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# The Relation between Trunk-to-Head Bathing and the Traditional Head-to-Trunk Bathing on Newborns' Outcome

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## Abstract

**Background:** Maintaining body temperature and decreasing stress are essential challenges in bathing newborn infants.

**Aim:** to compare the effects of trunk-to-head bathing and the traditional head-to-trunk bathing on newborns' outcomes.

**Design:** A quasi-experimental research design was selected for this study.

**Setting:** delivery room in Beni-Suef General Hospital.

**Sample:** A convenient sample of 100 pregnant women and her newborns in the previous setting.

**Tools:** Two structured interviewing questionnaires for pregnant women and her newborn. The first tool was for mother which included socio-demographic data. The second tool included questionnaires about infant outcomes.

**Results:** there were statistically significant differences ($P<0.001$) in bathing time between groups. No statistically significant differences in baseline body temperature, heart rate & oxygen saturation between experimental and control group.

**Conclusion:** The trunk to head bathing intervention seems to be safe, effective and of particular importance for stable and healthy full-term newborns. Thermal stability of newborns is very important in newborns' care. Therefore, trunk to head bath procedures must be carefully reflected to advance a method that decreases heat loss by evaporation not only before and after the bath but also during the bath.

**Recommendations:** The trunk to head bath practice should be standardized and supported by Ministry of Health and hospital administration. Increasing awareness of the routine trunk to head bath by obstetrics & pediatric nurses

**Keywords:** Trunk-to-Head bath, newborn, outcome.

## Introduction

Newborn period is a highly subsequent time for a newborn who is challenging many of the physiologic adjustments required for extra-uterine life. The newborn mortality rate reveals not only the quality of care available to women during pregnancy but also the quality of care accessible to infants during the first four weeks of life [1].

According to cultures and hospital's nursing care policy the skin care or bathing of newborns contrasts. Although temperature regulation is very important to nurses caring for newborns and the newborn bathing

has various benefits from it such as, maintaining skin integrity, decreasing the risk of infection, temperature elevation, promoting mobility and maintaining joints' function [2].

Early bathing of the newborn infant after birth may affect his adaptation to extra-uterine life, particularly by harmful disturbing of his pulmonary and gastrointestinal circulation as well as his thermoregulation (hypothermia), by excessive evaporation and dilate the peripheral vessels in the skin but after the bath, newborns are dressed and package in blankets or retained under a radiant heater until body temperature is within normal limits and thereafter when the temperature becomes stable, they are reverted to the family[3].

Full-term babies are born with a functioning skin barrier that remains too immature the first 12 months of life; newborn skin varies from adult skin in its structure, configuration, and functions. In newborns, the skin barrier is thinner than in adults, is extra acidic, more easily loses water and fails to conserve temperature. Therefore, the newborn skin needs special care to certify that the healthy skin barrier is maintained [4]

Bathing or skin cleansing is vital for good health, but if especially appropriate to newborns, the newborn skin needs special care, to continue in the maturation of structure, function, and composition [5]. The basis for healthy skin throughout life is establishing good practices from birth, but methods of newborn skin care are often based on habits, personal or parent experiences and cultural factors. The health professionals such as certified midwives and pediatric nursesare trusted sources of information and advice and can influence approaches to newborn bathing by change parents' habits, experience and cultural factors[6].

The first newborn bath aid to remove possible harmful bodily fluids, maintaining skin integrity, decreasing the risk of infection and temperature elevation, promoting mobility and maintaining joint function, cultural plays an important role to put the newborn at risk for temperature instability, which can cause complications such as hypoglycemia and respiratory distress. In caring for newborns the temperature regulation is vitally important to nurses[2]. Susceptible to changes in environmental temperature of the newborn because of their small mass & relatively large surface area & little insulating tissue such as fat and hair, this resulted in significant behavioral alterations & limited energy reserves of the newborn [7]. Newborn body temperature decreases or lose due to exposure to a cold environment, non-shivering themyogenesis, increased involuntary activity and vasoconstriction or through evaporation, radiation, convection and conduction [8].

