



ORIGINAL RESEARCH PAPER

Paediatrics

EFFECTIVENESS OF BABY MASSAGE ON PHYSIOLOGICAL JAUNDICE AMONG NEONATES IN A SELECTED HOSPITAL, MANGALURU

KEY WORDS: Baby massage, Phototherapy, Effectiveness, Neonate, Physiological Jaundice

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ABSTRACT

Physiological Jaundice is one of the most common problems in neonatal period. Approximately 60% of full term and 80% of premature infants develop jaundice during the first week of life and are responsible for 75% of hospitalizations within the first week.¹

Materials and Methods: A quasi-experimental study was conducted on 32 Neonates aged between 37-42 weeks, who were hospitalized in the NICU of FMMCH Mangaluru. The samples were selected by purposive sampling technique and assigned to interventional and non-interventional group. The interventional group received 10 minute baby massage twice a day with phototherapy.

Results: The computed 't' values of TCB and physiological parameters were greater than the table value ($t_{30}=1.70$) at $p<0.05$.

Conclusion: The findings of the study indicated that baby massage was effective in reducing physiological jaundice and improving physiological parameters among the neonates in the interventional group compared to non-interventional group.

INTRODUCTION:

Neonatal mortality and morbidity are the major health concerns in developing countries. About 3% of hospital born babies in India develops significant Jaundice with total Bilirubin levels more than 15mg/dl and kernicterous causes 10% of mortality and 70% of morbidity. Although phototherapy has become most common practice for curing Physiological Jaundice, it has several side-effects including watery diarrhoea, increased sensible water loss, skin rashes, blue baby syndrome and transient bronzing of the skin.² Infant massage is a tradition that is common in India and many other countries. Studies have reported that infant massage can improve weight gain, sleep patterns, growth and development, and autonomic nervous system functions. It also helps to reduce infant stress and promote positive emotional bonding between parents and babies.³

A controlled clinical trial was conducted at Niigata, Japan to evaluate the effects of baby massage on neonatal jaundice on 44 full term newborn, 22 in control group and 22 in experimental group. The samples were selected semi-randomly. The experimental group received massage for 15-20 minutes for 5 days. The results showed that the Transcutaneous Bilirubin levels and serum total bilirubin levels were significantly decreased in the massage group, compared to the control group.⁴ Taking all the above into account, this study has been carried out to evaluate the effect of baby massage on reduction of Neonatal Physiological Jaundice among Neonates. If the study shows positive outcome it would help in the reduction of morbidity, complications, reduce financial constraints on parents and would enhance the maternal-infant bonding and recovery by reducing the hospital stay.

Objectives:

1. To assess the Transcutaneous Bilirubin level and physiological parameters (feeding, defecation and voiding frequency) among the Neonates with Physiological Jaundice.
2. To evaluate the effectiveness of Baby Massage on Transcutaneous Bilirubin level and physiological parameters by comparing between the interventional and non-interventional group.
3. To identify the association of pre interventional status of physiological jaundice with selected demographic variables.

MATERIALS AND METHODS:

1. **Setting:** Neonatal Intensive Care Unit of Father Muller Medical College Hospital, Mangaluru.

2. **Research approach :** Evaluative approach
3. **Research design :** Quasi-experimental repeated measures time series design
4. **Sample :** 32 Neonates (16 in interventional group and 16 in non-interventional group)
5. **Sampling Procedure :** Purposive sampling technique
6. **Inclusion criteria:**
 - Neonates whose TCB level is between 10mg/dl to 18mg/dl
 - Neonates with the onset of jaundice after 24 hours of birth.
 - Neonates born with 37 weeks of gestation & above
 - Neonates birth weight is more than 2000grams
 - Neonates receiving phototherapy for hyperbilirubinemia.

7.Exclusion criteria:

- Pre term neonates.
- Rh & ABO incompatibility
- Major Congenital Anomalies
- Hyperbilirubinemia requiring exchange blood transfusion
- Glucose 6-phosphate dehydrogenase deficiency

8.Variables:

- Independent variable – Baby Massage
- Dependent variable – physiological Jaundice
- Extraneous variables – Gestational age, gender, time of starting phototherapy, type of feed, mothers blood group and Parity.

9.Data Collection Instruments:

- Baseline proforma of the Neonate and Mother
- Transcutaneous Bilirubin Test with Bilirubinometer
- Observation check list on physiological parameters– feeding, defecation and voiding frequency.

