



## **Practice of Kangaroo Mother Care: Unveiling Implementation Among Healthcare Providers in Sokoto, North-Western Nigeria**

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### **Abstract**

**Purpose** – To assess the proportion of Health Care Providers (HCPs) in Sokoto practicing Kangaroo Mother Care (KMC) in their various health facilities and identify barriers to KMC practice among HCPs in Sokoto. The purpose of this research is to evaluate the extent of KMC adoption and uncover the obstacles that hinder its effective implementation.

**Design/methods/approach** – A cross-sectional descriptive study was conducted among 80 Health Care Providers (HCPs) who attended the World Prematurity Day celebration in 2022. The program was held at the Medical and Health Workers Union office, Tamaje, Sokoto, on December 2, 2022. A structured questionnaire comprising both open and close-ended questions was used. Data obtained were analyzed using SPSS version 25.

**Findings** – The mean age of the HCPs was 32.9±7.6 years, with the majority, 30 (37.5%), having less than five years of working experience. Of the 80 respondents, 41 (51.3%) were nurses, 9 (11.2%) were doctors, and 16 (20.0%) were midwives. Forty-three (53.7%) of the HCPs practiced KMC. The most common barriers to implementing KMC among the HCPs were lack of privacy for the mothers (23, 28.8%), lack of space for the mothers (21, 26.3%), cultural reasons (19, 23.8%), and lack of skills on KMC (16, 20.0%). The factors associated with the practice of KMC were previous training on KMC and working in tertiary hospitals ( $p < 0.05$ ).

**Research implications/limitations** – This research implies that to mitigate barriers to KMC practice in hospitals, HCPs need to be trained to acquire skills for KMC, and rooms for KMC that ensure privacy for mothers should be available in health facilities.

**Practical implications** – By identifying and addressing the barriers to KMC, such as lack of privacy, space, and skills, health facilities can improve the adoption and effectiveness of KMC practices.

**Originality/value** – Kangaroo Mother Care reduces morbidity and mortality in Low Birth Weight (LBW) infants, making it crucial for countries with scarce resources to adopt this practice. Healthcare providers play a vital role in educating, supporting, and assisting mothers to practice KMC in the hospital and continue it at home after discharge.

**Keywords** Kangaroo Mother Care, Health Care Providers, Practice

**Paper type** Research paper

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## 1. Introduction

Preterm birth accounts for approximately 15 million babies born annually worldwide, indicating a global preterm birth rate of about 11%, with 1 million children dying due to preterm birth before the age of 5 years (Walani, 2020). Sub-Saharan Africa, including Nigeria, accounts for up to 60% of these cases, with over one million deaths due to complications of prematurity (Mustapha et al., 2020). Nigeria currently has the highest number of newborn deaths in Africa and the second highest in the world after India (Mustapha et al., 2020). In Nigeria, the leading causes of neonatal mortality are preterm births and intrapartum-related events, with 15% of babies born as low birth weight babies (Okoh & Onubogu, 2018). The Nigeria Demographic and Health Survey (NDHS) 2013 and 2018 estimated birth weight based on numerical values from written records and mother reports, showing 16% and 24% of newborns respectively were low birth weight.

These alarming statistics highlight the urgent need for effective interventions to address preterm and low birth weight (LBW) complications. Implementing practices like Kangaroo Mother Care (KMC) could significantly improve neonatal outcomes by providing a cost-effective and evidence-based method to support the health and development of preterm and LBW infants. Enhancing healthcare provider training and ensuring adequate facilities for KMC are crucial steps in reducing neonatal mortality and improving the overall health of newborns in Nigeria and other resource-limited settings.

The Sustainable Development Goals (SDGs) recognize child mortality as a major global health problem and aim to end preventable neonatal and child deaths by 2030. Progress towards achieving these targets has been notably uneven across countries and regions, and the COVID-19 pandemic has reversed recent gains in child survival. Only a few countries are on track to reach the Neonatal Mortality Rate (NMR) and Under-5 Mortality Rate (U5MR) targets by 2030. If current trends persist, two-thirds of countries in sub-Saharan Africa will miss these targets (You et al., 2015).

