Midwives' Support and Its Influence on Weight Gain for Neonates Under Kangaroo Mother Care in Western Kenya

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ABSTRACT

Context: The World Health Organization strongly recommends Kangaroo Mother Care due to its favorable effects on reducing mortality among low-birth-weight neonates weighing less than 2500 grams. This nursing procedure has been approved as a therapeutic intervention due to a lack of incubators. Midwives are strongly encouraged to focus on developing the skill while adopting a functional approach to enhance the overall well-being of neonates with low birth weight.

Aim: The study aims to examine midwives' support and its influence on weight gain among neonates undergoing Kangaroo Mother Care in the Western Kenya sample region.

Methods: The study used an analytical cross-sectional design. This design combined both qualitative and quantitative methods to examine midwives' support and its influence on KMC outcomes in Western Kenya. A multi-stage sampling approach was applied to select 275 mothers of low-birth-weight neonates enrolled in KMC in Busia, Kisii, and Migori counties. Data were collected using structured questionnaires for mothers and 12 key informant interviews (KIIs) for midwives. Quantitative data were analyzed using SPSS version 26, and binary logistic regression was employed to assess the effect of midwives' support on neonatal weight gain, with a significance level set at $p \leq 0.05$. Thematic analysis of qualitative data from the 12 KIIs provided additional insights into how midwives' support influences KMC outcomes.

Results: The timing of Kangaroo Mother Care initiation significantly influenced weight-gain criteria (χ^2=46.89, p<0.0001), with immediate initiation associated with better outcomes. Maternal satisfaction with KMC strongly correlated with meeting weight gain (χ^2=43.72, p<0.0001). Support from midwives (OR 2.47, p=0.001) and midwives' knowledge (χ^2=36.84, p<0.0001), as well as timely feedback on the neonate's progress (OR =3.92, p=0.0001), were also associated with meeting daily weight gain targets. The midwives described their roles in supporting KMC and influencing weight gain: "As a midwife in the KMC unit, I provide direct care to the mother and the neonate, ensuring early initiation, proper positioning, immediate and continuous breastfeeding." This support influenced weight gain.

Conclusion: The assistance of midwives is essential to maximize the benefits of KMC, particularly by supporting the timely initiation of KMC in low-birthweight neonates, providing knowledge about KMC to enable them to educate mothers, and advocating for their needs. The hospital administration should identify opportunities to strengthen KMC implementation and improve neonatal health outcomes by continuously updating midwives on current KMC practice.

Keywords: Influence**,** Kangaroo Mother Care, low-birthweight, midwives, neonate, support, weight gain

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1. Introduction

Low birth weight (LBW) newborns have become a serious public health challenge globally. LBW newborns account for 15-20% of all births around the globe *(Thapa et al., 2022).* One of the most medically approved and significant interventions for low-birth-weight neonates is Kangaroo Mother Care (KMC), the technique entails skin-to-skin contact between the neonate and the mother *(Altit et al., 2024).* The KMC approach is considered a better alternative to incubator-dependent care and has been shown to reduce neonatal mortality and morbidity *(Lawal et al., 2023).* KMC encourages growth and weight gain and enhances the emotional attachment between the mother and the neonate *(Mehrpisheh et al., 2022).*

Mothers from low socio-economic status are strongly encouraged to focus on KMC, as it is cost-effective and easy to implement, given that incubators may be limited and expensive *(Lawal et al., 2023)*. When performed for more than 8 hours a day, KMC lowers neonatal mortality, helps preterm neonates gain weight, and thus improves their survival *(Sivanandan & Sankar, 2023).*

Around the world, around 14.7% of babies are born with low birth weight (LBW), with the highest percentage in low-income countries, where LBW is the leading cause of death among newborns *(Krasevec et al., 2022).* The midwives' support tremendously influences the KMC

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outcomes for low-birth-weight neonates. Midwives' knowledge, competence, motivation, job satisfaction, and attitudes are some supports. Studies worldwide show that midwives should be equipped with knowledge through seminars and workshops *(Manzoor et al., 2020).*

In India, midwives' competence in demonstrating KMC techniques significantly impacts maternal adherence, with mothers guided by skilled midwives demonstrating interest in continuing KMC practice after discharge *(Washington et al., 2023).* Midwives' motivation and job satisfaction also influence KMC outcomes. Similarly, a study in Indonesia found that education and perceptions of KMC practice were key for midwives to understand its benefits and when to initiate KMC. On-the-job training also played a role in ensuring that midwives without formal training understood the need and benefits of the KMC practice *(WHO, 2023).*