10.Description of Tool:

Tool: 1 Demographic Proforma of the neonate and mother.

- Part I: Demographic proforma of the neonate which includes gestational age, Gender, Birth weight, APGAR score at 5 minutes, Neonates weight at admission to NICU, Hours at which Neonate placed for phototherapy, Type of feed, Mode of phototherapy and Duration of phototherapy in hours.
- Part II: Demographic proforma of the Neonates Mother which includes age, blood group, parity, education and mode of delivery.

Tool: 2: Assessment of Physiological Jaundice

- Part I: Checking of TCB Level is done by Transcutaneous Bilirubinometer (manufactured by Drager, JM-103 Japan) by placing the measuring probe vertically against the neonates' sternum and pushing the measuring probe gently until a click sounds.
- Part II: Observation checklist on feeding, defecation and voiding frequency. It is assessed before baby massage, at 24th hour and 48th hour by calculating the number of feeds per 24 hours given by the staff as well as neonates mother and number of defecation and voiding per 24 hour by checking the pampers of baby every 2 hourly.

11.Data collection procedure

The investigator obtained permission from the Institutional Authority and the Ethical Clearance Committee of Father Muller Medical College Hospital. Familiarized with Neonates mothers, explained the purpose, nature and duration of the study and the instruments used for the data collection. Obtained written consent from the mothers. Neonates who met inclusion criteria were randomly assigned to interventional and non-interventional group with lottery method. On admission to NICU the Neonates were checked for TCB with Transcutaneous Bilirubinometer. Neonates who are assigned to interventional group received phototherapy with Baby Massage (Vimala Massage Technique⁵) twice a day for ten minutes. The control group received phototherapy without Baby massage. Subsequent observations were made at 24th hour and 48th hour and recorded by the investigator for both the groups.

Major findings of the Study:

Section I: Description of demographic variables of the Neonate and Mother:

- Majority of the neonates in both the groups were at the gestational age of 40-42 weeks (68.7%) and 37-39 weeks (31.3%)
- Majority of the Neonates were male both in interventional (62.5%) and non-interventional group (56.3%).
- In interventional group majority of the neonates (43.7%) were placed at phototherapy between 24 to 48 hrs of birth and in non-interventional group majority of the neonates (68.7%) were placed between 48 to 72 hours of birth.
- Majority of the neonates (81.3%) in the interventional group had 16 to 20 hours of phototherapy whereas 68.7% of the neonate in the non-interventional group had 21 to 24 hours of phototherapy.
- Majority of the mothers both in interventional (62.4%) and non-interventional (75.0%) group, were between the age group of 20 – 25 years of age.
- Majority of the mothers both in interventional group (68.7%) and non-interventional group (56.3%) had normal vaginal delivery.
- Majority of the mothers both in interventional group (56.3%) and non-interventional group (62.5%) were Primi.
- Majority of the mothers both in interventional group (50.0%) and non-interventional group (43.7%) were with primary education.

Section II: Assessment of Transcutaneous Bilirubin level and physiological parameters (feeding, defecation and voiding frequency) both in interventional and non-interventional group at different time points.

The data presented in table 1 show the mean scores of Transcutaneous Bilirubin level at 24th and 48th hour interventional (5.50±1.81, 1.68±1.42) and non-interventional group (8.60±1.84, 6.44±1.75) is less than that of the pre-assessment mean scores of Transcutaneous Bilirubin level in interventional (14.31±2.78) and non-interventional group (16.09±2.42). But the mean scores of feeding, defecation and voiding at 24th hour (8.63±0.81, 5.50±0.52, 5.75±0.45) and 48th hour (10.31±0.60, 6.38±0.50, 6.63±0.50) in interventional group is higher than that of the pre-assessment mean scores of feeding (7.00±0.73), defecation (4.69±0.48) and voiding (4.69±0.48), whereas the mean scores of feeding, defecation and voiding at 24th hour

(8.91±0.83, 4.13±0.89, 4.00±0.82) and 48th hour (6.81±0.83, 3.69±.70, 3.75±0.68) in non-interventional group is lesser than that of the pre-assessment mean scores of feeding (7.38±0.89) defecation (4.56±0.73) and voiding (4.75±0.77).

