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PRACTICES OF ESSENTIAL NEONATAL CARE AMONG POSTNATAL MOTHERS ATTENDING NYERI COUNTY REFERRAL HOSPITAL, KENYA

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ABSTRACT

Background: Essential newborn care (ENC) included immediate and thorough drying of the newborn, delayed cord clamping and clean cord care, early skin-to-skin contact, early and exclusive initiation of breastfeeding, eye care, thermal protection, administration of vitamin K, timely immunization, and prompt recognition of and response to neonatal danger signs.

Objective: Data was collected using a semi-structured questionnaire and focused group discussions. This study found the following factors were statistically significantly associated with newborn care practices at the 5% level of significance: level of education (p = 0.034), parity (p = 0.027), place of delivery (p = 0.035), and receipt of healthcare breastfeeding training (p = 0.007). This study therefore has generated evidence-based results to inform the design of targeted interventions aimed at improving essential newborn care practice and, ultimately, reducing preventable neonatal morbidity and mortality within Nyeri County Referral Hospital.

Methods: The study was conducted at Nyeri County Referral Hospital, and a sample size of 126 postnatal mothers with neonates were included in the study determined by the Modified Fischer et al., 1998 formula. Maternal education, parity, place of delivery and receipt of breastfeeding training were associated with essential newborn care practice; given the cross-sectional design, these should be interpreted as correlates rather than causal predictors.

Results: Parity (AOR = 3.071, 95% CI: 0.507–18.599, p = 0.022), education (AOR = 0.077, 95% CI: 0.008–0.761, p = 0.028), place of delivery (AOR = 4.334, 95% CI: 0.768–24.437, p = 0.047) and healthcare training (AOR = 2.839, 95% CI: 0.944–8.537, p = 0.043) all indicated that they were independent predictors of essential newborn care practices.

Conclusion: Among the 126 postnatal mothers, 61.1% reported good practice, 38.9% reported bad practice and 42.7% reported all recommended practices.

Keywords: Essential Newborn Care; Neonatal Care Practices; Breastfeeding; Thermoregulation; Cord Care; Postnatal Mothers

1 INTRODUCTION

The World Health Organization (WHO) database showed that, according to estimates, in 2022, 2.3 million children died in their first 28 days of life, with an average of 6,500 children dying each day, and 47 percent of all child deaths under five years were caused by neonatal deaths [1]. Most deaths among newborns occur in the first week, and about 1 million babies die in the first 24 hours [1]. Many newborns die as a result of the quality of birth care received, insufficient skilled health care providers and limited medical care immediately after birth and during the first months of life [2].

The major problems confronted by postnatal mothers in Africa are; poor cord care, inadequate thermal care protection and poor breastfeeding practice with neonatal mortality rate of 28 per 1000 live births [3,4]. Arroyave et al [5] have been able to demonstrate that improving existing neonatal practices with regard to eye care, early initiation of breastfeeding, keeping the newborn warm, immunization and hygienic cord care has significantly contributed to the reduction of neonatal mortality and morbidity. The practices of EBC include thermal regulation (skin to skin contact), clean and dry cord care, avoiding early cord dipping or bathing, early initiation of breastfeeding, and timely drying and wrapping of the newborn baby. However, in developing countries, many low-resource health institutions are not able to reach the recommended level for ENC [6].

The infant mortality rate in Kenya in 2023 was 30.629 deaths per 1,000 live births, with significant variations between counties, from as low as 18 to as high as 52 [7,8]. In Nyeri County where the study was conducted, a KDHS was 28.3 per 1000 live births [9]. The majority of these deaths take place at home where babies do not receive proper care because mothers and others are not knowledgeable of the importance of proper care practices for newborns.

1.1 Statement of the Problem

Sepsis is an important cause of neonatal death, accounting for some 33.3 percent of the estimated 2.3 million neonatal deaths annually, while other common causes of neonatal death include birth asphyxia (45.5 percent), prematurity (12.5 percent), and hypothermia (11 percent). The KDHS [9] report showed that there was a disparity in essential neonatal health care in Kenya with regards to umbilical care, thermal protection, early initiation of breastfeeding and timely immunization – only 32.7 per cent of postnatal mothers reported that their babies received all the essentials at birth.

