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Original Research Article

Knowledge, attitude, and practices of postnatal mothers towards neonatal skin care in a tertiary care hospital in Southern India

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Abstract

Background: Neonatal skin care is crucial for maintaining skin integrity, preventing infections, and ensuring overall health. However, maternal knowledge and practices vary widely due to cultural beliefs, socioeconomic factors, and limited awareness. While some traditional practices are beneficial, others may pose risks, highlighting the need for standardized, evidence-based guidelines. This study evaluates the knowledge, attitudes, and practices of postnatal mothers toward neonatal skin care in a tertiary care hospital in Southern India.

Materials and Methods: A cross-sectional, questionnaire-based study was conducted from September 2024 to December 2024 at a teaching medical college in Chennai, Tamil Nadu. A total of 100 postnatal mothers were selected through non-probability convenience sampling. Data were collected via structured face-to-face interviews covering maternal hygiene, umbilical cord care, bathing practices, diaper care, and skincare routines. Statistical analysis was performed using SPSS version 21. Descriptive statistics were used to summarize baseline characteristics, with categorical data presented as frequencies and percentages.

Results: The study found that beneficial practices, such as oil massage (98%) and the use of soft cotton clothing (85%), were widely followed. However, harmful practices, including immediate post-birth bathing (42%), vigorous scrubbing (30%), and applying unverified substances to the umbilical cord (63%), were common. Additionally, 75% of mothers applied kajal, unaware of its potential health risks. Awareness of evidence-based skin care was low, with only 37% following WHO-recommended cord care guidelines.

Conclusion: Neonatal skin is delicate and highly sensitive, necessitating specialized care to prevent irritation and infections. This study highlights gaps in maternal awareness, emphasizing the need for structured educational initiatives. Strengthening collaboration between dermatologists, paediatricians, and caregivers is essential to improve neonatal skin health and long-term well-being.

Keywords: Neonatal skin care, Traditional practices, Newborn health, Evidence-based guidelines.

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1. Introduction

Skin care is vital in daily practice throughout life and plays a significant role during the neonatal period when skin is most delicate. Newborn care practices are influenced by a combination of cultural norms, geographical factors, available sanitary facilities, industrial developments and marketing strategies.[1-3] Within hospital settings, neonatal skin care practices often rely on personal experiences rather than standardized approaches, leading to considerable variability.[4]

The World Health Organization (WHO) underscores the importance of neonatal skin care as a cornerstone of 'Essential Newborn Care.'[5] Appropriate skin care is crucial in maintaining skin integrity, supporting the acid mantle and promoting balanced and healthy skin microbiome. Neonatal skin care plays a key role in immunomodulation, infection prevention, and neurodevelopmental outcomes, directly affecting both immediate and long-term health.[6-9] However, despite its significance, many neonatal skincare practices lack robust scientific evidence and are shaped by traditions, cultural influences, or convenience.

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Neonatal skin has unique vulnerabilities. It is thinner, with an underdeveloped epidermis, dermis, and hypodermis, and lacks full mechanical resistance due to an immature dermal-epidermal junction.[10,11] Immature corneocytes and biochemical differences contribute to heightened susceptibility to trauma, infection, and various skin disorders.[12] The transition from the protected intrauterine environment to the external world further necessitates specialized care to support the functional maturation of the skin. Trans epidermal water loss (TEWL) is initially low but increases rapidly in response to environmental challenges, underscoring the importance of early acidification and hydration in maintaining skin health.[9,13] This study seeks to assess the knowledge, attitude, and practices of postnatal mothers in a tertiary care hospital in Southern India. By evaluating current practices, the study aims to emphasise the importance of forming standardized guidelines that address these gaps and emphasise the role of dermatologist in newborn care to ensure consistent and effective neonatal skin care both in hospital settings and at home. Such efforts are vital to promote skin barrier health, preventing infections, and supporting the overall well-being of neonates, ultimately enhancing their quality of life.

2. Materials and Methods

This cross-sectional, questionnaire-based study was conducted at a teaching medical college in Chennai, Tamil Nadu, Southern India from September 2024 to December 2024. The study aimed to assess the knowledge, attitudes, and practices regarding neonatal skin care among postnatal mothers. A total of 100 postnatal mothers/caregivers were included in the study using a non-probability convenience sampling technique. The sample size was determined based on feasibility and resource constraints. Statistical analysis was done using SPSS version 21. The baseline characteristics of patients were analysed by descriptive statistics. Categorical data was described using percentages and frequencies.