Section III: Effectiveness of baby massage on Transcutaneous Bilirubin level and physiological parameters (feeding, defecation and voiding frequency) between the interventional and non-interventional group at different time intervals.

The data presented in Table 2 show that the computed 't' values of TCB (3.00, 5.65) and physiological parameters like feeding (3.61, 16.41), defecation (6.01, 13.10) and voiding (9.97, 13.76) are greater than the table value (t₃₀=2.04) at p<0.05 level of significance at both intervals in both the groups. But the mean difference of TCB is greater in interventional group than non-interventional group which indicates the rate of reduction is higher in interventional group compared to non-interventional group and the mean differences of physiological parameters scores are higher in interventional group than non-interventional group which signifies the level of improvement is high in interventional group compared to non-interventional group. The statistical test supports the effect of baby massage with phototherapy on reduction of physiological jaundice and improved physiological parameters.

Section IV: Association of pre-interventional status of physiological jaundice with selected demographic variables.

The computed 'p' values of all the demographic variables are higher than the table value (χ²=3.84) at 0.05 level of significance. Hence there was no significant association of pre-interventional status of physiological jaundice with selected demographic variables.

Discussion:

The data showed that the TCB level of the interventional group (1.68±1.42) was significantly lower than that of the non-interventional group (6.44±1.75).

This result is consistent with a study conducted at Japan, which has reported that the Bilirubin levels were significantly decreased in the massage group (9.5±3.1) compared with the control group (11.6±2.2).⁶ This results also supported by a randomized control trial study which was carried out at Bahman Hospital, Iran also indicated that the mean bilirubin level of infants in the massage group (9.92±1.3, p=0.001) was significantly decreased compared to the control group (11.97±1.52, p=0.001).⁷

The defecation frequency of this study was significantly higher in the interventional group (6.38±0.50) than in the non-interventional group (3.69±0.70) which is comparable with the results of previous studies. A study conducted at Niigata, Japan the mean defecation frequency of the massage group (5.5±2.6) was higher than that of the control group (4.7±2.5).⁶ Another study which was conducted at Taiwan also indicated the mean defecation frequency of the massage group (5.0±1.5) was significantly higher than that of the control group (4.3±1.5) on the 2nd day of therapy.⁸

The feeding frequency of the present study was higher in the interventional group (10.31±0.60) compared to non-interventional group (6.81±0.83). These findings were supported by a randomized control trial study at Bahman Hospital, Iran. The results showed that the feed intake in massage group (9.44±2.28) were higher than the control group (9.12±1.01).⁷

Voiding frequency of the present study showed higher frequencies in interventional group (6.63±0.50) than non-interventional group (3.75±0.68). It is reasonable as feeding increases voiding also increases.

Limitations:

- The sample was restricted to control and experimental groups, hence generalisation is limited.

- The sample was restricted to only full term neonates with physiological jaundice.
- Accurate quantities of physiological parameters were not measured.

Recommendations:

- Similar study can be conducted in a larger sample with randomization.
- A comparative study can be conducted to assess the occurrence of physiological jaundice among the neonates.
- A comparative study could be conducted between term and preterm babies.

Conclusion:

Massage increases lymph flow and blood circulation, also stimulates vagus nerve and enhance the digestive process and helps to increase defecation process thus decreases the re-absorption of Bilirubin into the blood. Enhances early maternal bonding, sustains breast feeding and reduces the hospital stay and cost of treatment.

Table 1: Distribution of Mean and standard deviation (SD) scores of Transcutaneous Bilirubin level and physiological parameters (both in interventional and non-interventional group at pre-assessment, 24th hour and 48th hour
n=16+16

Parameter	Time Interval	Interventional Group	Non-interventional Group
		Mean±SD	Mean±SD
TCB Level	Pre-assessment	14.31±2.78	16.09±2.42
	24 th hour	5.50±1.81	8.60±1.84
	48 th hour	1.68±1.42	6.44±1.75
Feeding frequency	Pre-assessment	7.00±0.73	7.38±0.89
	24 th hour	8.63±0.81	8.91±0.83
	48 th hour	10.31±0.60	6.81±0.83
Defecation frequency	Pre-assessment	4.69±0.48	4.56±0.73
	24 th hour	5.50±0.52	4.13±0.89
	48 th hour	6.38±0.50	3.69±.70
Voiding frequency	Pre-assessment	4.69±0.48	4.75±0.77
	24 th hour	5.75±0.45	4.00±0.82
	48 th hour	6.63±0.50	3.75±0.68