2. Significance of the study

In developing countries, LBW prevalence is 13.7%, with regional variations ranging from 6% to 28% *(Thapa et al., 2022).* In Kenya, the rate ranges from 8 % to 12% nationwide *(K'Oloo et al., 2023).* In Western Kenya, the situation is worse: Busia County has a 20%-30% rate, Kisii County has a 15.9%-20% rate, and Migori County has a 16% *(Bucher et al., 2023).* Neonates with low birth weight (LBW) are at an increased risk of morbidity and mortality and may also face long-term health complications *(Thapa et al., 2022).*

The strategy of Kangaroo Mother Care (KMC) is cost-effective in reducing the mortality and morbidity of LBW infants. Kangaroo Mother Care involves maintaining skin-to-skin contact between the newborn and the mother. Although more and more people are using this technique, it is still worth verifying whether it works effectively in poorer health facilities *(Lawal et al., 2023).*

It is of utmost importance that children are supported in every way possible to lead healthy and happy lives. According to *the Kenya Demographic and Health Survey (KDHS) (2022),* one in every 26 children born in Kenya dies before their first birthday, mostly within just a few days of birth. Because there are not enough incubators in the newborn units and trained midwives. Most LBW neonates die during the first 24 hours of life.

No prior studies have examined the factors influencing neonatal weight gain under KMC in the study areas. The goal of the study was to establish baseline data on midwives' capacity to support kangaroo mother care for weight gain among low-birth-weight neonates in Western Kenya. Additionally, identifying potential factors influencing KMC practice in the study areas aimed to help program managers and policymakers design, implement, and evaluate interventions that lead to a reduction in neonatal mortality and improved newborn care, contributing to the achievement of Sustainable Development Goal (SDG) 3, which ensures healthy lives and promotes well-being for all at all ages.

3. Aim of the study

The study aims to examine midwives' support and its influence on weight gain among neonates undergoing Kangaroo Mother Care in the Western Kenya sample region.

3.1. Research questions

- How does midwives' support influence the weight gain among low-birth-weight neonates under Kangaroo Mother Care in Western Kenya?
- Which midwives' related factors influence weight gain among low-birth-weight neonates in Western Kenya?

3.2. Operational definitions

- *Kangaroo Mother Care:* This form of care for a neonate involves placing the neonate on the mother's chest to provide warmth, while the neonate is dressed in a hat and diaper. The neonate is placed in an upright position.
- *Low birth weight* is the body weight of a newborn that is below 2500 grams.
- *A midwife* is a healthcare professional (nurse) specializing in pregnancy care, childbirth, and postpartum care.
- *Neonate:* A baby in their first 28 days of life.
- *Weight gain:* An increase in body weight from the baseline

4. Subjects & Methods

4.1. Research Design

The research employed a cross-sectional design, with both quantitative and qualitative sampling types for KMC. The cross-sectional technique enabled the assessment of conditions and associations in real time. It involved collecting data at a single point in time and examining midwives' practices that influenced neonatal weight gain.

4.2. Study Setting

This study was conducted in three counties in Western Kenya (Busia, Kisii, and Migori). The sites were chosen because of their high neonatal morbidity and mortality rates among low birth weight (LBW) neonates (Busia 20% -30%, Kisii 15.9%-20%, Migori 16%). The sites have both urban and rural populations; this enabled data collection at different levels, in relation to varying infrastructure, and the identification of the challenges midwives face in supporting KMC practices in these counties.

Participants were recruited from different levels of health facilities to reduce bias and ensure broader representation. They included Migori County Teaching and Referral Hospital, Rongo Subcounty Hospital level 4, Awendo Subcounty Hospital level 4 (Migori County study sites), Kisii County Teaching and Referral Hospital, Gucha Subcounty Hospital level 4, Nyamache Subcounty Hospital level 4 (Kisii County study sites), and Busia County Teaching and Referral Hospital, Nambale Subcounty Hospital Level 4, Khunyangu Subcounty Hospital Level 4 (Busia County study sites).

