

Restabilization of physiological parameters after bathing among newborns: a time based interventional study

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Abstract

Background: The first few days of life newborn infants go through diverse environmental changes and stressors. The care given during this period is critical in helping to prevent complications and ensuring intact survival. Bathing is one of the basic components of care and it affects the thermoregulatory and cardio-respiratory mechanisms of newborn infants. Hence the present study aimed to find out the time required for restabilization of physiological parameters after bathing among newborns.

Materials and Methods: A quantitative pre-experimental research approach with one group pre- test post- test research design was adopted. 30 stable newborns in the age group of 6 to 48 hours were selected through purposive sampling technique from MCH Unit of selected Hospital. The physiological parameters were assessed using physiological parameters assessment scale at baseline, 15 minutes, 30 minutes, 45 minutes and 60 minutes. The collected data were tabulated and analysed by using descriptive and inferential statistics.

Results: After bathing, at 15 minutes majority i.e. 20(66.6%), at 30 minutes most i.e.25 (83.3%), at 45 minutes most i.e.26 (86.6%) and at 60 minutes half i.e.15 (50%) of the newborns had were having moderate alteration in their physiological parameters. The difference between pre test and post test mean score of physiological parameters was found to be statistically non significant ($p>0.05$) at 15 minutes for pulse, at 30 minutes for respiration and at 60 minutes for oxygen saturation but for temperature it was found to be statistically significant ($p\leq 0.001$) at 15 minutes, 30 minutes, 45 minute and 60 minutes.

Conclusion: Bathing had significant impact on the physiological parameters of newborns and the time required for restabilization of temperature is more than 1 hour, respiration is 30 minutes, oxygen saturation is 60 minutes and pulse is less than 15 minutes. During this period general care measures could help to minimize the impact of bathing.

Keywords: Time, Restabilization, Physiological parameters, Bathing, Newborns

Introduction

Newborn is unique individual, he or she is not a miniature adult, not a little man or woman. The first few days of life is the period of the transition occurring all of sudden from foetal life (intrauterine environment) to a completely independent life (extra uterine). The process of birth and adaptation to the new surrounding depend upon number of adjustment on the part of newborn baby especially.¹

The care given during this period is critical in helping to prevent complications and ensuring intact survival. If primarily

neonatal care is inadequate it leads to unacceptable, high neonatal morbidity and mortality so each and every newborn should be given essential newborn care. The main basic component of essential newborn care are: maintenance of body temperature, initiation and maintenance of respiration, establishment of extra uterine circulation, maintenance of personal hygiene, intake of adequate nourishment, establishment of waste elimination, prevention of infection and establishment of infant parent relationship.²

Now days, the maintenance of personal hygiene is highest important basic need. The personal hygiene care involves bathing and cleaning of the baby. Newborns are routinely bathed within several hours of the birth to remove amniotic fluid, blood and other birthing fluids to reduce the possibility of transmitting potential pathogens to others.³ Bathing has significant effect on thermoregulation, cardio-pulmonary and gastrointestinal functions. Newborn infants lose their body temperature easily due to large surface area and a thin layer of subcutaneous fat in relation to body weight through evaporation, radiation, conduction and convection mechanisms.⁴

Studies conducted on the effects of bathing among newborns indicate that following bath there is the risk of heat loss and hypothermia. Significant decrease in temperature can occur 10 minutes after neonatal bathing. Hypothermia can result in tachypnea, apnea, hypoxia, metabolic acidosis, hypoglycaemia, coagulation defects, acute renal failure, necrotizing enterocolitis and ultimately death so particular care should be taken when bathing newborns.⁵⁻⁶

Maintaining a neutral thermal environment is one of the key component can helps to cope up with physiologic challenges a newborn faces during early neonatal period. Attention to details regarding the management of infant's neutral environment may lead to improvement in clinical outcome, including improved survival.⁷ Although an integral part of the routine care of all newborns, the broad spectrum of interventions from attention to specific individual therapies, have unfortunately received little attention and study. A commitment to great understanding of these issues and their impact on newborns is essential to improve their outcome.⁸

Based on above literature, the researcher observed that there is a paucity of research that has evaluated the time required for restabilisation of physiological parameters. It has motivated the investigator to undertake the

present research question for the research project.