Table 2: Distribution of Mean difference, SD and unpaired 't' test scores to compare the effectiveness of baby massage on Transcutaneous Bilirubin level and physiological parameters (feeding, defecation and voiding frequency) of Neonates between interventional and non-interventional group.
n=16+16

Parameter	Group Interval	Group	Mean df ± SD df	't' Value	p Value
TCB Level	Pre-assessment to 24 th hour	Interventional	8.81±1.21	3.00*	.005
		Non-interventional	7.49±1.28		
	Pre-assessment to 48 th hour	Interventional	12.63±1.76	5.65*	.000
		Non-interventional	9.64±1.17		
Feeding frequency	Pre-assessment to 24 th hour	Interventional	-1.63±0.81	3.61*	.001
		Non-interventional	-0.81±0.40		
	Pre-assessment to 48 th hour	Interventional	-3.31±0.79	16.41*	.000
		Non-interventional	0.56±0.51		
Defecation frequency	Pre-assessment to 24 th hour	Interventional	-0.81±0.66	6.01*	.000
		Non-interventional	0.44±0.51		
	Pre-assessment to 48 th hour	Interventional	-1.69±0.70	13.10*	.000
		Non-interventional	0.88±0.34		
Voiding frequency	Pre-assessment to 24 th hour	Interventional	-1.06±0.57	9.97*	.000
		Non-interventional	0.75±0.45		
	Pre-assessment to 48 th hour	Interventional	-1.94±0.68	13.76*	.000
		Non-interventional	1.00±0.52		

Table value t₃₀ = 2.04, p<0.05

* significant

References:

1. Maisels, M.J., McDonagh, A.F., (2008). Phototherapy for Neonatal Jaundice. Med. New England Journal of Medicine, 358, 252-255. Retrieved December 30, 2015. <http://www.nejm.org/doi/full/10.1056/NEJM080672?query=recent&rss=1>
2. Stokowski, L.A., (2006). Foundations in newborn care fundamentals of pathology for neonatal Jaundice. Advances in neonatal care, 6(6), 303-312. Retrieved January 5, 2016. http://www.ipekpp.com/admin/upload_files/Knowledge_2_39_D-Revrquos
3. Hernandez-Reif, M., Diego, M., Field, T., (2015). Preterm infants show reduced stress behaviours and activity after 5 days of massage therapy. Ital J Paediatr, 41, 94. Retrieved January 21, 2016. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4659198/>
4. Chen, J., Sadakata, M., Ishida, M., Sekizuka, N., Sayama, M., (2011). Baby massage ameliorates neonatal jaundice in full-term newborn infants. Tohoku Journal of Experimental Medicine. 223(2), 97-102. Retrieved January 8, 2016. <https://www.massagemag.com/infant-massage-lessens-risk-of-neonatal-jaundice-8604>
5. Seyyedrasooli, A., Valizadeh, L., Hosseini, M.B., Jafarabadi, M.A., Mohammadzad, M., (2014). Effect of Vimala Massage on Physiological Jaundice in Infants: A Randomized Controlled Trial. Journal of Caring Sciences. 3(3), 165-173. Retrieved November 1, 2016. <http://journals.tbzmed.ac.ir/JCS>
6. Moghadam, M.B., Moghadam, K.B., Kianmehr, M., Jomezadeh, A., Davoudi, F., (2012). Effects of massage on weight gain and jaundice in term neonates with hyperbilirubinemia. J Isfahan Med. 30, 1-8. Retrieved January 10, 2016. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4659198/>
7. Kianmehr, M., Moslem, A., Moghadam, K.B., Naghavi, M., Pasban-Noghabi, S., Moghadam, M.B., (2014). The Effect of Massage on Serum Bilirubin Levels in Term Neonates with Hyperbilirubinemia Undergoing Phototherapy. 128(1), 36-41. Retrieved January 25, 2016. <https://www.researchgate.net/publication/260210325>
8. Alden, E.R., Woodrum, D.E., Wennberg, R.P., Parks, C.R., Hodson, W.A., (1972). Morbidity and mortality of infants weighing less than 1,000 grams in an intensive care nursery. Paediatrics. 50(1). Retrieved April 20, 2017. <http://pediatrics.aappublications.org/content/50/1/40>