Premature and low birth weight (LBW) infants are at the highest risk for hypothermia, as they have less brown fat, less subcutaneous fat, and inefficient metabolic heat production (Onalo, 2013). Hypothermia increases the risk of death five-fold. For every degree Celsius drop in neonatal body temperature, the risk of mortality increases by 80% (Mullany et al., 2010). Hypothermia in newborns is associated with a range of morbidities, such as hypoglycemia, hypoxia, metabolic acidosis, peri-intraventricular hemorrhage (PIVH), necrotizing enterocolitis, sepsis, and bronchopulmonary dysplasia, as well as increased mortality. The presence of hypothermia at admission to the Neonatal Intensive Care Unit increases the chance of death by 1.64 times (Cordeiro et al., 2021).

Kangaroo Mother Care (KMC) reduces morbidity and mortality in low birth weight infants. Countries with scarce resources should adopt KMC to minimize problems associated with the management of preterm and low birth weight infants (Azmeraw Getie et al., 2022; Dhage et al., 2023). The every Newborn Action Plan, endorsed and launched by the World Health Assembly in 2014, envisages scaling up KMC to 50% of babies weighing under 2000g by 2020 and to 75% by 2025 (Organization, 2014).

In most countries, the use of incubators is standard for the thermal care of LBW babies (Okoh & Onubogu, 2018). However, incubator care is not widely available in developing countries. Even in the limited cases where incubator care is available, the use of this method can be very challenging (Dalal et al., 2014). Problems such as poor maintenance, power outages, and lack of replacement parts reduce the number of available, functional incubators (Dalal et al., 2014). Additionally, in developed countries where incubator care is readily available, there are various disadvantages when incubators alone are used for the thermal care of newborns. These include a reduction in breastfeeding and reduced maternal-newborn bonding (Arya et al., 2023; Yilmaz & Esenay, 2024). These risks can be mitigated if KMC is used alongside incubators for thermal care (Ibe et al., 2004).

Moreover, the reliance on incubators in developing countries poses significant financial and logistical challenges. High costs associated with purchasing and maintaining incubators can strain limited healthcare budgets, and logistical difficulties in transporting and installing these machines

further complicate their use. The intermittent availability of electricity in many low-resource settings exacerbates these issues, making incubators an unreliable solution for thermal care.

In contrast, KMC provides a cost-effective and practical alternative that can be implemented even in resource-limited environments. KMC not only supports thermal regulation but also promotes breastfeeding, enhances maternal-infant bonding, and can improve overall neonatal outcomes. By integrating KMC with incubator use, healthcare systems can optimize the thermal care of LBW infants, ensuring more comprehensive support for both the infants and their mothers. This dual approach leverages the strengths of both methods, addressing the shortcomings of relying solely on incubators and creating a more resilient and adaptable neonatal care framework.

Several factors inhibit KMC practice, such as inadequate facilities, lack of skills among health workers, and social norms (DURMAZ et al., 2023; Paradillah et al., 2022). To mitigate some of the barriers to KMC practice, training on Kangaroo Mother Care can be included in the training curriculum of health workers (Paradillah et al., 2022). This study aims to assess the proportion of Health Care Providers (HCPs) in Sokoto practicing KMC in their various health facilities and identify barriers to KMC practice among HCPs in Sokoto.

## 2. Methods

This study was conducted in Sokoto, one of the 36 states of Nigeria, located in the extreme North-Western zone of the country. Sokoto is situated between longitudes  $4^{\circ}8'E$  and  $6^{\circ}54'E$  and latitudes  $12^{\circ}N$  and  $13^{\circ}58'N$ . It has 23 local government areas and had a projected population of 4,886,888 people in 2015. The study was a descriptive cross-sectional study carried out among 80 Health Care Providers (HCPs) who attended the World Prematurity Day celebration on December 2, 2022, at the Medical and Health Workers Union office in Tamaje, Sokoto, organized by PHCDA Sokoto in collaboration with UNICEF.

