



NIGERIAN JOURNAL OF PAEDIATRICS

VOLUME 53 | NUMBER 1 | JANUARY - MARCH 2026

<https://www.njpaediatrics.com>

PRINT: ISSN 0302-4660

ONLINE: ISSN 2814-2985

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OFFICIAL JOURNAL OF THE PAEDIATRIC ASSOCIATION OF NIGERIA



Nigerian Journal of Paediatrics 2026 (March); Volume 53(1):39-50.
<https://dx.doi.org/10.63270/njp.v53i1.2000047>.

Infant Skin-Related Practices Among Attendees of Maternal and Child Health Clinics in Jos, Nigeria: A Cross-Sectional Study

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Abstract

Background: Evidence-based skin-related practices such as delayed bathing, skin-to-skin contact (SSC), and maternal skin care education are recommended to improve neonatal outcomes.

Objective: To assess infant skin-related practices among attendees of Maternal and Child Health (MCH) Clinics and identify gaps relative to global recommendations.

Methods: A facility-based, cross-sectional study was conducted among 255 mothers of infants attending nine public and private health facilities in Jos North Local Government Area (LGA). A semi-structured interviewer-administered questionnaire was used to collect data on sociodemographic characteristics and infant skin-related practices across antenatal, delivery, and postnatal contacts.

Results: Essential infant skin practices were often missed during facility contacts. Only 36.5% of mothers received instruction on infant bathing, 37.3% practiced SSC after delivery, and only 9.4% reported infant skin checks during postnatal visits. Inappropriate practices, such as bathing within 24 hours of life, were common, especially in public primary health centres (73.7%), while removing vernix caseosa was nearly universal (94.4%). Grandmothers were the main influencers of infant skincare practices, surpassing health workers (38% vs 22.7%) except in public tertiary hospitals, where health workers predominated.

Conclusion: Infant skin care practices in Jos remain suboptimal and inconsistent with international guidelines. Integrating evidence-based skin care education into routine maternal-child health services and strengthening health workers' capacity about skin-related practices are crucial to improving neonatal outcomes.

Keywords: *Delayed bathing, Neonatal skin, Skin-to-skin care, Umbilical cord stump, Vernix caseosa.*

Introduction

The skin is a critical natural barrier for infants, providing thermal regulation and protection against chemical and mechanical insults, while also acting as a first-line defence against infections.¹ The skin of the newborn and infant is, however, structurally and functionally immature compared to adult skin. The stratum

corneum - the outermost protective layer - remains underdeveloped until approximately one year of age. The maturation of the microvasculature, pigmentation, and biomechanical characteristics continues well into the second year of life.² This immaturity underlies the vulnerability of the skin to hypersensitivity reactions and infections,

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increasing risks for conditions like atopic eczema, infantile candidiasis, cradle cap, baby acne, and diaper dermatitis.³

Although the umbilical cord stump consists primarily of blood vessels and connective tissue rather than skin, the condition of the surrounding skin, particularly its dryness and hygiene, significantly influences the healing process of the stump. The use of bathing and skin care products may elevate the risk of both localised and systemic infections via the umbilical stump.⁴ These challenges highlight the necessity for evidence-based skin care practices tailored to infants' unique physiology. The World Health Organisation (WHO) recommends delaying newborn bathing until after the first 24 hours to allow vital signs to stabilise and to avoid submerging the umbilical cord.⁵ This delay preserves the vernix caseosa, which acts as a chemical and mechanical barrier against infections, and facilitates skin-to-skin contact (SSC) between mother and newborn. SSC promotes thermoregulation, bonding, early breastfeeding, and colonisation of the infant's skin with maternal microbiota, reducing infection risk, especially in resource-limited settings.^{6,7} SSC also benefits mothers by aiding placental expulsion, reducing bleeding, and lowering stress.⁷⁻⁹ In some cultural contexts where newborns are bathed immediately after delivery, as practised in certain ethnic groups in Northern Nigeria, a minimum delay of six hours is encouraged to allow neonatal adaptation. Other skin-related practices, such as the application of topical emollients on babies' skin, are also highly prevalent and reduce transepidermal water loss, enhance skin barrier integrity, and are associated with reduced hospital-acquired infections.¹⁰