The main role of the pediatric nurse in Neonatal intensive care unit nurses work in a team with other NICU doctors and nurses. They are directly responsible for monitoring vitals, administering medications and nutrients, and providing care & comfort to newborns. NICU nurses also educate new parents on the appropriate care for their newborn following discharge, and they answer any questions that families may have. NICU nurses work in public or private hospitals. Some NICU nurses may also work for in-home health services or in medical emergency & transportation teams. Regardless of their location, NICU nurses can expect to work very hard to provide care for vulnerable human beings. Neonatal nurse practitioners are advanced practice nurses that care for premature babies and sick newborns in intensive care units, emergency rooms, delivery rooms, and special clinics. Prematurity is a risk factor that follows early labor, a planned caesarean section, or pre-eclampsia.

The main role of midwives, pediatric and maternal & newborn nurses is to prevent hypothermia and maintain body temperature because of conserving the newborn's body temperature during and after bathing is an essential requirements of newborns and nursing by selecting most appropriate bathing method, keeping newborns warm and dry, using radiant warmers in the nursery, limiting air drafts, warming objects that come in contact with them, placing hats on a well-dried head & swaddling them with warm blankets help to reduce heat loss. One of the bathing methods that the nurse has followed based on hospital traditions, nurses immerse the newborn in a tub and wash, they first shower the face, hair and then the trunk. However, this head-to-trunk bath procedure exposed the newborn's head to air during the bath because the newborn is still-wet and

evaporative heat loss might increase. In the experimental group the newborns were bathed in the following instruction, first, the trunk and extremities of the newborn were immersed in a bathtub and washed. Second, the trunk still immersed in the water with face & hair were washed using running water. First, the nurse washed the newborn trunk while the trunk immersed in a bathtub with hair not yet fully dried and exposed to the air. Second, the midwife or nurse washed the newborn's face and hair with running water & removed moisture from the hair with a towel.

Keeping and maintaining the newborn's body temperature, heart rate, oxygen saturation & physiological function during & after bathing is an essential requirement of nursing care there for the researchers evaluate temperatures, heart rate, and oxygen saturation as physiological responses at four-time points in accordance with hospital guidelines to assess the difference between two methods. The study hypothesized that the experimental group who received a modified trunk-to-head bath would display decreased changes in physiological responses, including body temperature, heart rate, and oxygen saturation compared to the control group who established the traditional head-to-trunk bath.

## The Significance of the Study

Hypothermia or heat loss can lead to tachypnea, apnea, hypoxia, metabolic acidosis, hypoglycemia, coagulation defects, acute renal failure, necrotizing enterocolitis and ultimately death [9]. Neonatal deaths are irregularly disseminated around the globe. At home half of the world's newborns die and more than 99% of all deaths occur in the developing countries, 33 per 1000 average newborn mortality rate compared with 4 per 1000 in high-income countries [10]. Subsequently, newborn deaths account for more than 40% of under-5 mortalities. Direct or indirect causes of neonataldeath are complex & difficult for several reasons such as neonatal hypothermia [11]. Some studies show that trunk-to-head bathing is very effective in maintaining or conserving newborn body temperature and stabilizing heart rate and oxygen saturation among full-term healthy neonates[2]. Hence the investigators felt that there is a need to check the effectiveness of trunk-to-head bathing versus the traditional head-to-trunk bathing on newborns' body temperature, heart rate & oxygen saturation of newborn.

## The Aim of the Study

The aim of this study was to compare the effects of trunk-to-head bathing versus the traditional head-to-trunk bathing on newborns' outcomes.

## Research Hypotheses

The trunk-to-head bathing will have clinical benefits on neonatal outcome than head-to-trunk bathing.

## Subjects and Methods

**Research Design:** A quasi-experimental research design was used.

**Setting:** delivery unit in Beni-Suef General Hospital. This ward affiliated to the department of obstetrics and gynecology.