Data collection was conducted using interviewer-administered questionnaires. A structured questionnaire comprising both open and closed-ended questions was used for data collection. The questionnaire was validated by the authors and pre-tested among 8 (10% of the sample size) HCPs who were not part of the study. Information obtained from respondents included the location of their health facility, level of care rendered, age, gender, occupation, qualifications, years of practice, and previous training on KMC. Questions on various levels of personal practice of KMC by the respondents, including educating, supervising, encouraging, and assisting parents in the provision of KMC to neonates, as well as the actual practice of KMC, were included in the questionnaire. Data were analyzed using IBM SPSS version 25. Frequencies and percentages for demographic characteristics of the respondents and the practice of KMC were presented in tables. The Chi-Square test or Fisher's exact test, where necessary, was used to test for associations between demographic characteristics of the respondents and the practice of KMC. The level of statistical significance ( $\alpha$ ) for the test was set at  $p < 0.05$ .

Ethical approval for this study was obtained from Sokoto State Ministry of Health. In addition, written informed consent was also obtained from the study participants. The study participants were assured of strict confidentiality of their responses and were informed that their participation is voluntary.

## 3. Result

### 3.1. Demographic Characteristics of the Study Participants

There were 80 respondents recruited for the study. The mean age of the HCPs was  $32.9 \pm 7.6$  years, with the majority, 35 (43.8%), falling in the age range of 20 to under 30 years. Of these, 57 (71.2%) were females and 23 (28.8%) were males, giving a male-to-female ratio of 1:3.5. Most of the HCPs, 41 (51.3%), were nurses, while 9 (11.2%) were doctors and 16 (20.0%) were midwives table 1.

Table 1. Demographic characteristics of the respondents

Variable	Frequency	Percentage
Age Category (Years)		
<20	1.0	1.3
20-<30	35.0	43.8
30-<40	31.0	38.7
40 and above	13.0	16.2
Sex		
Male	23.0	28.8
Female	57.0	71.2
Qualification		
Nurse	41.0	51.3
CHEW	12.0	15
Doctor	9.0	11.2
Community Midwife	2.0	2.5
Midwife	16.0	20

CHEW= Community Health Extension Worker

### 3.2. Respondents Facility of practice, years of work experience and training on KMC

Thirty six (45.0%) of the respondents work in tertiary institutions while the least 21(26.0%) work in secondary Health institutions figure 1.

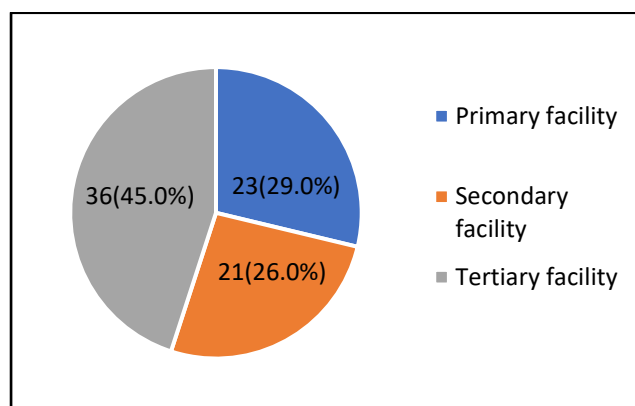


Figure 1. Respondents Facility of practice

Majority 30(37.5%) of the HCPs had less than 5 years working experience (Table 2). Twenty-four (30.0%) of the nurses work in the Paediatric Medical Ward, whereas 12(15.0%) were staff from Special care Baby Unit. Majority 42(52.5%) of the HCPs had received KMC training prior to the present study in table 2.