Appropriate timing of bathing, thermal care, and cord care form part of the minimum neonatal care package recommended at childbirth and throughout the first 28 days of life, alongside

birth preparedness, optimal breastfeeding, and immunisation.^{5,10} In Nigeria, maternal and child health services are structured in line with the WHO guidelines, largely anchored on the eight antenatal visits, facility-based delivery, four postnatal contacts, and adherence to immunisation schedules, all designed to ensure continuity of care and promote optimal child health outcomes.^{7,9,11,14} However, despite this comprehensive framework, infant skin care appears to be inadequately addressed during these interactions, resulting in its under-prioritisation within the continuum of neonatal care.

Studies have shown that infant skin care practices are influenced by maternal education, socioeconomic and health status, prevalent cultural norms, and media trends.^{7,9} Health facility protocols and health worker behaviours also significantly impact maternal care of infant skin.^{7,9,14} Varied knowledge and practice gaps have been documented among health workers across the different healthcare levels, which may adversely affect the guidance mothers receive in managing infants' skin and inappropriate information within families and the community.^{15,18} For instance, in a study in southwest Nigeria, a majority of the midwives studied (82%) practised immediate cleaning of the vernix from the newborn's skin after birth.¹⁸

Furthermore, a previous population-based National Demographic and Health Survey (2018) revealed very low rates of SSC after delivery (2.5%) and a large proportion of children reportedly bathed within six hours of birth (62.3%). The large proportion of out-of-facility births (56.1%) as recorded in that period may also have contributed to the high prevalence of poor skin-related practices surrounding delivery.¹⁹ Despite the nation's alignment with the WHO recommendations on newborn skin practices, the situation of skin-related practices for newborns in Jos health facilities needs to be studied since the infants usually have numerous contacts with

these facilities along the maternal-child continuum of life.²⁰

Therefore, this study aimed to determine newborn and infant skin-related practices during health facility contacts and to identify gaps between recommended and actual practices. The findings may establish a baseline for assessing frontline health worker protocols, aligning them with global standards, and informing facility-led education to improve overall infant outcomes.

Methods

Study setting

The projected population of Jos North Local Government Area (LGA) in 2022 was 670,000, with an annual growth rate of 2.4%, and recorded 9,212 live births.²¹ With 500 healthcare workers across the 135 health facilities, Jos North LGA has the highest number of health workers and facilities among the 17 LGAs in Plateau State. Among the 72 primary-level care facilities (public and private), 60 offer antenatal care, delivery services, and immediate newborn care and immunisation services. The LGA has four public secondary care facilities; however, there was no clear designation for secondary private institutions at this level. Additionally, four tertiary care facilities are located in the LGA, two of which are publicly owned.²²

Study design

This was a multi-facility, descriptive, cross-sectional study conducted across nine health facilities from February to March 2023.

Ethical consideration

Ethical clearance for the study was obtained from the Ethics and Research Committee of Jos University Teaching Hospital (JUTH/DCS/IREC/127/XXX/2754). Permission was also obtained from selected health facilities, while informed consent was obtained from

mothers. They were assured of anonymity and confidentiality of the information provided.

Study population

The study population comprised of mothers of infants (children less than 12 months) who had accessed the full continuum of maternal and child health services, such as antenatal care, delivery services, postnatal care, and child health services (immunisation, growth monitoring), at the same facility.