4.3. Study Subjects

A total of 707 mothers and 12 midwives participated in the study. Mothers participated in the study according to the following inclusion criteria: Those who had low-birthweight neonates at the selected health facilities over

one year in the three counties. All mothers who met the participation criteria and provided written consent, who voluntarily participated, and were practicing KMC for six months.

Midwives involved in newborn care services were recruited for this study according to the following inclusion criteria: midwives working in the maternity unit (labour ward, postnatal ward, and newborn unit) for over six months, and who consented.

Exclusion criteria: Respondents who did not consent, mothers who did not practice KMC, mothers deemed mentally unfit, and midwives who had not worked in the unit for at least six months.

Sample size determination.

To calculate the sample size for mothers, Cochran's formula for finite populations was selected as the most appropriate, yielding a total of 275 participants. The formula is as follows:

$$n=(NZ^2pq)/(e^2(N-1)+Z^2pq)$$

At a 95% confidence interval (Z=1.96), a study population (N) of 707, a margin of error (e = 0.05), and (n) a presumed population proportion, the sample size was calculated to be 250. To compensate for possible non-response, an additional 10% (25 participants) was included, resulting in a total sample of 275 mothers of low-birth-weight neonates.

Moreover, we carried out 12 key informant interviews KIIs with midwives operating in the newborn unit in selected facilities. These interviews provided valuable insights into how midwives support and influence KMC practice and neonatal weight gain.

Sampling technique

The researchers used purposive and random sampling techniques to select representative participants for the study. The purposive sampling chose Busia, Kisii, and Migori counties because of the highest burden of neonatal deaths and low birthweight neonates. The researchers randomly picked 2 level 4 health facilities from each county. They also intentionally selected the three-county teaching and referral hospitals. The expected workload was used to stratify by health facility type and size. This sampling technique ensured that each facility was represented in the sample in proportion to its patient volume, thereby improving the generalizability of the findings. The researchers employed a simple random sampling approach to select respondents, ensuring that all potential respondents had an equal chance of being selected. The study's selection bias was reduced to some extent. The total number of mothers of low-birth-weight neonates was 275, distributed across the selected health facilities.

The crucial informants were purposively recruited for participation in key informant interviews (KII). They included two midwives from each of the three referral hospitals (the midwife in charge and the deputy midwife in charge of the unit), as well as one unit in charge from each of the six sub-county hospitals.

Table (1): Proportionate sample allocation for quantitative sampling.

Health facility	Study population	Sample size
Busia County Teaching and Referral Hospital	128	50
Nambale Subcounty Hospital (level 4)	67	26
Khunyangu Subcounty Hospital (level 4)	70	27
Kisii County Teaching and Referral Hospital	115	45
Gucha Subcounty Hospital (level 4)	71	28
Nyamache Subcounty Hospital (level 4)	60	23
Migori Teaching and Referral Hospital	102	40
Rongo Subcounty Hospital (level 4)	44	17
Awendo Subcounty Hospital (level 4)	50	19
Total	707	275

4.4. Tools of Data Collection

This study employed interviews, questionnaires, reflective journalism, and observation checklists (note-taking) as data collection methods.

4.4.1. A Structured Interview Questionnaire

The study employed structured questionnaires as the primary data collection instrument due to their ease in capturing large amounts of information. Moreover, they were used for collecting data from the mothers. They included general relevant information from the mothers to avoid confusion. The main sections included:

Section (A), which contained sociodemographic information of the mothers.

Section (B) included the mother's response to midwives' support and its influence on weight gain for LBW neonates. The researcher develops this section based on *Samra et al. (2013).*

They were mainly closed-ended, but there was allowance for qualitative data in the form of comments, clarifications, or additions from respondents. Because closed-ended questions were easy to analyze, the open-ended questions offered opportunities for comments or suggestions, which were critical in enriching the data.

Scoring system

The study used a Likert scale for scoring, using a range of numerical responses (1-5) to gauge opinions. With a minimum of 5-10 questions per section. Descriptive statistics were presented in tables.

4.4.2. A Structured Midwives' Interview Guide

To collect qualitative data, the principal investigator conducted key informant interviews with the midwives. Structured interview guides and checklists were developed for KII interviews to collect data from midwives. Data were recorded after consent, and notes were taken. No photos were taken. A unique number was assigned, and respondents were selected at random. The guide for use was developed based on the key informants' guides on relevant data at their respective sites. The researcher managed the qualitative data through a reflective process to facilitate a more effective synthesis. The interview lasted 20 minutes for each respondent. It was integrated with quantitative results to provide a more comprehensive understanding.