**Subjects:** A convenient sample of 100 parturient women and her newborns in the previous settings.

**Intervention:** Newborns were randomly assigned into two groups.The newborn in the experimental group were bathed from trunk to head; those in the control group were bathed from head to trunk. Measurements of body temperature, heart rate, and oxygen saturation were obtained at four-times (T): before the bath ($T_1$), immediately ($T_2$), 30 ($T_3$) and 60 ($T_4$) minutes after the bath.

## Inclusion Criteria

- Women at the gestational period between 37-42 weeks.
- Body weight of baby 2.5 - 4 kgm
- Apgar score of baby>7
- Length of stay ≥ 24 hours after birth
- Baby free from medical disorders.
- Women were agreed to participate in the study.
- No obstetric complications during first stage of labor and free from any medical diseases.

## Exclusion Criteria

- Women at the gestational period <37 or > 42 weeks.
- Body weight <2.5 or >4 kgm
- Apgar score <7
- Length of stay < 24 hours after birth
- Baby with medical disorders.
- Women were not agreed to participate in the study.
- Women with obstetric complications during first stage of labor and complain from any medical diseases.
- Sample size was calculated utilizing the following formula [12].

$$n = \frac{N}{1+N\,(e)^2}$$

Where n= sample size, N= population (980), e= margin error (0.05)

## Tools of Data Collection

Three structured interview questionnaires for parturient women and newborns were designed by the researchers after reviewing related literature. It encompassed three main sections as follows:

**Tool I:** Women's Structured Interviewing Questionnaire Sheet which compromises from 2 parts:

*Part 1:* Women's general characteristics data such as weight, age, educational level, occupational status, and residence.

*Part 2:* Women's obstetrical and gynecological history and maternal characteristics such as (maternal parity and gravidity, gestational age and mode of delivery).

**Tool II:** Questionnaires aboutInfants' Outcomes:

*Part 1:* Socio-demographic data of the neonate and assessment condition as (sex, weight, chronological age, length, head circumference, type of umbilical cord clamping, need for resuscitations and need for phototherapy or admission to neonatal intensive care unit (NICU).

*Part 2:* Immediate neonatal outcomes: Refer to Apgar score at 1 and 5 minutes after birth to evaluate neonatal outcome includes fetal heart rate, respiratory rate, muscle tone, reflex response and color [13]. It is done at one and five minutes after birth and may be repeated later if the score remains low.

**Tool III:** Neonatal timetable bathing (head to trunk and trunk to head) temperature, oxygen saturation, heart rate checklists.

First temperature, oxygen saturation, heart rate will be taken $T_1$ (immediately before bathing) of the babies and a second bathing (head to trunk and trunk to head) applied, then the newborn's temperature, oxygen saturation, heart rate was monitored $T_2$ (immediately after bathing) and the $T_3$ and $T_4$ evaluation were conducted at 30 minutes and 60 minutes respectively after the bath [14].

**Tools validity** was estimated by 5 experts in pediatric and maternity, gynecological nursing and one from biostatistics field and its result was 95%.

**Reliability** was estimated by Alpha Cronbach's test for tool one and its result was R= 0.86.

**Pilot study** was conducted on 10% of the total sample to test the feasibility and the applicability of the tool, find out the possible obstacles and problems that might face the researchers and interfere with data collection, detect any problems peculiars to the statements as the sequence of questions and clarity and estimate the time needed for data collection. The samples of newborns included in the pilot study were excluded from the main study sample.

## Felid work

- The study was conducted after getting permission from the dean of faculty of nursing to the Directorate of General Hospital in Beni-Suef.
- The data were collected by the researchers during the period of 12 months from the start of December 2016 up to the end of November 2017. The present study was carried out through the following phases:

[1]. Interviewing or assessment phase: the mothers were selected at their 1st stage of labor or after labor by fitting eligibility criteria. The researchers explained the aim & approach of the study to every woman and then informed oral consents were obtained from all the eligible ones to participate in the study.