Materials and Methods

This was a quantitative pre-experimental study with one group pre-test post-test design conducted in the month of March and April 2016 at MCH unit, Civil Hospital, Hoshiarpur, Punjab. The sample size was determined based on the results of a pilot study and was computed by power analysis. The total sample for the study comprised of 30 newborns selected through non-probability purposive sampling technique. The inclusion criteria for sample selection included: newborns between 6-48 hours of age and parents willing for participation of their newborn baby in the study. The exclusion criteria included: newborns suffering with some form of illness/congenital anomalies and gestational age is less than 35 weeks. The study protocol was approved by institutional review board and institutional ethical committee of Shri Guru Ram Dass College of Nursing, Hoshiarpur, Punjab.

To execute the study, the researcher obtained official written permission from SMO of Civil Hospital, Hoshiarpur and written informed consent from the parents of newborns after explaining the study purpose and assuring for confidentiality and anonymity. The self structured tool was used for data collection and it consisted of two sections. Section A: Demographic variables of newborns: It consisted of 5 demographic variables including gestational age, birth weight, gender, mode of delivery and type of feeding. Section B: Physiological parameters assessment scale: It consisted of assessment of temperature, pulse, respiration and oxygen saturation on a four point rating scale to assess the level of alteration in physiological parameters. Total score was ranging between 0 to 12 and it was interpreted in terms of level of alteration in physiological parameters as mild (0- 4), moderate (5-8) and severe (9-12). The whole body bath was provided to the newborns as per the steps recommended by

National Neonatology forum of India with luke warm water for the duration of approximately 5 minutes by the investigator himself. The content validity of tool and intervention was obtained from the six experts in the field of medicine and nursing and reliability of tool was checked by inter-rater method and it was found 0.87, hence tool was considered reliable for data collection.

The pre-test observation was conducted before initiation of intervention to collect baseline data. After pre-test, the bathing was provided as per plan. The post-test observations were conducted at 15 minute (post-test-1), 30 minute (post-test-2), 45 minute (post-test-3), and 60 minute (post-test-4) by using the same questionnaire. The collected data was tabulated and analyzed in accordance with objectives of the study by using descriptive and inferential statistics with the help of Statistical Package for the Social Sciences version 16 software (SPSS Inc., Chicago, IL, USA) and Instat.

Results

The analysis of demographic characteristics of newborns revealed that 23(77%) of newborns were in the gestational age of 38-42 weeks and 7(23%) newborns were in gestational age of less than 37 weeks. Most of newborns i.e. 24(80%) were having birth weight more than 2500 gms and least 6(20%) newborns were having birth weight between 2001-2500 gms. 19(63%) of newborns were male and 11(37%) were female. Majority of newborns i.e. 21(70%) were delivered through normal vaginal delivery (NVD) with episiotomy, 5(17%) newborns were delivered through caesarean section and 4(13%) newborns were delivered through normal vaginal delivery. 23(77%) of newborns were receiving breast feed and 7(23%) of newborns were receiving cow's milk feed.

After bathing, at 15 minutes majority i.e. 20(66.6%), at 30 minutes most i.e.25 (83.3%), at 45 minutes most i.e.26 (86.6%) and at 60

minutes half i.e.15 (50%) of the newborns were having moderate alteration in their physiological parameters (Figure1).