### 3.3. Knowledge of Kangaroo Mother Care among the Health Care Providers

Majority 79(98.8%) of the HCPs do not know the definition of KMC, Most 32(40.0%) of the respondents knew only one out of the four elements of KMC, while 24(30.0) do not know that mothers can sleep while doing KMC. Only a few 13(16.3%) of the respondents incorrectly mentioned that only the mother can do KMC in table 3. This lack of knowledge among HCPs highlights significant gaps in training and awareness regarding KMC practices. Such gaps can impede the effective implementation of KMC and reduce its potential benefits for both mothers and infants. Addressing these knowledge deficiencies through comprehensive training programs is crucial. These programs should cover all elements of KMC, including its definition, the ability for mothers to sleep during KMC, and the involvement of other caregivers besides the mother. By improving HCPs' understanding and competency in KMC, healthcare systems can enhance the support provided to low birth weight infants and their families, ensuring that the practice is correctly and effectively utilized. More than half of the respondents were not knowledgeable on

the benefits of KMC such as early recognition of infection and protection from infection in figure 2.

Table 2. Respondents facility of practice and years of working experience

Variable	Frequency	Percentage
Place of practice		
Special Care Baby Unit	12.0	15.0
Paediatric Medical Ward	24.0	30.0
Antenatal Clinic	9.0	11.3
Labour room	9.0	11.3
Female Medical Ward	10.0	12.5
Male medical Ward	4.0	5.0
Others	12.0	15.0
Work experience (years)		
<5	30.0	37.5
5-<10	28.0	35.0
10-<15	12.0	15.0
15-<20	7.0	8.7
20-<25	1.0	1.3
25-<35	1.0	1.3
35 and above	1.0	1.3
Training on KMC		
Yes	42.0	52.5
No	38.0	47.5

Table 3. Knowledge of KMC among the Health Care Providers

Variable	Frequency (correct responses)	Percentage
Which babies are referred to as LBW babies	28.0	35.0
Components of KMC mentioned		
None	32.0	40.0
One	7.0	8.8
Two	9.0	11.3
Three	12.0	15.0
Four	20.0	25.0
KMC helps in preventing hypothermia in newborns while transporting to higher center	76.0	95.0
KMC Should be initiated immediately after birth	71.0	88.8
Babies Requiring KMC		
Preterm	40.0	50.0
SGA	2.0	2.5
Preterm, SGA and hypothermic	2.0	2.5
Preterm and hypothermic	6.0	7.5
Preterm and SGA	15.0	18.8
I do not know	15.0	18.8
Who can provide KMC		
Mother only	13.0	16.3
Father and Mother	8.0	10.0
Parents and family members	53.0	66.3
I do not know	6.0	7.5
Places where KMC can be practiced		
Hospital	22.0	27.5
Home	15.0	18.8
Hospital, home and community	23.0	28.8
Hospital and home	20	25.0