In Nyeri County Referral Hospital (NCRH), a level 5 health institution, the estimated neonatal mortality rate was 28.3 per 1,000 live births in the county, which is high in the county because of the number of mothers giving birth. Under this background, this study sought to develop evidence for improvement of the maternal and newborn health interventions at Nyeri County Referral Hospital and County and hence it evaluated the practices of essential newborn health care among postnatal mothers in NCRH.

1.2 Study Objective

To establish the practices of essential neonatal care among the postnatal mothers at Nyeri County Referral Hospital.

2 LITERATURE REVIEW

2.1 Practices of Essential Neonatal Care among Postnatal Mothers

The core newborn care practices are a package of evidence-based interventions that can reduce neonatal mortality and morbidity, comprising of timely thermal care, initiation of breastfeeding, delayed cord clamping, eye care, immunizations, and identification of danger signs. WHO underscores that effective use of these practices could save as many as 75% of all neonatal deaths worldwide [2]. The maternal education, place of delivery, attendance of antenatal care (ANC) and exposure to health education have been reported to influence mothers' ENC practices [10]. In Kenya, Kamau et al. [11] observed that only 62% of all postnatal mothers followed all the recommended ENC practices with low knowledge, cultural beliefs and no postnatal follow-up being some of the barriers. The findings of the 2022 Kenya Demographic and Health Survey (Kenya DHS) indicate that about two-thirds of postnatal mothers (67.3%) experienced gaps in the care that their newborn children received after birth, including getting support for feeding, handling the umbilical cord, keeping the baby warm, administering vaccinations, and receiving preventive eye treatment.

2.1.1 Thermoregulation Practices

The study by Ayele et al. [12] showed that approximately 80% of respondents knew that wrapping and covering a newborn with warm and dry clothes are helpful to prevent the baby from chilling, but 56.1% were unaware of the

importance of skin-to-skin contact care to prevent hypothermia. In Addis Ababa, Ethiopia, 68.6 percent of respondents reported being aware that warm clothes help reduce body heat loss, and in Ethiopia, Semanew et al. [13] reported that mothers used warm clothing for newborns to prevent body heat loss (80.8 percent). In India, Qazi et al. [14] found that 55 percent of the postnatal mothers had no knowledge of wrapping and drying, and 97 percent had no knowledge of the skin to skin thermoregulation care. In the study by Otieno and Wafula [15], 93 percent of the participants knew the importance of warm clothes, less than 7 percent knew Kangaroo Mother Care (KMC), and 4 percent knew that a warm room helps to reduce cold related fragility of the newborns. However, in Kenya, mothers have been observed to place high reliance on warm clothing and bundling over the use of KMC and skin to skin contact [15].

2.1.2 Neonatal Hygiene Practices

While high levels of hygiene when caring for the cord can prevent infections, Awuor et al. [16] revealed that postnatal mothers have gaps in knowledge about their cord care practices, eye care and first bathing. Of the mothers, their results indicated that 79.3% washed their hands with soap and water after using the toilet and 82.7% after changing their baby's diapers, with 20.7% only washing with water, mostly because soap was not available at handwashing stations. Bhandari [17] concluded that more than 95% of mothers washed their hands before reaching out to their newborns, but 83% washed their hands before touching the cord stump. Almost 80% of households did not have a handwashing facility near the toilet, which was more prevalent in urban areas (30.2%) than in rural areas (13.2%). Abuidhali (2019) further reported that Jordanian women dipped infants in salt water during the first week of their life and put an antibiotic powder on the stump of the navel cord, which can lead to dryness of the skin.

2.1.3 Early Initiation of breastfeeding

Today, 40 percent of children under six months are exclusively breastfed and just 23 countries can claim to have an exclusive breastfeeding rate of 60 percent or higher [1]. It was found that exclusive breastfeeding from birth to 6 months was not prevalent in rural Kenyan contexts [18], indicating a policy-practice disconnect. The proportion of children who start with early initiation is approximately 57% in East Africa, while it is 42% in West and Central Africa [19]. Nyamasege et al. [20] reported that mothers' knowledge about breastfeeding practices was good at Kenyatta National Hospital but that some mothers stopped breastfeeding when their children's condition deteriorated, such as when they had a fever or cold (6 percent), diarrhoea (18 percent), or vomiting (26 percent). Ashenef et al. [21] reported that in Ethiopia, 99 per cent of mothers started to breastfeed but only 79 per cent practiced exclusive breastfeeding within 24 hours. About 15.84 percent of infants were found to be pre-lacteal fed by Alamneh et al. [22] and mode of delivery was also seen to affect the initiation of breastfeeding.