[2]. The researchers started to collect baseline data using the tool (I) through interviewing technique to fill the tools. Each woman was interviewed individually by the researchers. The mean time needed for each sheet was about 15-20 minutes to fill the questionnaire, also the researchers help illiterate women in filling their questionnaire. The antenatal data as parity, gravidity, gestational age and mode of delivery were collected.

[3]. The researchers interviewed women at the deliveryroom in Beni-Suef general hospital. The participants were randomly divided into 2 groups (study & control), using random numbers table.

[4]. Newborns allocated to the study group were bathed within 1-2 h of life and those allocated to the control group were bathed within 4-6 h after birth. Bathing lasted 2-5 min with warm water (38±2°C) at the start of the bath, without using soap in a special place.

[5]. The researchers measured axillary temperatures, heart rate & oxygen saturation as physiological responses. Axillary temperatures were measured by mercury axillary temperature and heart rate and oxygen saturation were measured by a pulse oximeter. Measurement of axillary temperature, heart rate, and oxygen saturation was obtained at four-time points: $T_1$ (baseline), $T_2$, $T_3$, and $T_4$ in accordance with hospital guidelines. The thermometer was kept inside the axillary for 5 minutes and add 0.5 °C for accurate measurement

[6]. The two types of bath procedures had been evaluated by the researchers in accurately performing as well as measurement and documentation of body temperature, heart rate, and oxygen saturation in accordance with the study protocol. The researchers measured room temperature, humidity and maintained the water temperature at 38 °C to 40°C before each bath and the total bath time of 2 minutes.

[7]. Bath time has been assessed by the researchers to ensured consistency between two groups with a stop-watch and used the same liquid bath cleanser, towels, diaper, clothes and blankets from corner to corner groups.

[8]. The study newborns group was bathed in the subsequent order. First, the bathtub was filled with running warm tap water, the newborn was immersed into and the trunk and extremities were washed. Second, face and hair were washed using running water with the trunk still immersed in the water. While in the control group, the newborns were bathed in the next order. First, the nurse washed the newborn's face and hair with running warm tap water and the researcher used a towel to removed moisture from the hair. Second, the trunk was bathed while wrapped up in the bathtub with hair not yet fully dried and open to the air.

[9]. Body temperature, heart rate & oxygen saturation were measured 4 times as mentioned before in each newborn's crib. The researchers put the temperature probe at the center of the axilla and maintained the infant's arm next to the chest and the pulse oximeter probe was located on the lateral side of the newborn's foot. The first measurement occurred before the bath ($T_1$). The second measurement happened immediately after the bath ($T_2$), newborns had been dried and wrapped in a towel and moved totheir crib. Then, body temperature, oxygen saturation, and heart rate were evaluated before dressing. The researchers dressed the newborns in warm clothes, diapers & then swaddled witha warm blanket. The $T_3$ and $T_4$ evaluation were conducted at 30 minutes and 60 minutes respectively after the bath.

## Ethical considerations

- The aim of the study was explained to the women who participated in the research before applying the tools to gain their trust and confidence.
- An oral consent was obtained from each subject participating in the study, informing them that they have the right to withdraw at any time without giving any reason.
- The study was conducted in a safe place for women & newborns.
- Data were collected and treated confidentially.

## Statistical Data Analysis

The data were computerized and analyzed using the statistical package for social science (SPSS), version 20. Data were presented using:

- Descriptive statistics in the form of number, percentage, mean and standard deviation (mean±SD).
- Statistical tests included paired t- test.
- Statistical significance was considered at P -value (<0.05 or < 0.001).

## Result

**Table1.** This table revealed that both groups were comparable with no significant differences in respect to baseline characteristics as maternal age, occupation, education, and residence.