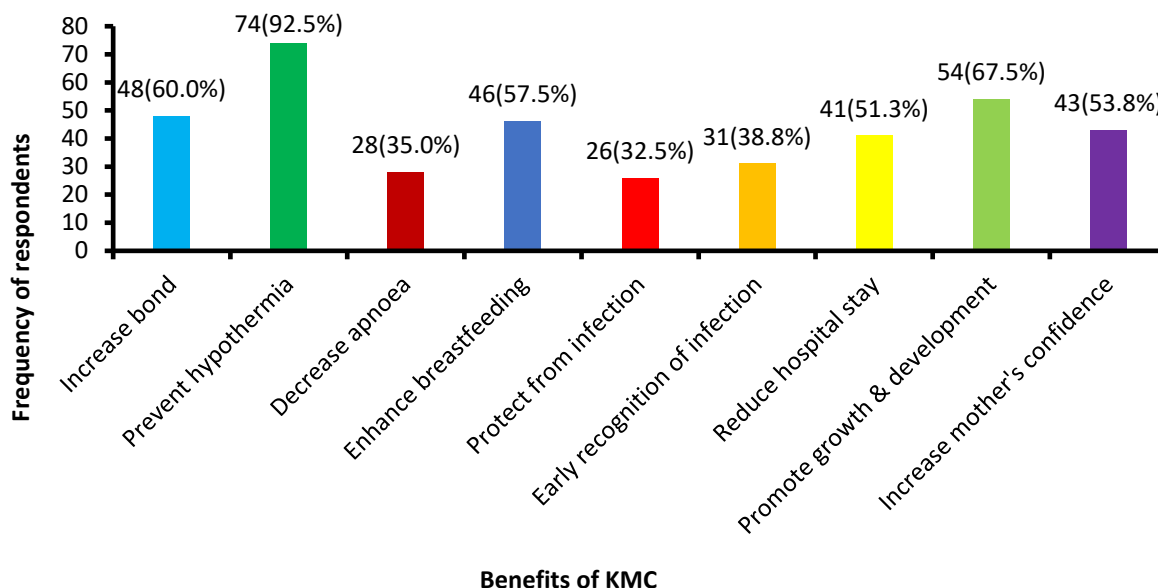


Figure 2. Knowledge of benefits of KMC among respondents

### 3.4. Practice of Kangaroo Mother Care among the Health Care Providers

Forty- three (53.7%) of the respondents in this study are practicing KMC in their health facilities in table 4.

Table 4. Distribution of Health Care Providers that Practice KMC by facility

Type of facility	Hospital KMC Practice	
	Yes n (%)	No n (%)
Primary	5(21.7)	18(78.3)
Secondary	11(52.4)	10(47.6)
Tertiary	27(75.0)	9(25.0)
Total	43(53.7)	37(46.3)

### 3.5. Barriers to Practice of Kangaroo Mother Care among the Health Care Providers

The commonest barriers to implementing KMC among the HCPs were Lack of privacy and space reported by 23(28.8%) and 21(26.3%) of the respondents respectively in figure 3.

### 3.6. Relationship between Health Care Providers practice of KMC with demographic characteristics, years of experience, type of facility, training and qualification

Practice of KMC was significantly associated with training on KMC, among the doctors and among respondents working in tertiary hospitals ( $p < 0.05$ ) respectively in table 5.