2.1.4 Immunization

Immunization is estimated to save the lives of 2–3 million children worldwide every year, while near 20 million babies do not receive the necessary vaccines each year [19]. The findings from South Asia by Ariff et al. [23] suggest that only 58% of infants received all required vaccines in the first month of their lives, primarily because of poor follow-up after birth. About 66% of newborns got the BCG vaccine and 33% got the first dose of oral polio vaccine (OPV0) within days of birth in Kenya, with some areas experiencing lower coverage in the arid and semi-arid areas like Turkana and Mandera [24]. Nyanchoka et al [25] reported a more than 30 percent increase in vaccine uptake when counselling was conducted in the first 48 hours after babies were born. Overall breast-feeding knowledge was found to be generally high among the postnatal mothers in Dar es Salaam, Tanzania, however, knowledge and practice in seeking care for mainly neonatal danger signs was found to be lower with mothers more likely to consult relatives or wait before seeking formal care [26].

3 METHODOLOGY

3.1 Study Location and Design

The study was carried out at Nyeri County Referral Hospital (NCRH) a level 5 public hospital located approximately 2.5 km off Nyeri town Centre of Business (CBD) in Nyeri County, Kenya (Latitude -0.42593; Longitude 36.9631). The hospital has 407 beds and 57 cots, which are used for 108.29% of the time, and has more than 800,000 population. NCRH provides holistic care for mothers and newborns before, during, and after delivery, such as delivering a baby with a skilled professional, providing supports for breastfeeding, caring for the umbilical cord, immunizing newborns, and educating mothers and newborns about health.

Using an analytical cross sectional design allowed the researcher to examine the various study variables at a single time in one study population and to examine trends and associations within the study population [27] (Polit & Beck, 2022; Saunders et al., 2023).

3.2 Study Population and Sampling

The study population included all postnatal mothers aged 15-49 years with their neonates admitted to the postnatal ward at NCRH who gave voluntary informed consent, were physically and mentally fit and involved both primiparous and multiparous mothers. Mothers whose neonates were taken to the Newborn Unit (NBU) for over 24 hours, those who refused consent and those with severe maternal complications were excluded, as were mothers with severely sick neonates who could not be cared for in the IC unit.

The sample size was calculated as $n = z^2PQ/d^2$, giving an initial sample size of 384, adjusted for a target population of 185 postnatal mothers to $nf = n/[1+(n/N)]$ resulting in a final sample size of 126 postnatal mothers with newborns selected using simple random sampling method.

3.3 Data Collection

The data collected were both qualitative and quantitative, using a method of semi-structured questionnaires and focus group discussions (FGDs) which were completed with the assistance of the researcher, who translated the data for the individual who could not read or write. It was pretested on 10% of sample size among the post natal mothers at Kerugoya County Referral Hospital with two supervisors checking its validity and test retest reliability was used to ensure consistency in measuring maternal knowledge and behaviors on early breastfeeding, cord care, eye care, thermal care, immunization and recognition of newborn danger signs.

A total of 14 focus group discussions with 8–9 participants were held, each discussion consisting of a homogeneous group according to parity, were audio-recorded and transcribed for qualitative analysis to give the quantitative results some context.

3.4 Data Analysis

The data were cleaned, coded and analyzed using SPSS version 29.0. Descriptive statistics such as frequencies, means, standard deviations and percentages were used to describe quantitative variables. The first objective was breastfeeding practice, hygiene, immunization and thermal control practice as independent variables and practice of ENC as the dependent variable analyzed using percentage, frequency, logistic regression, Chi-square and a p value of < 0.05 considered statistically significant. Qualitative data from the FGDs was analyzed thematically to look for any commonalities that relate to the key neonatal care practices.

3.5 Ethical Considerations

The study received approval from the Chuka University Research and Ethics Committee, National Commission for Science, Technology and Innovation (NACOSTI) and Medical Superintendent of Nyeri County Referral Hospital. Participants were fully informed about the study and the consent forms were signed voluntarily, with confidentiality upheld by the use of numbered consent forms, coded responses, and confidential interviews.

