

Traditional Practice of Oil Massage of Neonates in Bangladesh

Gary L. Darmstadt¹ and Samir K. Saha²

¹*Department of International Health, Bloomberg School of Public Health, The Johns Hopkins Medical Institutions, Baltimore, MD, USA, Saving Newborn Lives Initiative, Office of Health, Save the Children Federation, Washington, DC, USA, and* ²*Department of Microbiology, Dhaka Shishu (Children) Hospital, Bangladesh Institute of Child Health, Dhaka 1205, Bangladesh*

ABSTRACT

Topical application of natural oils is practised routinely in many countries and may either improve skin barrier function and health or have detrimental cutaneous and systemic effects, depending on the composition of the oil. Little literature on the epidemiology, practice, and perceptions of traditional neonatal oil massage is available. This study was undertaken to gain insights into the epidemiology, practice, and perceptions regarding traditional oil massage of Bangladeshi neonates. A questionnaire was administered verbally to the primary caretaker of 332 outpatients at the Dhaka Shishu Hospital, and to 20 women with children encountered at the Matlab Health Complex in Bangladesh. More than 96% (340/352) of the caregivers practised oil massage, irrespective of socioeconomic status and place of residence. Among those at the Dhaka Shishu Hospital who practised oil massage, mustard oil was used alone or in combination by 95% (303/320) over the entire body, 1-3 time(s) daily (96%), starting in the first three days of life (72%) in both term and preterm neonates. Perceived benefits included prevention of infections (69%) and hypothermia (2%). Oil massage is an important traditional domiciliary practice used annually on more than three million newborns in Bangladesh. Given its potential for beneficial and harmful effects, further research is needed on the value of this practice, and ways to optimize its beneficial effects.

Key words: Oils; Massage; Skin care; Knowledge, attitudes, practice; Perception; Infants; Neonates; Bangladesh

INTRODUCTION

Neonatal mortality comprises approximately two-thirds of all deaths worldwide in infants aged less than one year (1). Ninety-eight percent of these deaths take place in developing countries, principally in Asia and Africa. Most births and neonatal deaths in developing countries occur in home, unseen by healthcare professionals (1-5). In

Bangladesh, more than 90% of all births occur at home, and few neonates present to facilities for care (5,6).

Despite the importance of care practices in the newborn period, little is known about routine care in the home and the impact on neonatal outcomes. This is particularly so in cultures, such as Bangladesh, where mothers and infants are secluded from others for a time after birth. Previous studies on home-care practices in Bangladesh have focused principally on delivery issues (7-14), largely overlooking many routine practices that may significantly impact the health and survival of newborns.

For hundreds of years, some populations, particularly in the Indian subcontinent and Mediterranean region, have routinely applied natural oils to the skin of newborns

Correspondence and reprint requests should be addressed to: Dr. Gary L. Darmstadt
Senior Research Advisor
Saving Newborn Lives Initiative
Office of Health, Save the Children Federation
2000 M Street NW, Suite 500
Washington, DC 20036
USA
Email: gdarms@dc.savechildren.org
Fax: (206) 525-3293

(7,15-21). The practice of neonatal massage has gained recent favour in many neonatal care units in developed countries as well. Recent evidence from human and animal studies suggests that topical application of certain oils may improve skin barrier function, resulting in a number of potential benefits to neonatal health (22). Choice of oil is important, however, as some topical products may have detrimental effects, including toxicity when absorbed, and delay recovery of a compromised skin barrier (23). Traditional oil massage presumably developed in response to perceived benefits, but no reports detailing the practice of and perceptions about this treatment are available.

MATERIALS AND METHODS

A questionnaire was administered verbally to the primary caretaker of 322 patients who presented over a four-week period to the outpatient department of Dhaka Shishu Hospital, the largest tertiary care paediatric hospital in Bangladesh. Patients come to the hospital from throughout Bangladesh, although the principal catchment area encompasses approximately 16 million people, including urban Dhaka and adjoining suburban districts. The questionnaire examined practices and perceptions of the primary caretakers with regard to oil massage of their most recent liveborn child. Questions focused on oil massage during the neonatal period. Total duration of topical oil therapy in infancy and early childhood was also determined. Twenty consecutive women with children encountered at the Matlab Health Complex in rural Bangladesh were also asked whether they practised newborn oil massage, and what oil was used.