Sampling size determination and sampling techniques

The sample size was calculated using Cochran's formula for cross-sectional studies [$n = Z^2P(1-P)/d^2$]. A total sample size of 255 was calculated based on a facility delivery prevalence (P) of 43.9% for Plateau State, as reported in the 2018 Nigeria Demographic and Health Survey (NDHS).¹⁹

Nine health facilities, including two public primary health centres, one public secondary health facility and one public tertiary hospital, four private primary-level facilities, and one private tertiary-level hospital, were selected based on the services provided and the clientele served. Subsequently, a proportionate-to-size method was used to select participants per facility to achieve the total sample size of 255.

Data management

A semi-structured, interviewer-administered questionnaire was used to gather information on mothers' sociodemographic and infant characteristics, the type of health facilities attended, and infant skin-related practices received at various contacts with the health facility during antenatal care, delivery services, and the child's infancy period.

The data were entered into SPSS Statistics for Windows (version 26.0; IBM Corp). Frequency and percentage values were used for tabulation, while numeric variables were presented as means

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and categorised. Bivariate analysis was conducted with the Pearson Chi-Square test used to test associations. A p-value of <0.05 was considered statistically significant.

Results

In Table I, there were significant differences within the variable groups except in mothers' occupation and infant's gender. The vast majority of mothers were aged 20-39, while nearly half of the infants were aged 6-11 months, with more than a third (34.9%) of all infants being firstborn.

Table II shows that a lower proportion of mothers received a list of infant skin/hygiene products during the antenatal period as part of preparations for the newborn (43.1%). Also, only 37.3% mothers had SSC with their newborn after delivery, while less than a tenth (9.4%) of infants had their skin checked at any postnatal visits. Close to two-thirds (61.2%) of mothers received instructions/demonstrations on cord care, compared to 36.5% who received instructions/demonstrations on bathing the baby, such as timing, method, or frequency. The majority (94.4%) cleaned off the vernix of the newborn shortly after birth, and more than a quarter (28.6%) reported no influence on their current care practices for their infant's skin.

Table III shows that public and private primary-level care had the highest proportions of women who received a list of baby skin care/hygiene products before delivery (57.9% and 53.6%, respectively). Skin-to-skin contact was practised significantly more in public PHCs than in private tertiary centres (68.4% vs 25%). Also, the prevalence of early bathing of newborns was significantly higher in those attending public PHC (73.7%) than in other facilities. There were no significant differences in practices such as immediate cleaning of vernix, teaching about bathing the child, cord care, and skin checks at postnatal care across facility types.

Discussion

This study focused on infant skin-related care received during maternal-child health contacts within health facilities in Jos, north-central Nigeria. The predominance of mothers in their twenties and thirties in the study population aligns with the peak of reproductive age reported in other studies, reflecting the typical demographic utilising postnatal and immunisation services.^{14,23,24}

First-time mothers, who constitute a significant proportion of study participants, are considered inexperienced in childcare and require additional support. However, regardless of parity or experience, each maternal-child health care visit presents an opportunity for health workers to model and deliver targeted education on appropriate childcare practices, including infant skin care.²⁵ The proportion of women who recalled receiving infant skin care education was significantly lower compared to those taught about cord care. This discrepancy may reflect a limited recognition of the importance of skin-related practices for newborn health among health workers, or an institutional emphasis of one aspect of infant care over others.^{26,27}

Health care workers and parents in other settings have expressed a need for guidance on newborn and infant skin care, including the choice between water-only bathing and water-and-soap bathing, and safe products and regimens. This has led to research and expert consensus aimed at standardising evidence-based skin care for neonates and infants.²⁸⁻³⁰ Such information is not readily available in our context, as only a minority of participants had skin care or hygiene products included in the list of items provided by the health facility for preparing the newborn. However, a significantly higher proportion of women attending PHCs reported receiving such lists that included items such as baby soap, lotion, and shampoo. The inclusion may seem

contradictory, given guidelines that advise against their use within the first day of life. Still, this practice suggests that the use of baby skin

care products is normative at this level of care and is expected of mothers.