4 RESULTS

4.1 Response Rate and Socio-Demographic Characteristics

The study had a 100% response rate with all 126 cases of postnatal mothers who were sampled taking part fully in data collection. The mean age of the respondents was 27.16 years (SD = 5.49 years) and ranged between 15 and 35 years and above. The majority were in the 21–25 year (31.7%, n=40) and 26–30 year (31.1%, n=39) age groups. Most respondents were married (76.2%, n=96), had attained secondary education (47.6%, n=60), and were housewives (38.1%, n=48). Almost half of the mothers were multiparous (47.6%, n=60), and most of them had their deliveries in a health facility (92.1%, n=116). The result of the household income data showed high economic vulnerability: a mean household monthly income was KES 15,238.10 (SD = 13,097.44).

Table 1: Socio-Demographic Characteristics of Study Participants (n = 126)

Category	Characteristic	Frequency (n)	Percentage (%)
Age (Years):	15–20	12	9.5
	21–25	40	31.7
	26–30	39	31.1
	31–35	25	19.8

	>35	10	7.9
Marital Status:	Married	96	76.2
	Single	20	15.9
	Divorced/Separated	10	7.9
Education:	No formal education	8	6.3
	Primary	38	30.2
	Secondary	60	47.6
	Tertiary	20	15.9
Occupation:	Housewife	48	38.1
	Self-employed	36	28.6
	Formal employment	32	25.4
	Student	10	7.9
Parity:	Primipara (1)	56	44.5
	Multipara (2–4)	60	47.6
	Grand multipara (≥5)	10	7.9
Place of Delivery:	Health facility	116	92.1
	Home	10	7.9
Monthly Income:	<5,000 KES	30	23.8
	5,001–10,000 KES	34	26.9
	10,001–20,000 KES	29	23.1
	20,001–40,000 KES	22	17.5
	>40,000 KES	11	8.7

4.2 Breastfeeding Practices

Breastfeeding within the first hour of birth, the universally recommended time, occurred in 45.2% of mothers (n=57), 29.4% (n=37) initiated between 1-3 hours of birth and 19.8% (n=25) after three hours of birth. Regarding feeding frequency, 37.3% of babies (n=47) were fed 8-12 times a day as advised, and 34.9% (n=44) were fed on demand. 61.1% (n=77) of mothers reported exclusive breastfeeding (EBF) in the first 6 months, which is less than the WHO goal of at least 70%. Among non-exclusively breastfeeding mothers, the commonest supplements were infant formula (81.6%, n=40), water (30.6%, n=15), tea (16.3%, n=8), and cow or goat milk (16.3%, n=8). Remarkably, 31.7% (n=40) of the mothers disposed of colostrum, which is known for its nutritional and immunological properties. Mothers who were trained by healthcare workers (HCW) had significantly higher breast milk adequacy beliefs (71.4%, n=90) (breast milk can meet infant needs for up to 6 months) compared with the other mothers (7.6%, n=9).

Table 2: Breastfeeding Practices among Postnatal Mothers

Category	Variable	Frequency (n)	Percentage (%)
Initiation	within an hour	57	45.2
	1–3 hours	37	29.4
	Over 3 hours	25	19.8
	Others	7	5.6
Frequency:	Less than 8 times/day	10	7.9
	8–12 times/day	47	37.3

	More than 12 times/day	25	19.8
	On demand	44	34.9
Discarded colostrum milk:	Yes	40	31.7
	No	86	68.3
Received HCW breastfeeding training:	Yes	96	76.2
	No	30	23.8
Exclusively breastfeeding:	Yes	77	61.1
	No	49	38.9

4.3 Thermoregulation Practices

The most popular ways to warm the newborn were to use warm clothing (88.1%, n=111), and swaddling with blankets (78.6%, n=99), followed by a hat/cap (59.5%, n=75). While 69.8% of mothers (n=88) had engaged in skin-to-skin contact at some point after giving birth, only 44.4% of mothers (n=56) practiced skin-to-skin contact clinically recommended as a warming method.69.8% (n=88) of mothers reported engaging in skin-to-skin contact at any point after birth, but only 44.4% (n=56) engaged in skin-to-skin contact clinically recommended as a warming method. Just over half of mothers (55.6%, n=70) reported receiving thermal-care training from a health-care worker, while 79.4% (n=100) assessed newborn temperature by hand and only 15.9% (n=20) used a thermometer.