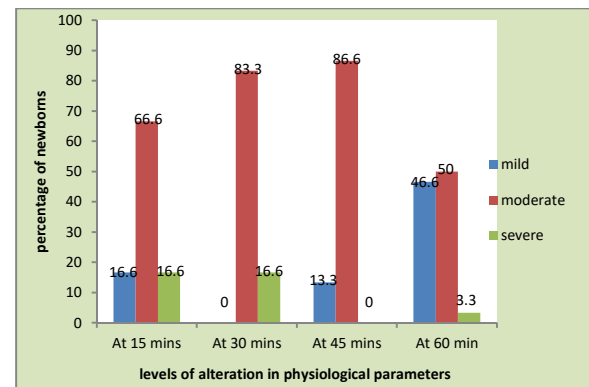


Figure 1: Percentage distribution of newborns as per levels of alteration in physiological parameters after bathing

The difference between the mean values of temperature at baseline and 15 minutes ($t=11.07, p=0.001$), at baseline and 30 minutes ($t=8.78, p=0.001$), at baseline and 45 minutes ($t=5.33, p=0.001$), at baseline and 60 minutes ($t=3.55, p=0.01$) was statistically significant. The difference between the mean values of pulse at baseline and 15 minutes ($t=0.10, p=0.86$), at baseline and 30 minutes ($t=0.96, p=0.42$), at baseline and 45 minutes ($t=0.94, p=0.43$), at baseline and 60 minutes ($t=0.60, p=0.56$) was statistically non significant. The difference between the mean values of respiration at baseline and 15 minutes ($t=9.52, p=0.001$), was statistically significant whereas at baseline and 30 minutes ($t=1.20, p=0.14$), at baseline and 45 minutes ($t=0.4, p=0.54$), at baseline and 60 minutes ($t=0.14, p=0.73$) was statistically non significant. The difference between the mean values of oxygen saturation at baseline and 15 minutes ($t=3.32, p=0.01$), at baseline and 30 minutes ($t=2.83, p=0.01$), at baseline and 45 minutes ($t=2.79, p=0.01$), was statistically significant whereas at baseline and 60 minutes ($t= 0.11, p=0.84$) was statistically non significant (Table 1).

Table 1: Comparison of pre-test and post -test mean score of physiological parameters among newborns.

N=30

Physiological parameters	Pre-test (Mean ± SD)	Post- test (Mean± SD)			
	At baseline	At 15minuts	At 30 minutes	At 45 minutes	At60 minutes
	(a)	(b1)	(b2)	(b3)	(b4)
Temperature	37.36±0.43	36.68±0.40	36.77±0.48	37.03±0.45	37.15±0.47
		a+b1	a+b2	a+b3	a+b4
		t=11.07, p=0.001	t=8.78, p=0.001	t=5.33, p=0.001	t=3.55, p=0.01
Pulse	103.83±14.58	104.06±14.67	104.02±17.71	104.23±16.91	103.67±16.55
		a+b1	a+b2	a+b3	a+b4
		t=0.10, p=0.86	t=0.96, p=0.42	t=0.94, p=0.43	t=0.60, p=0.56
Respiration	53.90±8.29	57.46±9.59	55.46±8.64	53.26±10.28	53.73±9.19
		a+b1	a+b2	a+b3	a+b4
		t=9.52, p=0.001	t=1.20, p=0.14	t=0.4, p=0.54	t=0.14, p=0.73
Oxygen saturation	94.93±4.17	89.53±8.05	90.13±7.87	89.90±8.68	95.03±3.81
		a+b1	a+b2	a+b3	a+b4
		t=3.32, p=0.01	t=2.83, p=0.01	t=2.79, p=0.01	t=0.11, p=0.84

Note: a= at baseline, b₁ = at 15 minutes, b₂ = at 30 minutes, b₃=at 45 minutes, b₄=at 60 minutes.