Table I: Sociodemographic characteristics of mothers and infants

Variable	Number(n)	Percentage (%)	X ²	p-value
Maternal characteristics				
Age (Years)			185.580	<0.001
≤ 19	5	2.0		
20-29	121	47.5		
30-39	115	45.1		
≥40	14	5.5		
Ethnicity			10.200	0.001
Plateau Indigenous	102	40.0		
Others	153	60.0		
Occupation			5.812	0.055
Housewife	71	27.8		
Self-employed	102	40.0		
Employed	82	32.2		
Infant characteristics				
Infants age group (months)			107.682	<0.001
<1	40	15.7		
2-3	67	26.3		
4-5	34	13.3		
≥6	114	44.7		
Gender			1.133	0.287
Male	136	53.3		
Female	119	46.7		
Gestational age			229.365	<0.001
Term	199	78.0		
Post term	29	11.4		
Preterm	27	10.6		
Birth order			23.251	<0.001
First	89	34.9		
Second	66	25.9		
Third & Fourth	77	30.2		
Fifth & above	23	9.0		

This finding highlights the influential role of healthcare workers in shaping neonatal skin care practices. It underscores the critical need for effective dissemination of appropriate knowledge to ensure evidence-based care. ⁷ Conversely, higher tiers of care tend to focus on more

specialised obstetric and paediatric care, potentially overlooking these dermatologic expectations. This tendency may explain the lesser use of similar practices in tertiary centres. However, integrating evidence-based recommendations with culturally relevant

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practices across all care levels is encouraged.^{7,9,12} While prior studies have documented low SSC rates, our facility-based findings are particularly concerning, as health facilities are settings where

evidence-based protocols are expected to be prioritised. This indicates that the standards for maternal-infant care are not being implemented fully.^{19, 20, 25}

Table IIa: Health facilities characteristics and related skin-related practices

Variable	Number (n)	Percentage (%)	X ²	p-value
Health facility			150.627	<0.001
Public primary health centre	19	7.5		
Public secondary health facility	34	13.3		
Public tertiary hospital	109	42.7		
Private primary health centre	85	33.3		
Private tertiary-level hospital	8	3.1		
Antenatal Contact				
Baby skin care/hygiene products are included in the birth items lists given to the mother before delivery			4.842	0.028
Yes	109	43.1		
No	144	56.9		
Delivery contact				
Skin-to-skin practice at birth			16.569	<0.001
Yes	95	37.3		
No	160	62.7		
Instruction or demonstration on recommended Cord care given			12.741	<0.001
Yes	156	61.2		
No	99	38.8		
Instructions or demonstrations on the recommendations of bathing a baby are provided			18.671	<0.001
Yes	93	36.5		
No	162	63.5		

Interestingly, this study found that more mothers who delivered in the public PHC facilities reportedly practised SSC shortly after delivery than in other centres. Ali *et al.* observed a similar pattern in Bangladesh, reporting a higher prevalence of SSC in public facilities compared to private ones, which was attributed to lower caesarean section rates -a factor found to negatively predict SSC.³¹ This observation may similarly account for the findings in the present study, as caesarean sections are not performed at primary care level in Nigeria.¹¹ Additionally, the repeated trainings on child survival and safe

motherhood strategies, coupled with integrated supportive supervision aimed at achieving the minimum service package at the public primary level, may have further contributed to this improved practice.^{12,32}

Despite the positive findings observed in PHCs, a pattern suggests underprioritising infant skin-related practices that are not included as monitored indicators within the Health Management Information System (HMIS) of the National Facility-based Data Collection Platform.