4.5. Procedures

Ethical research considerations: The study adhered to ethical standards by ensuring that informed consent was obtained from all participants, with emphasis on voluntary participation and assured confidentiality. Ethical approval was granted by Masinde Muliro University of Science and Technology (MMUST/IERC/105/2022. Approval was also granted by the National Commission for Science, Technology, and Innovation (NACOSTI/P/22/21399). The study sites (Busia, Kisii, and Migori counties) permitted the study to be conducted in their respective Counties.

Research Assistants: Three eligible (3rd-year) students were selected for each of the three high-volume study sites and two for each of the nine subcounty facilities (21 students in total). They were trained for two days on data collection skills, familiarization with data collection tools, data collection and management, and the importance of seeking consent.

The questionnaires were administered face-to-face to consenting respondents. Each lasted 15 minutes. Respondents who could not read the questionnaires had space to interpret their responses. The principal investigator conducted the key informant interviews. Data was collected over four months.

4.6. Data Analysis

All data that were collected were cleaned, coded, and entered (in the software). Quantitative data were examined using SPSS version 26.0. The results were presented as frequencies, means, and standard deviations. Bivariate analysis was used to determine proportion differences, with p-values used to test significance. The relationship between the independent and dependent variables was assessed using Crude Odds Ratios (COR) and their respective 95% Confidence Intervals. Binary logistic regression (enter method, final model) was then conducted to determine the final association using significant variables. The results are presented as Adjusted Odds Ratios (AOR), 95% CI. We decided that the data are statistically significant at the 0.05 level (two-tailed).

Thematic analysis was done on the KIIs transcripts for the qualitative component. Responses were coded, patterns identified, and themes organized to gain insights into midwives' support and their influence on KMC practice and neonatal weight gain. Thematic analysis of qualitative data from KIIs was conducted manually, with data cleaned, coded, and analyzed. The results were presented in narrative form.

5. Results

5.1. Quantitative data analysis

Table 2 shows the sociodemographic details of the respondents (275). Most of the mothers were aged 30 years or older (58.18%), and the majority had three or fewer children (67.27%); only 32.73% had more than three children. According to 114 mothers (41.45%) reported that midwives were their main source of information on KMC. The majority of the mothers (71.64%) reported having ≤5 households, and the majority were cohabiting (34.91%).

Table 3 provides insights into the support midwives provide for KMC implementation and the outcomes mothers perceive. Mothers' perceptions of midwives' support for KMC varied. About 23.64% rated it excellent; early initiation was reported at 31.27%; most mothers (64.00%) received assistance from midwives. Over half of the respondents had their concerns about KMC addressed (59.27%). Likewise, 52.36% received feedback on the neonate's progress.

Table 4 provides insight into the influence of midwives' practice on neonates' weight gain. The timing of KMC initiation significantly influenced meeting weight gain criteria (χ^2=46.89, df=4, p<0.0001), with immediate initiation leading to a notably higher proportion (62.79%) of infants meeting the criterion (Recommended daily weight gain of ≥15g/kg). Maternal satisfaction with KMC quality strongly correlated with meeting weight gain criteria (χ^2= 43.72, df=4, p<0.0001), with the very satisfied group of mothers having a significantly higher proportion (69.01%) of neonates who met the criteria. Additionally, support from midwives (OR=2.47, CI=1.43-4.24, p<0.0001) and satisfaction with midwives' knowledge (χ^2=36.84, df=4, p<0.0001) were associated with meeting weight gain criteria, with the very satisfied mothers having a higher proportion (62.64%). Maternal perceptions of midwives' readiness (χ^2=34.86, df=4, p<0.0001) and feedback provision (OR=3.93, CI=2.32-6.65, p<0.0001) also significantly influenced meeting weight-gain criteria. However, the level of support from the midwives did not significantly correlate with meeting weight gain criteria (χ^2=0.61, df=4, p<0.0001).