2.1. Inclusion and Exclusion Criteria:

Postnatal mothers or primary caregivers of neonates (0-28 days old) who were willing to participate were included in the study. Mothers with critically ill neonates or those who declined to participate were excluded.

2.2. Data collection tool

A structured questionnaire was developed based on a comprehensive literature review and expert consultation. The questionnaire consisted of three main sections: Demographic information, Knowledge assessment (multiple-choice questions), Attitude and practices assessment (Likert scale and multiple-choice questions). The questionnaire covered various aspects of neonatal skin care, including bathing, diaper care, umbilical cord care, massage, and other common practices.

After obtaining institutional ethical clearance and informed consent from participants, trained researcher (primary investigator) administered the questionnaire through face-to-face interviews. The interviews were conducted in a private setting within the hospital premises, ensuring confidentiality and comfort for the participants. Each interview lasted approximately 20-30 minutes.

The collected data and the responses were recorded in a spreadsheet for documentation. The questionnaire served as the primary tool for gathering information without further quantitative evaluation.

2.3. Pilot study

A pilot study was conducted with 10 participants to assess the feasibility of the study protocol and to validate the questionnaire. Minor modifications were made to the questionnaire based on the pilot study findings

3. Results

3.1. Demographic details

A total of 100 postnatal mothers were included in the study. Of which majority were within the age group of 19-25 years and were 1st time mothers (primiparous). There were no illiterate mothers in survey owing to majorly semi-urban and urban population in the geographic region under study. Most (68%) of the mothers were housewives. The demographic characteristics are given in **Table 1**.

On assessing the antenatal care practices, it was found that 80% of mothers reported attending three or more antenatal visits, demonstrating adherence to clinical guidelines, while 20% attended only twice, reflecting gaps in accessibility or utilization of antenatal care.

3.2. Maternal hygiene

As maternal hygiene plays significant role in newborn health, we collected data on maternal hygiene practices, 85% mothers reported bathing minimum once daily and 15% reported bathing once in 2-3 days. About 28% mothers practiced handwashing before handling their newborns and 22% strongly believed it is essential to clean the breast before each breastfeed.

3.3. Umbilical cord care

Among study participants, 42% of mothers reported receiving advice on umbilical cord care, while 58% did not receive such guidance. Among those who were informed on cord care, 37% practiced the recommended method as per WHO guidelines. However, traditional practices persisted, with few of the mothers using Vasambu, coconut oil, and turmeric powder at the cord site as described in **Table 2**.

3.4. Newborn bathing practices

The first bath was delayed for 2–3 days after birth by 20% of mothers, aligning with global recommendations. However,

immediate bathing of newborn was reported by 42% of participants, and the rest (38%) delayed the first bath for a week. The new born bathing practices are described in the **Table 3**.

The frequency of bathing the newborn varied among the participants. Around 65% of mothers bathed their infants daily. Majority of the participants (90%) believed that neonatal bathing must be prolonged with bathing time lasting up to 10-15 minutes. Around 40% of mothers admitted using additives to bathwater, majorly vasambu or herbal leaves such as neem leaf followed by commercial disinfectants or turmeric. Almost 30% mothers reported vigorous scrubbing of the newborn during bath. Soaps as prescribed by treating paediatrician were used by 50% of the mothers and other half chose bathing soaps based on affordability or social media influence and were unaware of importance of pH or moisturising component of soaps.

More than half of mothers (64%) practiced vigorous massage like pinching of the nose, stretching fingers and rubbing the back considering that will help in baby's sleep or improves the appearance, while 36% preferred gentler techniques. About 50% of mothers retained vernix caseosa on their newborns' skin, while the other half removed it during bathing or massaging perceiving it as unclean.

3.5. New born skin care

About 86% of the study participants revealed that they prefer to dry the newborn vigorously with towel post-bath as they perceive it can lead to common cold, while the other 14% admitted that pat dry was sufficient. Cleaning of body folds of the baby such as the neck, armpits, and groin was reported by 58% of mothers. Most of the mothers (85%) preferred cotton towels to dry the baby and all of them reported to wash towels often. Of the study group 10% mothers reported to use fumes of benzoin resin (sambrani) post bath considering it as a traditional practice that can improve babies sleep and wellbeing.