**Table1.** *Socio-demographic characteristics of women (n=100).*

| Characteristics | Control group N = 50 | | Study group No = 50 | | T | P. value |
|---|---|---|---|---|---|---|
| | No | % | No | % | | |
| **Women's age** | | | | | | |
| < 20 | 8 | 16.0 | 10 | 20.0 | 0.626 | > 0.05 |
| 20-35 | 20 | 40.0 | 25 | 50.0 | | |
| > 35 | 22 | 44.0 | 15 | 30.0 | | |
| Mean ± SD | 28.33 ± 6.2 | | 28.22 ± 5.2 | | | |
| **Education** | | | | | | |
| Illiterate | 6 | 12.0 | 8 | 16.0 | 0.422 | > 0.05 |
| Primary | 12 | 24.0 | 15 | 30.0 | | |
| Secondary | 22 | 44.0 | 18 | 36.0 | | |
| University | 10 | 20.0 | 9 | 18.0 | | |
| **Residence** | | | | | | |
| Urban | 20 | 40.0 | 24 | 48.0 | 0.672 | > 0.05 |
| Rural | 30 | 60.0 | 26 | 52.0 | | |
| **Occupation** | | | | | | |
| Housewife | 40 | 80.0 | 37 | 74.0 | 0.217 | > 0.05 |
| Employer | 10 | 20.0 | 13 | 26.0 | | |

Paired t-test (*)statistical significant difference (P ≤ 0.05)

**Table2.** Revealed that both groups were comparable with no significant differences in respect to baseline characteristics as numbers of gravidity, numbers of parity, gestational age, and mode of delivery.

**Table2.** *Obstetric history in the study sample (N=100)*

| Characteristics | Control group N = 50 | | Study group No = 50 | | T | P. value |
|---|---|---|---|---|---|---|
| | No | % | No | % | | |
| **Numbers of gravidity** | | | | | | |
| Primi | 12 | 24.0 | 8 | 16.0 | 0.241 | > 0.05 |
| 2nd | 10 | 20.0 | 11 | 22.0 | | |
| 3rd | 20 | 40.0 | 18 | 36.0 | | |
| Grand multi | 8 | 16.0 | 13 | 26.0 | | |
| **Numbers of parity** | | | | | | |
| Nullipara | 15 | 30.0 | 5 | 10.0 | 0.317 | > 0.05 |
| Multipara | 35 | 70.0 | 45 | 90.0 | | |
| **Gestational age** | | | | | | |
| 37 weeks | 0 | 0.0 | 0 | 0.0 | 0.411 | > 0.05 |
| 38 - 40 weeks | 20 | 40. 0 | 30 | 60.0 | | |
| 40 - 42 weeks | 30 | 60.0 | 20 | 40. 0 | | |
| Mean ± SD | 28.58 ± 1.30 | | 28.61 ± 1.31 | | | |
| **Mode of delivery** | | | | | | |
| *Normal vaginal delivery* | | | | | 0.662 | > 0.05 |
| - Without episiotomy | 10 | 20.0 | 7 | 14.0 | | |
| - With episiotomy | 8 | 16.0 | 12 | 24.0 | | |
| *Caesarean section* | | | | | | |
| - Emergency | 12 | 24.0 | 10 | 20.0 | | |
| - Planned | 20 | 40.0 | 21 | 42.0 | | |

Paired t-test (*) statistical significant difference (P ≤ 0.05)

Neonatal characteristics are presented in **Table3.** it was revealed that female infants made up 64% of the study group and 52% of the control group. Both groups were compared with no significant differences in respect to baseline characteristics as neonatal birth weight, Apgar score, current body weight and age after birth.