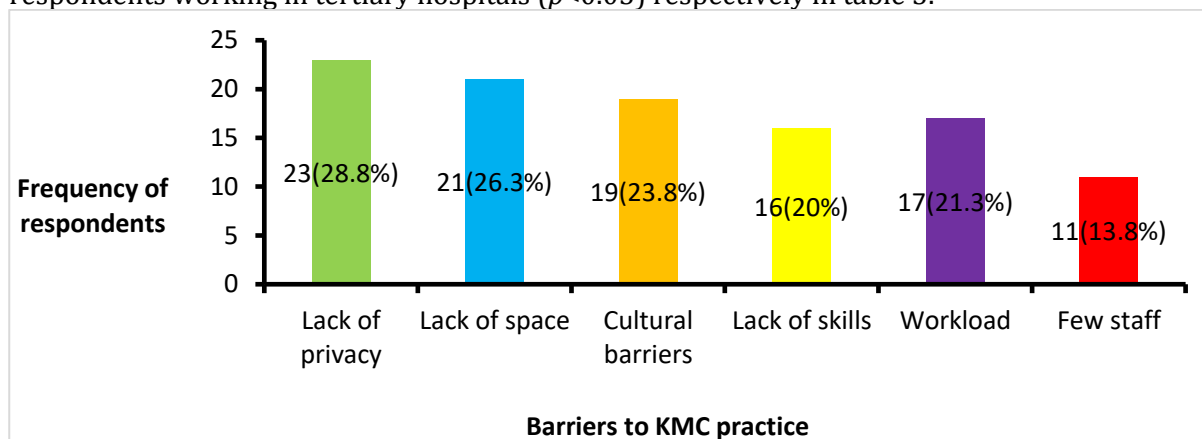


Figure 3. Barriers to KMC practice in facilities of the respondents

Table 5. Factors associated with Practice of KMC among the respondents

Variable	Practice of KMC		Test statistic p value
	Yes n (%)	No n (%)	
Age category (years)			
< or = 24	3 (60.0)	2 (40.0)	Fishers Exact p = 905
25 – 34	25 (53.2)	22 (46.8)	
35 – 44	12 (57.1)	9 (42.9)	
≥ 40	3 (42.9)	4 (57.1)	
Gender			
Male	15 (65.2)	8 (34.8)	$\chi^2 = 1.708$ p = 0.191
Female	28 (49.1)	29 (50.9)	
Years of experience			
< 5	13 (43.3)	17 (56.7)	Fishers Exact p = 539
5 – 10	17 (60.7)	11 (39.3)	
11 – 15	8 (66.7)	4 (33.3)	
16 – 20	4 (57.1)	3 (42.9)	
> 20	1 (33.3)	2 (66.7)	
Type of facility			
Primary	5 (21.7)	18 (78.3)	$\chi^2 = 16.036$ p < 0.001
Secondary	11 (52.4)	10 (47.6)	
Tertiary	27 (75.0)	9 (25.0)	
Training			
Yes	22 (52.4)	20 (47.6)	$\chi^2 = 8.324$ p = 0.004
No	21 (55.3)	17 (44.7)	
Qualification			
Nurses	25(61.0)	16(39.0)	Fishers Exact p = 0.008
CHEW	3 (25.0)	9 (75.0)	
Doctor	14 (82.4)	3 (17.6)	
Community Midwife	0	2 (100)	
Midwife	1 (50.0)	1 (50.0)	

## 4. Discussion

The majority of the HCPs (45.0%) in our study were from tertiary centers, which aligns with the findings of a previous study by Okoh & Onubogu (2018) that reported similar results. This study also found that almost half (46.3%) of the respondents are not practicing KMC in their health facilities, consistent with Ka'oje et al., who reported that 48.9% of PHCs in Sokoto are not practicing KMC (Kaoje et al., 2018), and who reported a 53.5% practice rate of KMC among HCPs in Nigeria at a scientific conference (Okoh & Onubogu, 2018). However, this contrasts with, who reported an 81.8% practice rate of KMC in the North-Western zone of Nigeria among health workers at the Pediatric Association of Nigeria Conference (Okoh & Onubogu, 2018). The high prevalence reported by Onubogu & Okoh may be due to the small number (11) of HCPs from the North-Western zone out of the 157 sample size in their study.

This study also identified the most common barriers to implementing KMC among the HCPs as a lack of privacy and space, reported by 28.8% and 26.3% of the respondents, respectively. Numerous health system-related barriers to KMC practice in hospitals, such as the lack of KMC wards to accommodate the privacy of mothers, have been reported by several studies (Asmare et al., 2021; Dhage et al., 2023; Yue et al., 2020). Most health facilities in low-income countries barely have enough space for baby cots and incubators and cannot provide a ward for stable mothers to stay and practice KMC. In places with KMC wards, there is the problem of the transferred cost of such ward occupancy on the family, who already have the financial burden of a long hospital stay due to their preterm infant (Campanha et al., 2024; İnan Yurdagül & Esenay, 2023; Mehrpisheh et al., 2022, 2023; Parikh et al., 2023; Zengin et al., 2023).

Furthermore, these privacy and space barriers are exacerbated by the lack of infrastructure in healthcare facilities, which are often not designed to support KMC practices. Even in situations where basic infrastructure is available, inadequate space arrangements can hinder mothers' ability to provide the necessary care. Additionally, limited training and awareness among healthcare providers regarding the importance and procedures of KMC contribute to these barriers. A lack of training can result in healthcare providers being unable to effectively encourage and facilitate KMC practices, further compounding the challenges faced by mothers and preterm infants. These challenges underscore the need for greater investment in healthcare infrastructure, healthcare provider training, and policies that support the effective and sustainable implementation of KMC.