5.2. Qualitative data analysis

Theme 1: Midwives' insights about their role in KMC

Midwives in KMC units at the sampled hospitals were interviewed in depth about their roles in KMC. Their views were analyzed using thematic analysis and summarized into five key roles: Clinical implementation and support; educational and training; research and quality improvement; advocacy and policy development; and family and community engagement. These were summarized as follows:

Subtheme 1.1. Clinical implementation and support roles

Midwives attested that they provide direct patient care, offer support, and coordinate care in the KMC unit. According to one of the midwives, they play an important role in providing care to both mothers and neonates during KMC practice by ensuring comfort "…As a bedside midwife in the KMC unit, my role is to provide direct care to mothers and neonates during KMC sessions…" (KI 1). The KMC coordinator, a midwife, supervises all aspects of KMC care, including sessions and resources. According to a midwife, this contributes to the smooth running of the KMC units. "…As a KMC coordinator, my role is to coordinate all aspects of KMC care, from scheduling sessions to ensuring that all necessary resources are available…" (KI 2).

Table (2): The percentage and frequency distribution of sociodemographic characteristics of mothers (n=275).

Characteristics	No.	%
Age		
≤30 Years	115	41.82
>30 Years	160	58.18
Mean±SD	32.28±6.20	
Level of education		
Primary	24	8.73
Secondary	76	27.64
College	99	36.00
University	76	27.64
Marital status		
Single	74	26.91
Married	86	31.27
Widowed	19	6.91
Cohabiting	96	34.91
Number of other children		
≤3	185	67.27
>3	90	32.73
Mean±SD	2.95±1.54	
Mothers' occupation		
Employed	70	25.45
Business	85	30.91
Farmer	40	14.55
Housewife	80	29.09
Information source on KMC		
Radio/TV	68	24.73
Phone Text/Internet	41	14.91
Midwives	114	41.45
Family and friends	52	18.91
Number of people in the household		
≤5	197	71.64
>5	78	28.36
Mean±SD	4.59±1.64	
Monthly income		
Below KES 5000	51	18.55
KES 5000–10000	72	26.18
KES 10000–15000	51	18.55
KES 15000–20000	51	18.55
Above KES 20000	50	18.18
Newborn's Birth Weight		
<1500 grams	162	58.91
≥1500 grams	113	41.09
Mean±SD	1578.85±232.72	
Gestation at time of birth		
≤35 weeks	146	53.09
>35 weeks	129	46.91
Mean±SD	35.59±2.30	

Subtheme 1.2. Educational and training roles

Midwives are responsible for training midwives and mothers in KMC in accordance with the norms and protocols. As two midwives indicated, these roles are also important. "…As a KMC educator, I train both the staff and the mothers on KMC principles and practices…" (KI 3). "…I provide guidance and support to both staff and mothers in implementing KMC best practices as a resource midwife…" (KI 2). As KMC trainers and resource midwives, respectively, train staff and mothers in KMC practice and adherence.

Subtheme 1.3. Research and quality improvement roles

Midwives lead research initiatives, conducting research, collecting data, and running clinical trials to assess and improve the effectiveness and outcomes of KMC. For instance, two midwives said "…I do research and quality improvement activities on KMC..." (KI 4) and "…I do clinical trials and studies to evaluate the effectiveness of KMC..." (KI 5).

Subtheme 1.4. Advocacy and policy development roles

Midwives and nurses advocate kangaroo mother care (KMC) for newborns. According to a midwife informant, "…As a KMC advocate, I work to raise awareness on KMC among health professionals, policymakers, and the general public..." (KI 7). Likewise, the KMC advocates and policy developers want to create awareness on the importance of KMC for healthcare professionals and policy makers, and formulate and implement policies that will enable the

Table (3): Frequency and percentage of midwives' support influencing weight gain among neonates under KMC (n=275).

Midwives' KMC support aspect	Frequency	Percent
Midwives' support rating in your practice of KMC		
Excellent	65	23.64
Somewhat excellent	54	19.64
Neutral	53	19.27
Somewhat not excellent	54	19.64
Not excellent	49	17.82
KMC initiation timing after delivery		
Immediately	86	31.27
1 Hour	57	20.73
2 hours	50	18.18
3 hours	46	16.73
>3 hours	36	13.09
The level of satisfaction with the quality of KMC		
Very satisfied	71	25.82
Satisfied	63	22.91
Neutral	44	16.00
Dissatisfied	43	15.64
Very dissatisfied	54	19.64
If the mother has received any support from midwives		
Yes	176	64.00
No	99	36.00
Mother's level of satisfaction with the knowledge of midwives on KMC		
Very satisfied	91	33.09
Satisfied	51	18.55
Neutral	42	15.27
Dissatisfied	43	15.64
Very dissatisfied	48	17.45
If the midwives adequately addressed my concerns on KMC		
Yes	163	59.27
No	112	40.73
Rating the readiness of the midwife to help with my KMC roles		
Ready	91	33.09
Somewhat ready	58	21.09
Neutral	46	16.73
Somewhat not ready	41	14.91
Not ready	39	14.18
The midwife provides feedback on the progress of the infant		
Yes	144	52.36
No	131	47.64