**Table3.** *Socio-demographic characteristics of neonate and Apgar score (N=100).*

| Characteristics | Control group N = 50 | | Study group No = 50 | | T | P. value |
|---|---|---|---|---|---|---|
| | No | % | No | % | | |
| **Neonatal birth weight in (Kg)** | | | | | | |
| Mean ± SD | 32.1 ± 4.7 | | 31.7 ± 4.5 | | 1.02 | > 0.05 |
| **Neonatal sex** | | | | | | |
| Male | 24 | 48.0 | 18 | 36.0 | 0.65 | > 0.05 |
| Female | 26 | 52.0 | 32 | 64.0 | | |
| **Apgar score >7 (Mean ± SD)** | | | | | | |
| At 1 minute | 7.6 ± 1.57 | | 8.8 ± 1.35 | | 0.85 | > 0.05 |
| At 5 minute | 7.33±1.57 | | 9.2±1.39 | | 1.26 | |
| Current body weight | 3364.3±435.7 | | 3422.1±486.2 | | 0.98 | > 0.05 |
| Age after birth | 33.4±3.7 | | 32.5±3.4 | | 0.64 | > 0.05 |

Paired t-test (*)statistical significant difference (P ≤ 0.05)

**Table4.** presents the comparison of outcome variables at baseline. There were no statistically significant differences in temperature or oxygen saturation between groups. However, the heart rate in the experimental group was significantly higher than in the control group (t = 2.10, p = <0.001).

**Table4.** The relation between the baseline body temperature, heart rate and oxygen saturation between study and control groups (n=100).

| Variables | Neonatal bath | | T | P. value |
|---|---|---|---|---|
| | Control group N = 50 | Study group No = 50 | | |
| | (Mean ± SD) | (Mean ± SD) | | |
| Body temperature (°C) | 37.0±0.17 | 36.8±0.13 | -0.48 | >0.05 |
| Heart rate (beat/min) | 134±14.12 | 142±16.42 | 2.10 | 0.001* |
| Oxygen saturation (%) | 99±1.04 | 99±1.15 | -1.33 | >0.05 |

Paired t-test (*)statistical significant difference (P ≤ 0.05)

**Table5.** Shows a statistically a significant difference in baseline body temperature, heart rate and oxygen saturation between experimental and control group.

**Table5.** *The relation between the changing pattern of body temperature, heart rate and oxygen saturation between groups*

| Variables | $T_1$ | $T_2$ | $T_3$ | $T_4$ | P. value |
|---|---|---|---|---|---|
| **Body temperature (°C)** | | | | | |
| Control group | 37.0 ± o.18 | 36.6 ± o.31 | 36.6 ± 0.24 | 36.7 ± 0.23 | > 0.05 |
| Study group | 37.1 ± 0.14 | 36.9 ± 0.28 | 37.0 ± 0.021 | 37.1 ± 0.19 | |
| **Heart rate (beat/min)** | | | | | |
| Control group | 140 ± 14.22 | 150 ± 15.64 | 144 ± 15.81 | 139 ± 10.88 | > 0.05 |
| Study group | 145 ± 16.44 | 150 ± 14.26 | 147 ± 14.68 | 138 ± 12.12 | |
| **Oxygen saturation (%)** | | | | | |
| Control group | 99 ± 1.22 | 99 ± 1.08 | 100 ± 0.70 | 100 ± 0.56 | > 0.05 |
| Study group | 99 ± 1.08 | 99 ± 1.19 | 99 ± 0.76 | 100 ± 0.70 | |

(*)statistical significant difference (P ≤ 0.05)

**Table6:** Shows a statistically significant positive correlation differences in bathing time between experimental and control group.

**Table6.** *The relation between the time bath in the Study and control groups*

| Bathing time | Study group (N = 50) (Mean ± SD) | Control group (N = 50) (Mean ± SD) | T | P. value |
|---|---|---|---|---|
| Body temperature (°C) | 36.95 ± 0.22 | 36.80± 0.24 | 2.22 | < 0.001* |
| Heart rate (beat/min) | 145±12.33 | 145± 12.52 | 0.55 | > 0.05 |
| Oxygen saturation (%) | 99± 1.01 | 99± 0.82 | 1.33 | > 0.05 |

Paired t-test (*)statistical significant difference (P ≤ 0.05)

## Discussion

One of the improving newborn health outcomes strategies is the promotion of essential newborn care practices. WHO has stated that essential newborn care includes delivery bath and clean cord care, thermal security, early and exclusive breastfeeding, initiation breathing & resuscitation, eye care, immunization, care for low birth weight newborn &management of newborn illness [15].