More than half (56%) of mothers applied moisturizers immediately after bath, among these, 43% identified it as a preventive measure against dryness. About 10% used moisturisers with fragrance or fragrance enhancers like colognes. Talcum powder was used by 47% of mothers, 30% of them applied it during diaper changes. Majority of mothers (85%) preferred to use thin cotton cloth for newborn clothing over thick cotton, muslin or wool. Kajal (kohl) application was noted in 75% of mothers who believed it could enhance eyebrow shape and eye contour. However**,** 20% participants recognized potential risks associated with these practices but followed it due to traditional norms. Threads were used around the waist or neck of the baby by 25% of mothers, with 10% reporting allergies to them. Most mothers (63%) were unaware of the ideal ambient temperature for their baby, which is crucial to prevent overheating or hypothermia.

3.6. Diaper care

Seventy-eight percent of mothers used commercial diapers, 12% used cloth napkins, and 10% alternated between the two. Parents preference on commercial diapers over cloth napkins was in terms of ease of use, however cost was reported to be the limiting factor. The frequency of diaper change and knowledge and practices pertaining to diaper care is shown in **Table 4**.

None of the mothers changed diapers 2-3 hourly, 27% changed at least 4-6 hourly irrespective of soiling or diaper being full where others preferred to change immediately after faecal soiling or when its full. Awareness on diaper cream was very poor among the study population with only 15% had some idea about availability diaper creams, however 95% among them perceived it can be used as treatment modality and were not aware that it can be used as a preventive modality. The usage of wet wipes was rampant among the study population with 35% using only wet wipes and 20 % using both but none of the mothers were aware of the allergies associated with wet wipes and most of them choose wet wipes as it was convenient to use.

All mothers felt dermatology consultation or health education on neonatal skin health post-delivery might improve the skin care practices.

Table 1: Demographic characteristics of the study population (n=100)

Characteristic	**Percentage (%) (n=100)**
Age (Mean ± SD)	25.89 ± 3.46
Parity	
Primiparous	65
Multiparous	35
Occupation	
Homemakers	68
Employed Mothers	32
Education	
Primary Education	33
High School Education	31
Intermediate/Diploma	20
Graduate-Level Education	16

Table 2: Umbilical cord care among postnatal mothers (n=100)

Practice	**Percentage (%) [n=100]**
Advised on Cord Care After Delivery	
Yes	42
No	58
Practice of Applying Substances on Umbilical Stump	
None	37
Vasambu	33
Coconut oil	20
Turmeric	10

Antibiotic ointment	0
Cow dung	0
Slaked lime	0

Table 3: Newborn bathing practices

New born bathing practices	Percentage (%)(n=100)
First Bath	
Delayed Bath (2–3 days)	20
Immediate Post-birth Bath	42
Bath Delayed for 1 Week	38
Bath frequency	
Daily	65
Twice a day	25
2-3 times a week	10
Duration of bath	
Quick, short	10
Prolonged (10-15 mins)	90
Bathing water temperature	
Warm	83
Hot/cold	17
Massaging before bath	
Yes	98
No	2
Massage oil preferred	
Commercial baby oils	40
Coconut oil	29
Gingelly oil	26
Mustard Oil	5
Bath Soap preferred	
Gentle, Neutral pH, fragrance free soaps	50
Other commercially available soaps	50
Additional substances used as soap alternatives or along with soap	
Yes - Turmeric powder	15
Vasambu/ herbal leaves	40
No	36
Sambrani (Benzoin resin) use post bath	
Yes	10
No	90

Table 4: Diaper care practices

Diaper care practices	Percentage (%)
Diaper preference	
Commercial diapers	78
Cloth napkins	12
Both	85
Frequency of diaper change	
Immediately after soiling	73
Time based (4-6hrs)	27
2-3 hourly	0
Diaper area cleaning methods	
Soap and water	45
Commercial wet wipes	35
Both	20
Awareness on availability of diaper creams (n=100)	
Yes	15
No	85
Frequency of use of diaper creams (n=15)	
With every diaper change	13.3
Once or twice daily	13.3
During the period of diaper rash	73.3
Diaper free periods	
Yes	53
No	47