implementation of KMC in the healthcare system, as one interviewee reiterated, "…I am tasked with drawing up and implementing policies and procedures that govern KMC in our hospital…" (KI 7).

Subtheme 1.5. Family and community engagement roles

Mothers and their families receive assistance from midwives on KMC in communication with hospital staff through community outreach services. This communication ensures the KMC practice continues uninterrupted after discharge. Two midwives state: "…as a family liaison midwife in the KMC unit, I am responsible for facilitating communication between families and the healthcare team…." (KI 1) and "…My responsibility is organizing KMC training programs for health staff in our hospital and in the community…" (KI 8).

Theme 2: Midwives' capacity on KMC Practice

During the in-depth interviews, the KMC midwives were asked whether they had received on-the-job training, workshops, or seminars on KMC, and how this affected their care provision to mothers practicing KMC.

Subtheme 2.1. Impact of the formal training

The midwives reveal that their training sessions were effective in helping them understand and practice KMC. According to one midwife, "…This training has taught me new techniques and knowledge to better help the mothers practicing KMC…The training taught me the latest techniques and benefits of KMC practice, and I now provide education on KMC practice and the benefits to mothers with low-birth-weight neonates to help them achieve the required daily weight gain of 15g per day..." (KI 7). Similarly, others said that they advocated more after attending the workshop. "…Last year, I attended a seminar on KMC. Since then, I have been actively promoting KMC among our mothers and colleagues..." (KI 4), and it was a great refresher on the latest guidelines and best practices... I have become more confident in my ability to help mothers who are practicing KMC..." (KI 4).

Table (4): Midwives' support influencing weight gain among neonates under KMC in western Kenya (n=275).

Variables	Meets Recommended Daily Weight Gain (>=15g/Kg)				OR/ Chi	95% CI/df	P-Value
	Yes		No.				
	No.	%	No.	%			
Rate the midwives' support in your practice of KMC							
Excellent	27	41.54	38	58.46			
Somewhat excellent	21	38.89	33	61.11			
Neutral	20	37.74	33	62.26	0.61	4	0.446
Somewhat not excellent	20	37.04	34	62.96			
Not excellent	17	34.69	32	65.31			
How soon did KMC initiate after delivery?							
Immediately	54	62.79	32	37.21			
1 Hour	26	45.61	31	54.39			
2 hours	13	26.00	37	74.00	46.89	4	<0.0001
3 hours	9	19.57	37	80.43			
> 3 hours	3	8.33	33	91.67			
Satisfaction with the quality of KMC							
Very satisfied	49	69.01	22	30.99			
Satisfied	24	38.10	39	61.90			
Neutral	12	27.27	32	72.73	43.72	4	<0.0001
Dissatisfied	10	23.26	33	76.74			
Very dissatisfied	10	18.52	44	81.48			
Received support from midwives							
Yes	80	45.45	96	54.55	2.47	1.43 - 4.24	0.001
No	25	25.25	74	74.75			
Satisfaction with the level of knowledge of midwives on KMC							
Very satisfied	57	62.64	34	37.36			
Satisfied	17	33.33	34	66.67			
Neutral	10	23.81	32	76.19	36.84	4	<0.0001
Dissatisfied	12	27.91	31	72.09			
Very dissatisfied	9	18.75	39	81.25			
Midwives addressed my concerns on KMC adequately.							
Yes	77	47.24	86	52.76	2.69	1.59 - 4.55	<0.0001
No	28	25	84	75			
Rating the readiness of midwives to help with my KMC roles							
Ready	57	62.64	34	37.36			
Somewhat ready	17	29.31	41	70.69			
Neutral	11	23.91	35	76.09	34.86	4	<0.0001
Somewhat not ready	10	24.39	31	75.61			
Not ready	10	25.64	29	74.36			
Midwives provide feedback on the neonate's progress.							
Yes	76	52.78	68	47.22	3.93	2.32 - 6.65	<0.0001
No	29	22.14	102	77.86			