This study aimed to evaluate the effect of trunk-to-head bathing versus the traditional head-to-trunk bathing on newborns' body temperature, heart rate, and oxygen saturation. As regarding socio-demographic characteristics of mothers including age, educational, occupational condition, numbers of gravidity, numbers of parity, gestational age and mode of delivery, the present study revealed that there were no statistically significant differences between both experimental and control group. These finding was in the same line with Bryanton et at (2004), who stated that, no significant differences regarding socio-demographic data between both groups were comparable of study subjects except obstetric history parameters, however, the only significant difference in her study about tub bathing versus traditional sponge bathing for the newborn [16].

Regarding the distribution of studied groups neonatal characteristics including neonatal (birth weight, sex, current body weight, age after birth and Apgar score), the present study revealed that there was no statistically significant difference between both study and control group. These finding supported by Edraki1 et al (2014) who found no significant difference between the two groups in the infants' mean body temperature 10 minutes before the bath and showed no statistical significant difference in body temperature before & after the bath in the study group in his study about comparing the effects of swaddled & conventional bathing methods on body temperature & crying duration in premature infants at Shiraz, Iran [17]. In addition, So et al (2014) stated that there were no statistically significant differences in general characteristics between groups in his study about the effect of trunk-to-head bathing on physiological responses in newborns at University Hospital, Suwon, South Korea[2]. Moreover, Taheri et al (2007) studied the effect of early bathing on the temperature of normal newborn infants at Iranian reported that there were no statistically significant differences in general characteristics between groups [18].

According to differences in baseline body temperature, heart rate and oxygen saturation between experimental and control groups, there were no significant differences in temperature or oxygen saturation between groups. However, the heart rate in the experimental group was significantly higher than in the control group. This finding agreed with So et al (2014) who found that, in comparison of outcome variables at baseline, there were no significant differences in temperature or oxygen saturation between groups. While, the heart rate in the study group was significantly greater than the control group ($t = 2.14$, $p = .036$) this may be due to increased neonatal crying [2]. In addition, Taheri et al (2007) stated in his study that, there were no statistically significant differences in body temperature, heart rate and oxygen saturation between groups [18].

The present study showed that, there were no statistically significant differences between changing pattern of body temperature, heart rate & oxygen saturation between the two groups (P>0.05) but the neonatal

temperature in experimental group returned to baseline measurement faster than neonatal body temperature in control group when comparing between $T_1$, $T_2$,$T_3$ and $T_4$ in both groups. This finding supported by So et al (2014) who reported that there was no significant difference in body temperature, heart rate and oxygen saturation between groups [2]. Additionally, in the study group, there was a neonatal body temperature drop at $T_2$, but neonatal body temperature gradually rose thereafter. However, the body temperature of those in the control group dropped until $T_3$ and then rose in his study about the effect of trunk-to-head bathing on physiological responses in newborns at University Hospital, Suwon, South Korea. The researchers found that newborns were bathed from trunk to head returned to their initial body temperature faster than head to trunk. The newborns' temperatures were bathed from trunk to head dropped by 0.2°C after their bath, increased 0.1°C at 30 minutes & increased again by 0.1°C at 60 minutes after bath. While, newborns' body temperature was bathed from head to trunk dropped 0.3 °C until at 30 minutes after bath this due to that the head of a newborn is considered quarter body weight or body size of the total surface area and has a higher surface temperature due to the brain's high rate of metabolism and increased 0.1°C at 60 minutes after bath. In addition, Lunze et al (2012) stated that current practices command that nurses' first bath the face and hair and then the trunk and extremities [19].