RESULTS

More than 96% (320/332) of the primary caretakers questioned at the Dhaka Shishu Hospital applied one or more product(s) to the skin of their most recent liveborn child during the neonatal period, irrespective of socioeconomic status [92.7% (102/110) and 97.6% (163/167) of paying [family income \geq 5,000 taka (nearly equal to \$100) per month] and non-paying [family income $<$ 5,000 taka (nearly equal to \$100) per month] patients respectively. All (20 of 20) women questioned at the rural Matlab Health Complex indicated that they applied mustard oil to the skin of their most recent child. Among those interviewed at the Dhaka Shishu Hospital who practised oil massage, the most commonly-applied product was mustard oil, which was the sole product applied to 86.6% (277/320) of the neonates and was used alone or in combination by 94.7% (303/320) of those

reporting the use of oil massage. Olive oil was used in 11.6% (37/320) of the newborns who received oil massage, although it was used alone in only 3.4% (11/320) of the cases, more typically by patients of a higher socioeconomic status due to its greater cost than mustard oil (data not shown). The most common combination of products used was mustard plus olive oils (5.6%, 18/320). Only 4.4% (14/320) used other products, i.e. proprietary baby lotions, alone or in combination. More than 99% applied oil to the whole body, with special emphasis on the head, chest, and feet.

Oil massage was initiated on the first day of life in nearly half (47.5%, 152/320) of the neonates and before the end of the third and fourth days of life in nearly three-fourths (71.9%, 230/320) and in four-fifths (80%, 256/320) of the cases respectively. In a small subgroup of patients (6.9%, 22/320), oil massage was, however, delayed beyond the tenth day as a traditional practice in some households, particularly those in which the mother and baby were secluded after birth. Most mothers (55%, 176/320) reported that they began oil massage on their own initiative, whereas others did so on the advice of the grandmother (25%, 80/320), a neighbour (9.1%, 29/320), or others (10.9%, 35/320), such as elderly family members, midwives, traditional birth attendants, and 'quack' doctors or village healers. Once oil massage was begun, it was continued throughout infancy and childhood in more than 80% of all cases (Table 1). Oil massage most commonly was practised 2-3 times daily for a variety of reasons, principally to prevent infections, improve the condition of skin, improve thermoregulation, or as a matter of tradition (Table 2). There were no differences between the topical products used, or the frequency or reason for use of oil massage in term infants compared to preterm ones.

DISCUSSION

Oil massage with mustard oil was nearly a universal practice ($>$ 96%) in the urban, suburban and rural households included in this survey. Olive oil was used in a minority (11%) of households, generally those of a relatively higher socioeconomic status, given its greater cost. The timing (from the first day of life), the frequency (typically 1-3 time(s) daily), pattern (total body), and the duration (throughout infancy and early childhood) of use suggest that the practice is an important event in daily childcare, that significant time and resources are devoted to it, and that exposure to the oil is significant. Moreover, we found no differences in the practice of oil massage for term or preterm infants.

Duration (days)	Age group (months of age at time of study)						Total	Cumulative
	0-1	2-6	7-12	13-24	25-60	>60 m		
1	0	1	0	1	0	0	2	2
3	3	1	0	1	0	1	6	8
7	1	1	0	0	0	0	2	10
30	0	2	0	1	0	1	9	19
60	0	1	1	5	0	0	7	26
90	0	3	1	6	0	0	10	36
120	0	3	0	1	0	0	4	40
180	0	1	2	1	0	1	5	45
365	0	0	1	3	0	1	5	50
545	0	0	0	1	1	0	2	52
Until study date	16	97	58	61	16	8	256	308
Total	20	115	63	81	17	12	308	

Parameter	Full-term neonates (n=283)		Preterm neonates (n=25)		Total (n=308)	
	No.	%	No.	%	No.	%
A. Frequency (applications/day)						
1	43	15.2	3	12	46	14.9
2	99	35.1	9	36	108	35.1
3	129	45.6	12	48	141	45.8
4	5	1.7	0	0	5	1.6
5	6	2.1	1	4	7	2.3
9	1	0.3	0	0	1	0.3
B. Reasons given for oil massage						
					Total (n=308)	
Prevent cough and cold	122	43.1	6	24	128	41.5
Keep baby well	73	25.7	10	40	83	26.9
Keep skin smooth	37	13.1	4	16.4	41	13.3
Tradition only	33	11.7	3	12	36	11.7
Keep baby warm	6	2.1	1	4	7	2.3
Make bones strong	4	1.4	0	0	4	1.2
Prevent skin infections	1	0.3	0	0	1	0.3
Others	7	2.5	1	4	8	2.6

<ul style="list-style-type: none"> • Improved skin condition • Increased skin hydration and surface lipid content • Protection from skin injury • Reduction of transepidermal water loss, leading to improved thermoregulation, with reduced incidence of hypothermia • Provision of nutrition through transcutaneous absorption of lipids • Protection from infections • Enhanced neurological development and promotion of mother-infant bonding due to tactile stimulation during application