Subtheme 2.2. Practical experience

A midwife stated that training on KMC and having mothers in the unit to support had a great impact on them. Also, he stated that learning by doing had made a huge difference. "…Since I was trained, it changed my perception on KMC practice because I got the knowledge and understanding, and I have been educating the mothers on KMC practice and its benefits ever since that training, and I have seen the positive impact on the mothers I have assisted..." (KI 11). Some KIs reported that while formal training offered a good foundation, practical experience in a hospital setting has been valuable. "…Since then, I have been engaged in KMC sessions with mothers to guide them on the practice and allay their doubts..." (KI 10).

Subtheme 2.3. Continuous learning

Midwives emphasized the need for ongoing education to stay current with the latest KMC practices. A midwife reported that knowledge gained through refresher courses and updates boosts her confidence. "…It was refreshing to update my knowledge and learn about new practices … I make sure that they have all the support and information they need…" (KI 6). One pointed to the growing evidence in favor of KMC, while the other emphasized the enduring impact of its fundamental principles. "…Although it was a while ago, KMC fundamentals have stayed with me…I have been working on my skills always..." (KI 3). They continually upgrade their skills to ensure the highest quality of care for KMC mothers and neonates.

Subtheme 2.4. Lack of training

Certain midwives stated that there were no formal opportunities to train them and suggested that they need short courses. Three midwives stated that they hope to attend workshops or seminars in the future, as they felt it was important to them. "…Unfortunately, I have not received any training on KMC...I would like to take a workshop or seminar in the future…" (KI 8). "No, I have not received any formal training on KMC since I started… I provide emotional support and assistance to mothers who

use KMC... (KI 10) and "…Unfortunately, since I joined the unit, I have never received any formal training on KMC... So, I try my best..." (KI 9). Even so, they continued to support KMC mothers with self-initiated learning and on-the-job experiences.

Subtheme 2.5. Passion and advocacy

Many midwives are passionate about KMC and want to promote its benefits. Some midwives got involved in KMC advocacy efforts because they believe the practice is beneficial and effective. They passionately advocated within their units and also in communities. "…I have started becoming more actively involved in KMC advocacy within the unit…" (KI 4). "…I am motivated to promote KMC actively both at the hospital and in the community..." (KI 5). "…While training is important, I think doing it practically is also essential to teach it well..." (KI 12).

6. Discussion

Kangaroo Mother Care (KMC) is a method of caring for preterm and low-birth-weight infants that emphasizes continuous skin-to-skin contact between the mother (or caregiver) and the baby. This approach has been shown to significantly improve neonatal survival, enhance thermal regulation, stabilize cardiorespiratory function, promote breastfeeding, and strengthen maternal–infant bonding. The World Health Organization (WHO) recommends KMC as a standard of care for low-birthweight and preterm infants, citing its cost-effectiveness and applicability in both low-resource and high-resource settings *(WHO, 2023)*. The study aims to examine midwives' support and its influence on weight gain among neonates undergoing Kangaroo Mother Care in the Western Kenya sample region.

Sociodemographic characteristics of the mothers reveal that most were aged 30 or older, reflecting their maturity; these mothers were more confident in caring for the neonates. More than one-third of the studied mothers had a college education, and more than one-quarter had a university education. These findings emphasized that literacy improves one's comprehension and understanding of information and instructions.

More than two-thirds of the mothers had three or fewer children, based on the average number of children per mother. Mothers with fewer children were more likely to have sufficient time to practice KMC due to lower resource requirements, resulting in greater weight gain. Additionally, more than two-fifths of the mothers their main source of information was midwives. This finding indicates the significant role played by the midwives in ensuring the low-birth-weight neonates meet the recommended daily weight gain of 1.5g/kg.

This finding agrees with a study conducted in Ethiopia, which found that older women were more likely to adhere to KMC due to their experience *(Ayele et al., 2023).* This finding contradicts a study at the University of South Carolina, Columbia, which found that adolescent mothers were more adherent to KMC practice and bonding *(River et al., 2022).*

The study reveals that the timing of KMC initiation significantly influences weight gain, with immediate initiation leading to a notably higher proportion in meeting the recommended daily weight gain of 15g/kg. This finding was consistent with a study that found that when KMC was initiated immediately, weight gain was marked and survival increased, even in very low birth weight (VLBW) neonates *(WHO et al., 2021).* Midwives need to act promptly after delivery of low-birth-weight neonates and initiate them on KMC immediately, to enable the neonates to gain the recommended weight per day of 15g/kg.