Another bottleneck to KMC practice in our study is cultural barriers, reported by 23.8% of the respondents. Cultural barriers are one of the challenges faced by HCPs in practicing KMC in their various health facilities. Involving fathers and relevant family members increases the role of the father in KMC implementation and enhances the father's parenting confidence (Pratomo et al., 2012). Moreover, studies have shown that educational programs are crucial in increasing parental knowledge and improving the uptake of KMC (Wang et al., 2023). To counter widespread misconceptions in some regions, it is recommended to strengthen KMC education for parents through social media or other channels (Mimani Minuta et al., 2023).

Some (20.0%) of the HCPs in this study do not have the skills to practice KMC. Many studies have shown that improving training and increasing the participation of relevant stakeholders, such as medical staff, hospital managers, mothers, and their families, may help promote KMC implementation (Anjur & Darmstadt, 2023; Yue et al., 2020).

The lack of skills among HCPs highlights the urgent need for targeted educational interventions. Training programs should be designed to equip healthcare providers with the necessary competencies to perform KMC effectively. These programs can include practical workshops, simulation exercises, and continuous professional development opportunities. Moreover, fostering a collaborative approach by involving hospital managers can ensure the allocation of necessary resources and the creation of supportive policies. Engaging mothers and their families in the educational process can also enhance their understanding and commitment to KMC, making them active participants in the care process. By addressing these areas, healthcare systems can create a conducive environment for the successful implementation of KMC, ultimately improving neonatal outcomes and maternal satisfaction.

The results of our study revealed that workload on staff is a barrier to KMC practice for 21.3% of the respondents, a finding also reported. Challenges regarding the availability of human resources and increasing workloads are obstacles in various countries for implementing KMC (Paradillah et al., 2022). Based on the results of the present study, it was also found that some (47.5%) of the informants had never participated in any training regarding the Kangaroo Care Method, a situation documented by a previous study (Paradillah et al., 2022). Several factors support the implementation of KMC from the side of healthcare providers, one of which is adequate training (Rahmatika et al., 2022).

The significant impact of workload on the ability to practice KMC underscores the need for systemic changes within healthcare settings. Addressing staffing shortages and managing workloads more effectively could alleviate some of these barriers. Implementing policies that ensure an adequate nurse-to-patient ratio and providing support for overburdened staff are crucial steps. Additionally, the lack of training participation among nearly half of the informants indicates a critical gap in professional development. Comprehensive and accessible training programs for all healthcare providers involved in neonatal care are essential. Such programs should emphasize the practical aspects of KMC and its benefits, ensuring that all staff members are well-equipped to support its implementation. By addressing both workload and training issues, healthcare systems can create a more supportive environment for KMC, ultimately enhancing care for low birth weight infants.



## 5. Conclusion

The majority of health care providers in Sokoto practice KMC. The most common barriers to KMC practice identified in this study were the lack of privacy and space for mothers to practice KMC and the lack of skills among the staff. The study recommends training and retraining HCPs to enhance their skills at all levels of facilities by the government and the provision of KMC wards to provide a suitable environment for the practice of KMC in health facilities in Sokoto.

## Declarations

### Author contribution statement

Asma'u Adamu conceived the idea, conducted data collection, and performed the analysis. Khadijat Omeneke Isezuo developed the theory of Practice of KMC among the HCPs. All authors engaged in discussions regarding the findings and made contributions to the final manuscript.

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### Data availability statement

The dataset generated and analyzed during the research is available from the corresponding author upon reasonable request.

### Declaration of interests statement


All authors declare that they have no financial or personal interests that could influence the work presented in this manuscript.

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