4. Discussion

4.1. Demographic profile

The demographic profile underscores pivotal factors influencing neonatal care practices. Srinivasa et al.[14] reported maternal age and education significantly influence neonatal care. The average maternal age in our study population was 25.89 ± 3.46 years with a majority (65%) being first-time mothers (primiparous), indicates potential reliance on cultural practices and external advice due to limited caregiving experience. Educational levels varied significantly, with only a small proportion (16%) being graduates. Reports strongly indicates that literacy enhances evidence-based caregiving behaviours, with less-educated mothers often adhere to traditional practices or external advices.[1] Tailored health education, including engaging visual aids and interactive materials, can effectively bridge gaps for less-educated mothers, fostering consistent caregiving practices. In our study 68% of mothers were homemakers, affording them more time for caregiving, while working mothers faced additional challenges balancing responsibilities.

4.2. Antenatal care practices

About 80% of the mothers in this study attended three or more antenatal visits, indicating adherence to antenatal care guidelines and recognition of the importance of prenatal monitoring for maternal and neonatal health (World Health Organization).[15] Srinivasa et al.,[14] reported regular antenatal visits were associated with improved knowledge of neonatal care practices. All mothers with 3 or more antenatal visits to hospital in our study reported that they were not educated specifically on neonatal skin care however they were educated on breast feeding and cord care. A study done in rural Uttar Pradesh, India, found that ANC attendance significantly improved immediate newborn care practices, such as breastfeeding initiation and cord care.[16] Blume-Peytavi et al. emphasized the importance of incorporating skin care education into antenatal counselling, particularly in regions where traditional practices often dominate postpartum care.[17]

4.3. Maternal hygiene

Hygiene practices among mothers in this study exhibited considerable variability. About 28% of the mothers practiced handwashing before handling their newborns, an essential measure to minimize the risk of neonatal infections. This aligns with findings of Darmstadt et al.[6] and WHO,[15] which emphasize the pivotal role of maternal hand hygiene in preventing pathogen transmission to infants. Smaller subset of mothers (22%) believed it was essential to clean the breast before each feeding, however, the AAP guidelines[18] do not recommend cleaning the breast before each feed unless there is visible soiling. Instead, it emphasizes maintaining general breast hygiene through daily cleaning as part of routine bathing. About 85% of the mothers followed bathing at least once daily which could also play a role in reducing the risk of transmitting infections to the newborn.

4.4. Umbilical cord care

Only 42% of mothers in the study received advice on umbilical cord care, of which 37% of them adhered to WHO-recommended practice of keeping the cord and dry, indicating a disconnect between education and implementation. Approximately 33% of the mothers used Vasambu (sweet flag), while a few others used coconut oil (20%) and turmeric powder (10%). The WHO emphasizes on avoiding harmful substance application which can cause infections like omphalitis leading to neonatal mortality.

4.5. Newborn bathing practices

Bathing practices among participants revealed a blend of adherence to evidence-based recommendations and cultural traditions. About 20% of the study population delayed the first bath for 2–3 days, aligning with WHO[15] guidelines. Srinivasa et al.,[14] highlighted the growing acceptance of delayed bathing in his study participants as a neonatal health measure. Conversely, 42% of the participants in our study reported immediate post-birth bathing, and 38% reported delayed first bath up to a week which are often influenced by cultural norms or ritualistic practices. Early bathing is reported to be associated with risk of hypothermia and infections due to loss of vernix caseosa[19] and delayed bathing for up to a week, can raise concerns regarding hygiene in resource limited settings.

Majority (85%) of the mothers bathed their newborns daily or even twice daily, exceeding the recommended frequency of 2–3 times per week. Excessive frequency of bathing can lead to dryness by disrupting the natural skin barrier and increases transepidermal water loss.[17] The trend of prolonged bathing sessions, lasting more than 10–15 minutes, reported by 90 % of participants, can weaken the skin barrier and increase susceptibility to friction injuries.[6,20]

A significant proportion (83%) utilized warm water for neonatal bathing, consistent with guidelines to minimize the risk of hypothermia or overheating.[20] The rest reported using either hot or cold water, posing potential risks such as scalds or hypothermia. This variability highlights the importance of educating caregivers about the critical role of optimal water temperature in safeguarding neonatal health.