Table IIb: Health facilities characteristics and related skin-related practices

Variable	Number (n)	Percentage (%)	X ²	p-value
Cleaned of Vernix shortly after birth				
Yes	234	94.4	195.161	<0.001
No	14	5.6		
First bath given within			128.776	<0.001
6 hours	4	1.6		
Day 1	102	40.0		
Day 2-3	149	58.4		
After 3 Days	19	7.5		
Who gave the first bath?			219.459	<0.001
Grandmother	140	54.9		
Mother of the baby	11	4.3		
Relatives	55	21.6		
Friends	3	1.2		
Health worker	19	7.5		
Others	27	10.6		
Postdelivery contact				
The infant's skin was checked at any postnatal visit			168.035	<0.001
Yes	24	9.4		
No	231	90.6		
The infant received treatment for a skin condition.			125.651	<0.001
Yes	37	14.5		
No	218	85.5		
Primary source of information/advice concerning index infants' skincare/health #			212.459	<0.001
Health worker	58	22.7		
Grandmother of the infant	97	38.0		
Other relatives	8	3.1		
Experience community person	2	0.8		
Friend	9	3.5		
Neighbour	8	3.1		
No body	73	28.6		

Specifically, the immediate cleaning of vernix caseosa from the skin of newborns, against recommendations, was almost universally practised across all facility types, aligning with what others have previously documented.^{7,14,15,17} Additionally, delivery in primary care settings was associated with higher rates of bathing newborns within the first 24 hours postpartum compared to other levels of care. Evidence

indicates that not only is this a predominant practice across sub-Saharan Africa, but that there are occasions when the attending practitioner advises a delay. Yet parents and relatives insist on an early bath for the newborn, based on cultural beliefs.^{5,7,9,33,34} Early discharge before the recommended 24-hour post-delivery facility stay has also limited health workers' opportunities to provide support and ensure adherence to key

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newborn care practices.^{34,35} The integration of postnatal checks with immunisation services to enhance maternal and child health service uptake

has not achieved optimal outcomes, as postnatal care utilisation in Jos remains low, mirroring national trends.¹⁹

Table IIIa: Pattern of skin-related practices across health facility type

Variable	Health facility level					X ²	p-value
	Public			Private			
	Primary	Secondary	Tertiary	Primary	Tertiary		
Antenatal contact							
Baby skin care products are included in the ANC birth preparedness list							
Yes	11 (57.9)	6 (7.6)	46 (42.2)	45 (53.6)	1 (14.3)	16.841	0.02*
No	8 (42.1)	28 (82.4)	63 (57.8)	39 (46.4)	6 (85.7)		
Delivery							
Skin-to-skin practice at delivery							
Yes	13 (68.4)	10 (29.4)	44 (40.4)	26 (30.6)	2 (25.0)	11.372	0.023*
No	6 (31.6)	24 (70.6)	65 (59.6)	59 (69.4)	6 (75.0)		
Cleaned off vernix shortly after birth #							
Yes	15 (83.3)	30 (90.9)	102 (96.2)	79 (95.2)	8 (100)	6.123	0.190
No	3 (16.7)	3 (9.1)	4 (3.8)	4 (4.8)	0 (0)		
Instruction or demonstration on recommended cord care given							
Yes	10 (52.6)	19 (55.9)	75 (68.8)	47 (55.3)	5 (62.5)	4.902	0.298
No	9 (47.4)	15 (44.1)	34 (31.2)	38 (44.7)	3 (37.5)		
Instructions or demonstrations on the recommendations of bathing a baby are provided							
Yes	5 (26.3)	11 (32.4)	48 (44.0)	26 (30.6)	3 (37.5)	5.061	0.281
No	14 (73.7)	23 (67.6)	61 (56.0)	59 (69.4)	5 (62.5)		

Not necessarily within the health facility

However, this integration may have inadvertently led to the neglect of other essential components of postnatal visits, such as thorough physical examinations of infants, including the skin, which are often overshadowed by the focus on immunisation.³⁴ This may likely explain why fewer than a tenth of infants had their skin checked during postnatal visits. A small

proportion of mothers sought care for skin conditions that their infants developed. While not significantly different across facilities, tertiary-level centres tended to have higher proportions of patients who sought management at the centre, possibly due to the availability of relevant expertise.¹²

Of all the persons who influenced mothers' infant skin care practices, grandmothers exerted the most, surpassing health workers (38% vs 22.7%), except among women who attended public tertiary hospitals, where mothers often cited health workers as their primary information source, likely due to perceived expertise.