After bathing, at 15 minutes, 30 minutes, 45 minutes and 60 minutes, there was no significant association found between levels of alteration in physiological parameters and gestational age ($\chi^2=2.32$, p=0.31; $\chi^2=0.3$,p=0.84; $\chi^2=0.007$,p=0.93; $\chi^2=4.01$,p=0.13), birth weight ($\chi^2=0.00$,p=1; $\chi^2=1.50$,p=0.22; $\chi^2=0.07$,p=0.78; $\chi^2=0.26$,p=0.87), gender ($\chi^2=0.17$, p=0.71; $\chi^2=1.40$,p=0.23; $\chi^2=2.67$,p=0.10; $\chi^2=0.88$,p=0.64), mode of delivery

($\chi^2=1.85$,p=0.39; $\chi^2=0.90$,p=0.34; $\chi^2=1.25$,p=0.53; $\chi^2=0.24$,p=0.88) and type of feed ($\chi^2=0.09$, p=0.95; $\chi^2=0.93$,p=0.33; $\chi^2=1.40$,p=0.23; $\chi^2=0.42$,p=0.80) of newborns respectively.

Discussion

Every moment of newborn care is full of excitement and challenges. Thermoregulation in the neonate is a critical physiological function that is strongly influenced by physical immaturity, extent of illness and environmental factors.⁹ Improving newborn survival is a natural priority in child health today. If primarily neonatal care is inadequate it leads to unacceptable, high neonatal morbidity and mortality.¹⁰ The neonate's susceptibility to temperature instability needs to be recognised and understood in order to appropriately manage and limit the effects of cold stress.¹¹

The findings of present study showed that after bathing, at 15 minutes majority i.e. 20 (66.6%), at 30 minutes most i.e.25 (83.3%), at 45 minutes most i.e.26 (86.6%) and at 60 minutes half i.e.15(50%) of the newborns were having moderate alteration in their physiological parameters. These findings are consistent in line with the findings of the study reported by Raman V et al and Bergstorm et al that bathing has significant effect on temperature.¹²⁻¹³ The present study findings are contradictory with the findings of study reported by Pugliesi and Vania Elisa M that bathing does not affect the thermoregulation and cardio respiratory adoption of term newborns.¹⁴

As per findings of present study bathing had significant impact on the physiological parameters of newborns and the time required for restabilization of temperature is more than 1 hour, respiration is 30 minutes, oxygen saturation is 60 minutes and pulse is less than 15 minutes. These findings are similar with findings of study done by Dong Yeon Kim and Ho-Ran Park who has reported that after bathing temperature restored to baseline

temperature at 90 minute and oxygen saturation restored to baseline oxygen saturation at 60 minute.¹⁵ The present study findings are contradictory in line with findings of study done by Hyun-Sook So et al and Nakoy, Harigaya A et al that bathing had no significant effect on body temperature, heart rate and oxygen saturation of newborn.¹⁶⁻¹⁷

The findings of present study revealed that after bathing, at 15 minutes, 30 minutes, 45 minutes and 60 minutes, there was no significant association found between levels of alteration in physiological parameters and gestational age, birth weight, gender, mode of delivery, and type of feed of newborns. These findings are similar with the study done by Varda KE and Behnke R.S who found that gestational age, gender, birth weight, length of bath in minutes and room temperature had no significant association with body temperature.¹⁸

Limitations of study work:

The study was carried out on small sample size (n=30) and studied the effect of bathing only on limited physiological parameters due to time and resources constraints.

Conclusion

Bathing have significant impact on the physiological parameters of newborns. Temperature and oxygen saturation decreases whereas respiration and pulse increases as a result of bathing. The time required for restabilization of temperature is more than 1 hour, respiration is 30 minutes, oxygen saturation is 60 minutes and pulse is less than 15 minutes. Hence it is essential that after bathing newborn should be nursed in neutral thermal environment, dried immediately, clothed and skin to skin to skin contact to be provided so that newborn will be able to maintain normal body temperature and has a minimal metabolic rate and minimal oxygen consumption.

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Conflict of interest

The author declare that he have no competing interest.

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