Results of research on topical skin therapy have suggested that several benefits (Table 3) may be derived, particularly in preterm infants whose skin barrier is immature and functionally compromised (15,18, 21, 22). Several of these benefits, including improved skin condition, improved thermoregulation, and/or protection from infections, were perceived (albeit unproven) by many respondents in our survey. On the other hand, the topical products may have detrimental toxic effects, particularly when applied to the highly permeable skin of preterm neonates in the first month of life or to infants with superimposed malnutrition that also serves to

compromise skin barrier integrity (22-24). Systemic toxicity has been seen during outbreaks of 'epidemic dropsy,' due to ingestion (25), or transcutaneous absorption of topically applied (26) mustard oil that was contaminated during processing with oil from seeds of the weed *Argemone mexicana* that was growing with the mustard.

Results of our recent research also suggest that massage of mustard oil may have dramatic adverse effects on the structure and function of the skin barrier, including increased losses of water through the skin, delayed recovery of skin barrier function, and ultrastructural changes in epidermal keratinocytes, indicative of stress and toxicity (23). On the other hand, application of certain oils, notably sunflower seed oil, may enhance skin barrier function (23). Moreover, certain topical skin barrier-enhancing emollients may decrease risk for invasive infections in preterm infants with compromised skin barrier function, presumably by preventing access to deeper tissues and the bloodstream through skin portals of entry (22,23,27). The reasons for these observations are not yet clear, but may stem, in part, from differential effects of fatty acids in the oils on structural lipid elements of the skin barrier (22,23,28). Thus, choice of a topical product for use during traditional skin massage may have important previously unrecognized public-health implications. Another potentially important aspect of skin massage is the risk for injury to the skin during the process. This was suggested by recent data showing an increase in infections, following topical applications of ointment to extremely preterm infants below (but not above) a birth weight of 750 g, possibly due to further skin compromise due to injury in the course of handling their extremely fragile skin during massage (29).

In summary, this study indicates that oil massage is an important practice in the daily care of the vast majority of neonates and infants in Bangladesh. In Bangladesh alone, extrapolation of our data would suggest that more than three million neonates are treated topically on a routine basis with mustard oil each year. Given the extent and duration of oil massage, suggesting significant exposure to the oil, and the potential for the practice to be beneficial or detrimental, particularly for preterm neonates, depending on the composition of oil used and the extent of skin mechanical injury during application, it is important to further understand the impact of the practice on newborn and infant health. Moreover, further research is needed to optimize the beneficial effects while

minimizing potential risks of this traditional practice, including potential compromise of skin barrier structure and function. Given the importance of oils, such as mustard oil, in other aspects of daily life, such as cooking and as a medicinal (30-32), research on the impact of oil massage on health, and recommendations stemming from that research, must also carefully consider the cultural context in which the practice occurs.

ACKNOWLEDGEMENTS

This study was supported by a William Weston Research Grant from the Society for Pediatric Dermatology (GLD), the Johns Hopkins Family Health and Child Survival Cooperative Agreement with the United States Agency for International Development (GLD, SKS), the Thrasher Research Fund (GLD, SKS), and Save the Children Federation-USA through a grant from the Bill & Melinda Gates Foundation (GLD).

REFERENCES

1. State of the world's newborns. Washington, DC: Save the Children Federation-US, 2001:1-49.
2. World Health Organization. Perinatal mortality—a listing of available information. Geneva: Maternal Health and Safe Motherhood Programme, World Health Organization, 1996:1-152.
3. Stoll BJ. The global impact of neonatal infection. *Clin Perinatol* 1997;24:1-21.
4. de Zoysa I, Bhandari N, Akhtari N, Bhan MK. Care-seeking for illness in young infants in an urban slum in India. *Soc Sci Med* 1998;47:2101-11.
5. Ahmed S, Sobhan F, Islam A, Barkat-e-Khuda. Neonatal morbidity and care-seeking behaviour in rural Bangladesh. *J Trop Pediatr* 2001;47:98-105.
6. Islam MA, Chakraborty N, Khan JA. Program performance in areas served by government and non-government organizations. In: Bangladesh demographic and health survey, 1996-1997. Dhaka: National Institute of Population Research and Training, 1997:1-37.
7. Bhatia S. Traditional childbirth practices: implications for a rural MCH program. *Stud Fam Plann* 1981;12:66-74.
8. Afsana K, Rashid SF. Discoursing birthing care: experiences from Bangladesh. Dhaka: University Press Limited, 2000. 128 p.
9. Blanchet T. Women, pollution and marginality: meanings and rituals of birth in rural Bangladesh. Dhaka: University Press Limited, 1984. 163 p.
10. Rozario S. Traditional birth attendants in Bangladeshi villages: cultural and sociological factors. *Int J*