Table 3: Thermoregulation Practices among Postnatal Mothers

Category	Variable	Frequency (n)	Percentage (%)
Temperature assessment:	Use of hand	100	79.4
	Thermometer	20	15.9
	Others	6	4.8
Received HCW thermoregulation training	Yes	70	55.6
	No	56	44.4
Warming method:	Warm clothes	111	88.1
	Wrapping/swaddling	99	78.6
	Hat/cap	75	59.5
	Closed doors/windows	57	45.2
	Skin-to-skin contact	56	44.4
	Warm environment/heater	29	23.0
Skin-to-skin practiced after birth:	Yes	88	69.8
	No	38	30.2

4.4 Cord Care and Newborn Hygiene Practices

The methods used to clean cords were diverse with 33.3% (n=42) cleaning with water, 31.7% (n=40) cleaning with surgical spirit (no longer recommended by WHO), 25.4% (n=32) cleaning with chlorhexidine (WHO recommended method), and 7.9% (n=10) of mothers not cleaning the cord at all. As far as bathing is considered only 50.0% (n=63) of mothers postponed the first bath beyond 24 hours as recommended by WHO; while 24.6% (n=31) bathed the newborn right after birth. More than half of the mothers (57.2%, n=72) applied traditional substances such as herbs, saliva, ash or cow dung to the cord stump, a practice that is a recognized risk factor for neonatal tetanus and infection. Regarding eye care, the breast milk application was used by 23.8% (n=30) of mothers, although there is no clinical evidence of this practice; tetracycline eye ointment use was performed by 38.1% (n=48) of mothers.

Table 4: Cord Care and Newborn Hygiene Practices among Postnatal Mothers

Category	Variable	Frequency (n)	Percentage (%)
Cord care:	Cleaning with water	42	33.3
	Surgical spirit	40	31.7
	Chlorhexidine	32	25.4
	Do not clean	10	7.9
	Others	2	1.6
Cleaning cord frequency:	Once a day	60	47.6
	Twice a day	50	39.7
	Once a week	10	7.9
	Never	6	4.8
First bath:	Immediately	31	24.6
	Within 24 hours	27	21.4
	After 24 hours	63	50.0
	Never	5	4.0
Applying Cord stump substance:	None	54	42.9
	Herbs	34	27.0
	Spit/Saliva	15	11.9
	Ash	11	8.7
	Cow-dung	7	5.6
	Others	5	4.0
Eye care:	Tetracycline ointment	48	38.1
	Soft cloth cleaning	46	36.5
	Applied Breast milk	30	23.8
	Others	2	1.6

4.5 Immunization-Related Practice Behavior

As far as actual immunization practice, 87.3% (n=110) of mothers thought newborns should be immunized immediately following birth, indicating a general positive attitude towards immunization practice. But, vaccination practice in the hospital during the mothers' stay was limited by supply; actual vaccination practice at the hospital during the mothers' stay was constrained by supply with 81.0% (n=102) of mothers reporting that vaccines were not available in the hospital during their stay.

4.6 Qualitative findings about neonatal care practices

Focus group discussion (FGD) data helped to enrich the quantitative practice findings, especially on the issues of breastfeeding supplementation and thermoregulation behaviour:

"I gave my baby water since she was crying a lot and I wasn't able to produce enough milk." ***FGD 101***

"The infant would sometimes cry after breastfeeding, and I believed that I was not producing enough milk to feed the infant; therefore, I would give my baby Nan milk to supplement my breast milk." ***FGD 010***

"In the house, I touch my baby's forehead and stomach/s with my hand to check for heat; if I feel the baby to be hot, I bring her to the hospital. " ***FGD 001***

5 DISCUSSION

This section addresses the results obtained in the study regarding the essential care practices for newborns (breastfeeding, thermoregulation, cord care and hygiene, immunization) and how this compares to the literature and global recommendations.

5.1 Breastfeeding Practices

The findings showed that not all postnatal mothers were initiated to exclusive breastfeeding within one hour of birth which was below the World Health Organization [4] recommendation. This is similar to the findings in Kenya and the entire East African region where the rates of early breastfeeding initiation are still low despite the national campaigns. In Kisumu County, Odhiambo et al [28] reported similarly, with less than half of the mothers initiating breast-feeding in a timely manner, which they linked to a lack of early skin-to-skin contact after CS, and other institutional constraints.