Traditionally, grandmothers are the primary caregivers in early infancy, performing essential practices such as cord care, bathing, and diaper changing. In the present study, more than half (55%) of newborns were first bathed by their grandmothers.

Table IIIb: Pattern of skin-related practices across health facility type

Variable	Health facility level					X ²	p-value
	Public			Private			
	Primary	Secondary	Tertiary	Primary	Tertiary		
Timing of the infant's first bath #							
Within 1 st Day	14 (73.7)	17 (50.0)	30 (27.5)	42 (49.4)	3 (37.5)	20.124	<0.001*
After 1 st Day	5 (26.3)	17 (50.0)	79 (72.5)	43 (50.6)	5 (62.5)		
Who gave the first bath? #							
Grandmother of the baby	8 (42.1)	19 (55.9)	64 (58.7)	46 (54.1)	3 (37.5)	19.272	0.255
Mother of the baby	0 (0.0)	1 (2.9)	8 (7.3)	2 (2.4)	0 (0.0)		
Relatives & friends	4 (21.1)	7 (20.6)	18 (16.5)	26 (30.6)	3 (37.5)		
Health worker	2 (10.5)	3 (8.8)	9 (8.3)	5 (5.9)	0 (0.0)		
Others	5 (26.3)	4 (11.8)	10 (9.2)	6 (7.1)	2 (25.0)		
Postdelivery contact							
Infant's skin is checked at every visit post-delivery							
Yes	1 (5.3)	2 (5.9)	9 (8.3)	10 (11.8)	2 (25.0)	3.883	0.422
No	18 (94.7)	32 (94.1)	100 (91.7)	75 (88.2)	6 (75.0)		
The infant received treatment for a skin condition							
Yes	1 (5.3)	3 (8.8)	21 (19.3)	9 (10.6)	2 (25.0)	5.410	0.248
No	18 (94.7)	31 (91.2)	88 (80.7)	76 (89.4)	6 (75.0)		
General							
Primary source of information/advice concerning index infants' skin #							
Health worker	2 (10.5)	8 (23.5)	40 (36.7)	8 (9.4)	0 (0.0)	45.572	<0.001*
Grandmother and other family members	10 (52.6)	12 (35.3)	37 (33.9)	46 (54.1)	0 (0.0)		
Other	3 (15.8)	2 (5.9)	5 (4.6)	6 (7.1)	3 (37.5)		
None	4 (21.1)	12 (35.3)	27 (24.8)	25 (29.4)	5 (62.5)		

Not necessarily within the health facility.

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They also serve as a key source of information regarding infant skin care, though not likely evidence-based, but passed down through generations as traditional practices within families.³⁶ This underscores the need for targeted maternal-child health education that includes grandmothers to align home practices with evidence-based care for optimal infant health.

Conclusion

This study identifies significant gaps in optimal infant skin care practices during contacts with MCH facilities. These include skin-to-skin contact, retention of vernix caseosa, delayed first bathing, and infant skin examination. This study reports notable variation in skin-related practices for infants across healthcare levels and ownership, highlighting critical areas for intervention. Moreover, grandmothers were prominent in shaping infants' skin care practices. Therefore, there is a need to improve the state of adherence to health facility protocols, health worker training, and the supervision and monitoring of these practices to achieve better child health outcomes.

Acknowledgements: The authors appreciate Iroagba Chisomaga, Yusufu Hope, Johnson Grace and Otene Amina of the University of Jos for data collection.

Authors' Contributions: AR, CJ and BM conceptualised and designed the study. AR conducted the literature review, data curation, analysis, and interpretation, and drafted the manuscript. JC and BM critically revised the draft manuscript for sound intellectual content. All the authors approved the final version of the manuscript.

Conflicts of Interest: None declared.

Financial support: The authors did not receive financial support for the research or the preparation of the manuscript.

Accepted for publication: 29th March 2026.

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