial need for comprehensive training and retraining on tangible breastfeeding support measures, including mandatory certification in the UNICEF/WHO 20-h course for all professionals in newborn care nurseries [61]. Routine screening for Common Mental Disorders in pregnant and breastfeeding women is deemed crucial for early diagnosis and appropriate care. Finally, healthcare providers are encouraged to maintain a positive, nonjudgmental attitude towards mothers encountering breastfeeding difficulties.

The study's strengths and limitations

While our study's strength lies in its multi-site nature across all six geopolitical zones in Nigeria, boasting a substantial sample size of 895 and providing tailored predictors of sustainable breastfeeding practices in the study settings, it is not without limitations. We utilized a scale-based proxy measure for CMDs, developed by the WHO for LMICs, which, being self-reported, is susceptible to recall bias and provides a generic diagnosis, unable to identify specific mental disorders for definite intervention. However, mothers identified with this spectrum of disorders have an optimal chance of further evaluation by experts for definitive treatment.

The cross-sectional design hinders the establishment of a direct or indirect cause-and-effect relationship between mothers' CMD and breastfeeding support status. Nonetheless, it offers valuable baseline data for future longitudinal studies using conventional psychiatric disorder screening tools. The high prevalence of CMD disorder may be influenced by spurious CMD-suggestive characteristics in the immediate postpartum period due to hormonal changes, although the body maintains homeostasis. Limited tools for evaluating breastfeeding competency among healthcare professionals may impact the generalizability of our measurements. Despite these limitations, our questionnaire, rooted in well-researched literature and validated by an expert, lends credibility to our findings. Additionally, the unrecorded mode of delivery (caesarean section or spontaneous vertex delivery) may have been a confounding variable influencing CMDs.

Conclusion

Common mental disorders are common among nursing mothers in Nigerian tertiary hospitals' neonatal nurseries and are inversely related to breastfeeding support. To increase breastfeeding rates among nursing mothers whose infants were admitted to neonatal nurseries in Nigeria, we recommend maternal mental health services, a comprehensive family-centred care strategy, and tangible breastfeeding support from healthcare practitioners.

Supplementary Information

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Supplementary Material 1.

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Authors' contributions

Alao Michael Abel: Substantially contributed to conception or design; contributed to acquisition, analysis, or interpretation of data; drafted the manuscript; critically revised the manuscript for important intellectual content; gave final approval; agree to be accountable for all aspects of the work in ensuring that questions relating to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Rasheed Olayinka Ibrahim: Substantially contributed to the design, analysis, and interpretation of data; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy. Sikirat Adetoun Sotimehin and Datonye Christopher Briggs: Contributed to the design, drafting of the manuscript, critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy. Sakiru Abiodun Yekini, Udochukwu Michael Diala, Aishatu Zaidu Musa, Zainab Oluwatosin Imam, Esther Oluwatoyin Famutimi, Adedeji Abiodun Idris, Kenechukwu Adaeze C. Ayuk, Kosisochukwu Iloh, Chioma Laura Odimegwu, Ayomide Toluwanimi Adeyemi, Patricia F Medupin, Yetunde C. Adeniyi and Kenechi Ogbodo Nnamani Contributed to the design, critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy. Olukemi Oluwatoyin Tongo: Contributed to the design, drafting of the manuscript, supervision critically revised manuscript; gave final approval and agrees to be accountable for all aspects of work ensuring integrity and accuracy.

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Data availability

The dataset(s) supporting the conclusions of this article is included within the article as an additional file.

Declarations

Ethics approval and consent to participate

Ethics approval was obtained from the National Health Research Ethics Committee of Nigeria (NHREC) with approval number NHREC/01/01/2007–31/03/2023. Informed consent was obtained from every participant before participating in the study. The majority of the participants in this study are literate; in the few cases where participants were illiterate, informed consent was obtained from the participants' literate legal guardians. This study strictly conformed to the Declaration of Helsinki, and all relevant regulations and guidelines for the conduct of research with human subjects were followed.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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