Although the current exclusive breastfeeding (EBF) rate in this study is encouraging, it is still sub-optimal and is not currently at target in order to be considered 'on track' to reach the WHO target of 70% or more. Non-EBF mothers most frequently provided supplemental feeds of infant formula, water, tea, or cow or goat milk, which would increase the risk of infection and reduce the immune protection provided by breast milk in the critical neonatal period. The quantitative results were corroborated by FGDs – mothers reported that beliefs about inadequate milk supply were an important factor in explaining why they gave their babies formula supplements, indicating a lack of knowledge about cluster feeding and normal feeding patterns.

One of the more alarming results was that 31.7% of mothers discarded colostrum, a result the FGDs attributed to traditional beliefs that colostrum is watery and unclean and that it causes a risk of infection for their infants. This demonstrates the persisting influence of traditional beliefs over evidence-based practice. The results are in line with the findings of Muluye et al. [29] in Ethiopia, which reported high rates of colostrum discarding due to the beliefs of family members from one generation to the next, especially the mothers-in-law. Mothers trained by HCW on breastfeeding (76.2%) were significantly more likely to practice EBF (AOR = 2.839, 95% CI: 0.944–8.537, p = 0.043) which is aligned with the finding from Rollins et al. [30] that facility-level skilled breastfeeding support is one of the strongest EBF interventions globally.

5.2 Thermoregulation Practices

Evidence for thermoregulation found significant gaps in evidence based practice. The most common method for checking the infant's temperature was by touching the forehead or the abdomen with the mother's hand, which is not a clinically valid method, with 79.4% of mothers doing so; only 15.9% used a thermometer to check the temperature. The findings are similar to Edmond et al. [31], who found hand-based temperature assessment was common in resource-limited settings and associated with the lack of and cost of thermometers in Ghana.

69.8% of mothers said that they practiced skin-to-skin contact, but this percentage does not account for the quality and consistency of this practice. Skin-to-skin contact was found to be an issue, as lack of privacy in ward conditions, open windows and frequent visitors were reported to be a factor that discouraged mothers from being skin to skin. This is better compared to the 2022 Ghana Demographic and Health Survey analysis based on which 67.2% of mother-newborns across the country had skin-to-skin contact. A more in-depth examination of the DHS data for five East African countries from 2019 to 2023 revealed that the prevalence of not having skin-to-skin contact with the newborn for mothers in the national population was close to 50%, with low maternal education rate, low exposure to mass media and rural residence being the strongest independent determinants of non-practice [32]. Thermoregulation training coverage was 55.6% of mothers, which may explain this high level of inappropriate temperature assessment, and was lower than breastfeeding training coverage (76.2%), suggesting a greater emphasis on lactation support than on education about thermal care.

5.3 Cord Care and Hygiene Practices

The practices of cord care were very diverse in this study. The most common methods used in cleaning were water (33.3%), surgical spirit (31.7%) and chlorhexidine (25.4%). The use of dry cord care or chlorhexidine is recommended by WHO and Kenya National Guidelines on Neonatal Care, especially in the home delivery situation in high neonatal mortality areas. Surgical spirit, which was used by almost a third of mothers is also not recommended, as it can slow down the separation of the umbilical cord. More alarming were the 7.9% of mothers who reported not cleaning the cord at all which put their newborns at risk of omphalitis. Logistic regression analysis revealed that only health worker training on neonatal care was statistically significant predictor of appropriate cord care (chlorhexidine use) indicating focused health worker training is a critical lever to improve neonatal care practice.

The results are consistent with the results of a mixed methods study conducted in three counties (Kwale, Vihiga, Machakos) which indicated that only 1.3% of the caregivers had used chlorhexidine for cord care, while most used either methylated spirits, other antiseptics, or salty water [33]. A study, however, at a national teaching and referral hospital in Eldoret showed that 64% of postnatal mothers used chlorhexidine, indicating that the availability of a well-resourced referral hospital could make a difference. The persistence of harmful substances despite the fact that chlorhexidine is on the Kenya's Essential Medicines List is another factor that has been cited as affecting the implementation of national policy at the facility- and community-level [34].