The study finds that mothers' satisfaction with the quality of kangaroo mother care is strongly correlated with meeting the daily weight-gain criteria. Mothers who were very satisfied with the practice had significantly higher proportions of meeting the daily weight gain criteria. This result concurred with a study that found 53% of midwives agreed that KMC enhanced bonding between mother and neonate *(Sivanandan & Sankar, 2023).* Mothers are often confident, secure, and satisfied when they are directly involved in their neonate's care.

Midwives' support is vital as the highest percentage of the mothers reported great support from the midwives, which may be due to assisting them in understanding why their neonates were born underweight, teaching how to care for them and supported in teaching on proper positioning (skin to skin care), provision of required supplies, and emphasizing on the benefits which included weight gain. A study in Southern Ethiopia found that mothers' acceptance and KMC practice were associated with midwives' support *(Bilal et al., 2021)*.

The study found that midwives with knowledge and skills in KMC were a strong source of encouragement to mothers, due to the timely provision of KMC information, prompt feedback on the neonate's progress, and continuous education on KMC practice. Similarly, a multicenter study conducted in India across Delhi, Mumbai, and Bangalore found that midwives' competence in demonstrating KMC techniques significantly influenced maternal adherence. The research reported that mothers guided by highly skilled nurse-midwives were 2.3 times more likely to continue KMC after hospital discharge than those assisted by less skilled staff *(Medhanyie et al., 2019).* Information is power; knowledge gives midwives the confidence to guide mothers in KMC practice, which, in turn, gives mothers satisfaction and trust in their care.

Nearly half of the mothers whose neonates met the recommended daily weight gain reported that midwives addressed their concerns about KMC. Also, nearly two-thirds reported that midwives' readiness to help them with KMC, and more than half reported that the midwives provided feedback on the neonate's progress. These findings might be due to midwives offering the mother a shoulder to lean on in times when they are low, like having a low-birth-weight neonate, which gives them the strength to face the situation and the courage to cope with it; it helps them appreciate the midwife's involvement.

Equally, the study found that midwives echoed the need for training on the current KMC practice. They argued that being equipped with current knowledge of KMC practice would enable them to teach mothers and other staff what KMC practice entails, including the positioning of the neonate (skin-to-skin) and exclusive breastfeeding, with its

benefits to the neonate, such as faster weight gain. A study in Indonesia on midwives' knowledge, practice, and attitudes found that training is key to their service delivery *(Adisasmita et al., 2021).* When midwives are knowledgeable about KMC and able to teach mothers, mothers gain trust in the midwives, and the midwives' morale is boosted as they can address all the concerns mothers raise *(Adisasmita et al., 2021)*.

7. Conclusion

Early initiation of KMC practice among low-birth-weight neonates is key in preventing morbidities and hypothermia, which helps the neonates gain the daily recommended weight of 15g/kg. Mothers' satisfaction with the quality of KMC, receiving midwives' support, mothers' satisfaction with midwives' knowledge, midwives' addressing of mothers' concerns, midwives' readiness to help with KMC roles, and providing feedback on the neonatal progress were among midwives-related factors that affect neonatal weight gain under KMC.

The midwives' insights, which were echoed, including adequate training on KMC, clinical implementation, and support that improve KMC practice, are vital because they help improve service care delivery, which contributes to increased weight gain in neonates.

Hospitals need to ensure timely training of midwives in updated KMC practices, provision of supplies for use in the unit, provision of standard operating procedures for the practice, and motivation of those passionate about the work.

8. Recommendations

The Ministry of Health in Kenya, Maternal, Neonatal, and Child Health Department (MNCH), should develop a policy for implementing Kangaroo Mother Care for stable, low-birth-weight neonates at health facilities on an early, intermittent basis.

The hospital administration should identify opportunities to strengthen KMC implementation for improved neonatal health outcomes. This approach supports evidence-based practices and capacity building among midwives to enhance the success of KMC in the management of low birthweight neonates through improving weight gain.

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