- Gynecol Obstet* 1995;50(Suppl 2):S145-52.
11. Nessa S. Training of traditional birth attendants: success and failure in Bangladesh. *Int J Gynecol Obstet* 1995;50(Suppl 2):S135-9.
 12. Goodburn EA, Chowdhury M, Gazi R, Marshall T, Graham W. Training traditional birth attendants in clean delivery does not prevent postpartum infection. *Health Policy Plann* 2000;15:394-9.
 13. Amin R, Khan AH. Characteristics of traditional midwives and their beliefs and practices in rural Bangladesh. *Int J Gynecol Obstet* 1989;28:119-25.
 14. Goodburn EA, Chowdhury M, Gazi R, Marshall T, Graham W, Karim F. Maternal morbidity in rural Bangladesh: an investigation into the nature and determinants of maternal morbidity related to delivery and the puerperium. Dhaka: Bangladesh Rural Advancement Committee, 1994. 74 p.
 15. Fernandez A, Patkar S, Chawla C, Taskar T, Prabhu SV. Oil application in preterm babies—a source of warmth and nutrition. *Indian Pediatr* 1987;24:1111-6.
 16. Pradhan HB. Traditional child rearing practices should be maintained. *J Inst Med* 1981;3:127-36.
 17. Yurdakok M, Yurdakok K. Topical vegetable oil therapy for premature infants (editorial). *J Pediatr* 1997;130:330-1.
 18. Iyengar SD, Bhakoo ON. Prevention of neonatal hypothermia in Himalayan villages. *Trop Geogr Med* 1991;43:293-6.
 19. Thapa M. Traditional beliefs and practices in newborn care in Nepal. In: Costello A, Manandhar D, editors. Improving newborn health in developing countries. London: Imperial College Press, 2000: 181-7.
 20. Manandhar M. Obstetric health perspectives of Magar and Tharu communities: a social research report to inform the Nepal Safer Motherhood Project's IEC strategy. London: Options, 2000:1-70.
 21. Johanson RB, Spencer SA, Rolfe P, Jones P, Malla DS. Effect of post-delivery care on neonatal body temperature. *Acta Paediatr* 1992;81:859-63.
 22. Darmstadt GL, Dinulos JG. Neonatal skin care. *Pediatr Clin North Am* 2000;47:757-82.
 23. Darmstadt GL, Mao-Qiang M, Chi E, Saha SK, Ziboh VA, Black RE *et al.* Impact of topical oils on the skin barrier: possible implications for neonatal health in developing countries. *Acta Paediatr* 2002;91:1-9.
 24. Darmstadt GL. The skin and nutritional disorders in the newborn. *Eur J Pediatr Dermatol* 1998;8: 221-8.
 25. Singh NP, Anuradha S, Dhanwal DK, Singh K, Prakash A, Madau K, Agarwal SK. Epidemic dropsy—a clinical study of the Delhi outbreak. *J Assoc Phys India* 2000;48:877-80.
 26. Sood NN, Sachdev MS, Mohan M, Gupta SK, Sachdev HPS. Epidemic dropsy following transcutaneous absorption of *Argemone mexicana* oil. *Trans Roy Soc Trop Med Hyg* 1985;79:510-2.
 27. Darmstadt GL, Saha SK, Ahmed ASMNU, Khatan M, Chowdhury A. The skin as a portal of entry for invasive infections in neonates. *Perinatology* 2002; (In press).
 28. Elias PM, Feingold KR. Does the tail wag the dog? Role of the barrier in the pathogenesis of inflammatory dermatoses and therapeutic implications. *Arch Dermatol* 2001;137:1079-81.
 29. Edwards WH, Conner JM, Soll RF. The effect of Aquaphor® original emollient ointment on nosocomial sepsis rates and skin integrity in infants of birth weight 501 to 1000 grams [abstract]. *Pediatr Res* 2001;49(Suppl):388A.
 30. Singh AJ, Kaur A. Knowledge and practices of urban and rural high school children regarding minor injuries. *Indian J Public Health* 1995;39:23-5.
 31. Garg AP, Muller J. Inhibition of growth of dermatophytes by Indian hair oils. *Mycoses* 1992;35:363-9.
 31. Sircar S, Kansra V. Choice of cooking oils—myths and realities. *J Indian Med Assoc* 1998; 96:304-7.