Fifty-seven and a half percent of mothers reported using traditional remedies on the cord stump such as herbs (27.0%), saliva (11.9%), ash (8.7%) and cow dung (5.6%), which are associated with a preventable, but potentially fatal, infection acquired by the newborn, tetanus neonatorum. FGD respondents concurred that these practices had been handed down the generations. The results are similar to those in Uganda and Tanzania, where there is strong adherence to traditional cord care despite efforts of the health education campaign.

In terms of newborn bathing only 20.4% of mothers waited more than 24 hours after birth for the first bath as recommended by WHO to avoid hypothermia and prevent the loss of the protective vernix caseosa, suggesting a good knowledge-practice gap that calls for specific education and intervention. Less than half (38.1%) of mothers used the recommended tetracycline eye ointment and breast milk use for eye care (23.8%) was not an evidence-based practice and may hinder appropriate prophylaxis, consistent with the findings in Malawi and Uganda.

5.4 Immunization Practices

The study revealed high general knowledge regarding immunization and majority (87.3%) of mothers agreed that immunizing children soon after birth was the best way to do it. The welcome was not so pleasant, however, when 81.0 per cent said the vaccines were not available at the hospital during their postnatal stay, as this is a County referral hospital; and this is alarming because of a significant systemic problem in the health Commodity supply chains. However, 81.7% of respondents considered immunization services to be good or excellent, which may reflect social desirability bias, or a lack of comparison points among mothers to assess the quality of services.

The extent of the stockout reported by mothers in this study is comparable to, and in some aspects less serious than, facility-level stockout audits carried out in other areas of Kenya. As many as 88% of public health facilities surveyed in Nairobi City County experienced stockouts of tetanus, measles, and oral polio vaccines, according to Kanja et al. [35]. Following the assessment of rural facilities in Turkana County, it was revealed that while most health providers were using vaccine forecasting sheets, only 81% had adopted a functional minimum/maximum inventory control system, indicating that there were shortcomings in demand forecasting and management of the stocks [36]. Combined with the findings of the present study that an 81.0% facility-level stockout rate was seen at the county referral hospital, this evidence shows vaccine unavailability is a systemic problem that is not isolated to individual facilities but is multi-county, across Kenya.

6 CONCLUSION

The practice of essential newborn care is not at the expected level in many aspects such as initiation of breastfeeding, exclusive breastfeeding, thermoregulation, cord care, hygiene and immunization practices among the mothers who delivered their babies at the Nyeri County Referral Hospital. The gap between practice and knowledge is large and extends to cultural beliefs, financial restraints, and even mothers with a decent degree of awareness, resulting in non-evidence based practices. The most consistently statistically significant predictor of best practices in the provision of neonatal care was the volume of training received by health workers, with positive impacts seen on breastfeeding and cord care, suggesting that training of health workers is likely to deliver the greatest benefits within the current health system.

Recommendations

- Health Policy

The Ministry of Health and the Health Department of Nyeri County should develop and implement an elaborate Postnatal Care Policy to include detailed and standardized health education on all aspects of essential neonatal care before mothers are discharged from health facilities, as well as competency checks of mothers before they are discharged from the health facility.

There is need to allocate adequate budgets for the continuous supply of essential neonatal commodities like chlorhexidine, thermometers, tetracycline eye ointment, and neonatal vaccines by National Treasury and County government of Nyeri, to end stock-outs at county referral hospitals.

- Healthcare Practice

Nyeri County Referral Hospital should establish a dedicated Neonatal Care Education Unit in the postnatal ward with lactation consultants and neonatal care nurses to provide domain specific education to all postnatal mothers before they leave the hospital.

Healthcare workers should receive proper training, and be updated regularly on all aspects of essential neonatal care including the importance of thermoregulation, cord care with chlorhexidine, timing of bathing, benefits of colostrum and recognition of danger signs, and a cultural humility approach should be incorporated into training.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

Statement of Ethical approval

Ethical clearance for the study was obtained from the Chuka University Institutional Ethics Review Committee under approval number CUIERC/NACOSTI/885. In addition, a research permit was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) under license number NACOSTI/P/26/4184012. These approvals ensured that the study complied with the required ethical and regulatory standards.

Statement of informed consent

The information provided by the participant was kept confidential and used solely for research purposes. Personal data was not disclosed to any third parties. Participation in this research was voluntary with no inducement, and participants had the right to withdraw at any time without any consequences.

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