Soap selection practices varied among mothers. Nearly half relied on soaps prescribed by paediatricians, adhering to recommendations for pH-balanced, gentle cleansers suitable for delicate neonatal skin. On the other hand, some mothers chose products based on affordability or social media influence, often neglecting essential factors such as pH balance and moisturizing properties, which are vital for maintaining skin barrier integrity.

Traditional additives like vasambu, neem leaves, and turmeric powder were incorporated into the bathwater by some participants (50%), driven by cultural beliefs about their antimicrobial and soothing properties. However, these substances raise concerns regarding potential skin irritation and allergic reactions.[19] Furthermore, practices such as vigorous scrubbing with gram-based powders were reported among a few participants (15%), similar to the findings by Srinivasa et al.,[22] which highlight the risk of damaging the delicate neonatal epidermis. About 50% of the mothers followed the WHO guidelines of retaining the vernix caseosa due to its anti-infective, antioxidant and wound-healing properties[21] while the other half removed it perceiving it as unclean.

Gentle pat drying with a soft, absorbent towel/ cloth, such as cotton, is widely recommended in neonatal care to protect the delicate skin of newborns and minimize the risk of irritation.[22,23] In our study, 85% of participants followed this practice.

10% of mothers used Sambrani (benzoin resin), traditionally used post-bath for babies to gently dry their hair, provide warmth, and improve sleep through its calming aroma. However medical caution is advised due to potential respiratory risk from smoke exposure.

Majority (63%) were unaware of the optimal room temperature for newborns. Maintaining a room temperature of around 21- 24°C supports neonatal thermoregulation and prevents cold stress.[17]

4.6. Oil massage practices

A substantial majority of participants reported administering oil massages to their newborns before bathing, reflecting a widely practiced tradition rooted for both cultural and its perceived health benefits. Among the oils used, commercial baby oils emerged as the most popular choice, followed by coconut oil and gingelly oil. Coconut oil, in particular, has demonstrated substantial benefits in neonatal care, including improvements in skin barrier function and enhanced hydration.[9] However, the use of mustard oil (5%) can disrupt the skin barrier and may cause contact dermatitis as it contains allylisothiocyanate.[24,25]

Cultural practices also influenced the technique of massage. More than half of the mothers practiced vigorous techniques, such as pinching the nose, stretching fingers, and robust back-rubbing. While these methods are deeply ingrained in traditional beliefs, they pose risks of skin irritation and injury to the neonate. Gentle massage techniques are reported to help with preserving skin integrity while fostering mother-infant bonding.[14,17]

4.7. Post bath care

About 56% of mothers applied moisturizers post-bath, with 44% recognizing its role in preventing dryness. However, selection often relied on affordability or social influences. Few (10%) mothers reported using moisturizers containing fragrances on their babies which contain potential allergens like limonene, linalool, and benzyl alcohol, these increase the risk of contact dermatitis.[26]

Approximately 47% of mothers in the study used talcum powder unaware of the risk. The Indian Academy of Paediatrics advises against talcum powder use due to risk of inhalation and respiratory distress.[20] If desired, parents are advised to use it sparingly by applying it to their hands first before gently applying it to the infant rather than sprinkling it directly.[27]

Kajal, also known as kohl, is a traditional cosmetic widely applied to neonates' eyes, eyebrows, or forehead in various Indian communities. This practice is deeply rooted in cultural beliefs, often linked to enhancing the child's aesthetic appeal and providing protection against the "evil eye" and passed down through generations as a harmless tradition. Tiffany-Castiglioni et al.[28] reported that many commercially available kajal products contain lead, posing serious health risks such as neurotoxicity, developmental delays, infections, irritation, or allergic reactions and other systemic effects, particularly to neonates.[28] In our study, 75% of mothers reported using kajal for their neonates, a practice also observed by Srinivasa et al.,[14] where nearly 88% of mothers engaged in similar behaviour.

Other protective rituals to ward off “evil eye," as observed by other authors, are tying black threads, wearing black bangles, tying blue bead chains or garlic threads, and placing neem leaves, Bibles, or coal near the baby.[29,30] In our study, 25% of mothers used threads around the waist or neck, and a minority (10%) of them reported allergic reaction/ dermatitis to such practice.

4.8. Diaper care practices

Diaper care practices among the participants reflected a balance between modern conveniences and traditional approaches, shaped by economic factors and varying levels of awareness. Most families (85%) alternated between commercial diapers and cloth napkins, aiming to strike a compromise between practicality and affordability. Srinivasa et al.[14] observed similar findings, where cost-effectiveness played a pivotal role in the decision to incorporate cloth alternatives, despite a preference for the ease and hygiene associated with commercial diapers.

About 73 % of mothers changed diapers only after faecal soiling, or if its heavy with urine and a subset (27%) of caregivers followed time-based routines (e.g., diaper changes every 4–6 hours). This practice, while convenient, may inadvertently increase the risk of skin irritation and infections.[6,17] None of the mothers followed recommended guidelines of changing diapers at an interval of 2-3 hrs irrespective of soiling.[31]

The awareness and use of barrier creams were notably low among participants. None of the mothers were aware that barrier creams could prevent diaper dermatitis. Of the 15% of the mothers who were aware of availability of diaper creams, only 5% perceived these creams are necessary only after the onset of rash rather than a preventive measure. Blume-Peytavi et al., in his study emphasizes the importance of early education on prophylactic skincare practices to reduce the incidence of diaper dermatitis.[17]

Over half of the participants embraced the concept of diaper-free periods, recognizing its benefits in promoting skin aeration and reducing irritation. Lund et al.[32] found similar practices where caregivers valued diaper-free time for maintaining skin integrity. However, a significant proportion (47%) of mothers dismissed this practice, often citing logistical challenges or lack of awareness about its importance.

Cleaning methods varied among participants, with many mothers (45%) relying on soap and water for maintaining cleanliness in diaper areas. A significant proportion (35%), however, opted for commercial wet wipes, influenced by their convenience and widespread marketing. None of the mothers in our study were aware of the risk of allergic contact dermatitis caused by methylisothiazolinone, a preservative in wet wipes, as highlighted in reports by Chang and Nakrani.[33]

It should be noted that while diaper care is meant to be a daily component of newborn and infant care, a portion of the general public view it as a kind of treatment modality. The diaper is sometimes changed only after faecal soiling, without regard for the length of time the diaper has been worn or in contact. Additionally, some mothers leave the diaper on overnight without checking in between. According to Indian Academy of Pediatrics Guidelines, the diaper must be changed every 2 hours in neonates, regardless of soiling.[20] Therefore, it is imperative that all caregivers receive instructions on proper diaper usage.

4.9. Dermatology consultations

Dermatology consultation plays significant opportunity to enhance maternal understanding on adoption of safe neonatal skin care practices. Majority of mothers acknowledged that dermatology consultations may enhance their understanding

of neonatal skin care. However, the limitations reported in following such practices are cultural norms, interference by elderly at home, and economical constraints. Blume-Peytavi et al.[17] noted that evidence-based dermatological consultations promote safer practices similarly Fernandes et al. demonstrated that structured dermatological sessions significantly enhance adherence to safe practices, reducing the prevalence of neonatal skin conditions. Integrating these consultations into routine paediatric care can empower caregivers to make informed decisions, ultimately improving neonatal skin health outcomes.

Limitations of the study- The small sample size and single-centre design restrict the generalizability of findings. The use of self-reported data introduces recall bias affecting accuracy. Lastly, cultural variations and unverified practices may impact the applicability of results to broader populations.

5. Conclusion

Neonatal skin remains more prone to internal and external stressors, thus educating postnatal mothers about evidence-based neonatal skin care practices is essential to mitigate morbidity and ensure optimal outcomes. While some traditions and cultural practices, like oil massage, staying indoors after delivery are beneficial, others such as immediate post-birth bathing, use of kajal and applying unverified substances on the umbilical cord are harmful. Educating mothers through structured antenatal and postnatal counselling can bridge knowledge gaps and promote safer practices. Paediatricians and Dermatologists can play a key role in guiding caregivers toward evidence-based skin care. Establishing scientifically validated guidelines is vital for safeguarding neonatal skin health and preventing complications.

6. Source of Funding

None.

7. Conflict of Interest

None.

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