Heat loss arises through fluid evaporation in a wet infant who has not been dried out. Moreover, Loring et al (2012) who investigate bath techniques among healthy full-term newborns & late preterm infants have demonstrated tub baths to be more effective than sponge baths in maintaining body temperature & preventing temperature loss [20]. The researcher found that the lowest body temperature happened immediately after newborn`s bath because of evaporative heat loss during the bathing process and the change in body temperature loss over time have shown a consistent pattern. While the researcher found that, the experimental group returned to their initial body temperatures faster than control group because of the study group bathing procedure, the newborn was immersed in a bathtub, the trunk & extremities were washed at present and then face and hair was washed with the newborn body still immersed in the warm water.

The current study showed that there were statistically significant differences ($P<0.001$) in bathing time between groups. This finding agreed by So et al (2014) who reported that there was significant difference ($P<0.001$) in bathing time between groups in his study about the effect of trunk-to-head bathing on physiological responses in newborns at University Hospital, Suwon, South Korea [2]. In addition, this result supported by Edraki1 et al (2014)who stated that, therewere statistically significant differences in crying time in the study group was significantly lower than in the control group ($P<0.001$) in his study about comparing the effects of swaddled & conventional bathing methods on body temperature &crying duration in premature infants at Shiraz, Iran [17].

## Conclusion

In the bright of the central study results, it was concluded that, there are statistically significant differences in the effect of trunk-to-head bathing versus the traditional head-to-trunk bathing on newborns' body temperature, heart rate, oxygen saturation.

This intervention seems to be safe, effective and of particular importance for stable and healthy full-term newborns bathed from trunk to head reverted to their initial body temperature more rapidly than those who bathed from head to trunk. Thermal stability of newborns is very important in newborn care. Therefore, trunk to head bath procedures must be carefully reflected to advance a method that decreases heat loss by evaporation not only before and after the bath but also during the bath.

## Recommendations

Based on the findings of the present study, it recommended that:

1. Trunk to head bath should be standardized practice and supported by the ministry of health and hospitals' administration.
2. Increasing awareness of the routine trunk to head bath by midwives, maternity & newborn and pediatric nurses and reflect this practice as one of the total quality standers to achieve babies' benefits.

## References


1. Ahmed M., Mohamed R., Mahmoud S. and Zaki M. Quality of Nursing Care Provided for Neonates with Tracheoesophageal Fistula. Journal of Education and Practice, 2015; 5(3).
2. So S., You A., Mun Y., Hwang J., Kim K., Pyeon J., Shin Y., Chang H. Effect of Trunk-to-Head Bathing on Physiological Responses in Newborns. Journal of Obstetric, Gynecologic & Neonatal Nursing, 2014; 1; 43(6):742-51. doi: 10.1111/1552-6909.12496.
3. Taheri A., Fakhraee H. & Sotoudeh K. Effect of Early Bathing on Temperature of Normal Newborn Infants. Iranian J Publ Health, 2007; 36(2): 82-86.
4. Telofski S., Morello P., & Mack Correa C., et al. The infant skin barrier: can we preserve, protect, and enhance the barrier? Dermatol Res Pract, 2012; 198789.
5. Stamatas GN, Walters RM, Telofski LS. (2011):Keeping infant skin healthy through proper cleansing. In: Hayes SM (editor). Skin care. Hauppauge, New York: Nova Science Publishers 2011: 1-29.
6. Ness J., Davis R., Carey A. Neonatal skin care: a concise review. Int J Dermatol, 2013; 52: 14-22.
7. Pierro A., De Coppi P., & Eaton S. Neonatal physiology and metabolic considerations. In A.G.Coran(Ed.), Pediatric surgery 7th ed., Philadelphia, PA: Saunders.2012: 89–107.
8. RozanceJ. & Rosenberg A. Neonatal thermal regulation physiology. In S. G. Gabbe, J. R. Niebl, H. L. Galan, E. R. M. Jauniaux, M. B. Landon, J. L. Simpson, & D. A. Driscoll (Eds.), Obsterics: Normal and problem pregnancies, 2012;6th ed., Philadelphia, PA: Saunders: 481– 516.
9. Edraki M., Paran M., Montaseri S., NejadR., Montaseri Z. Comparing the Effects of Swaddled and Conventional Bathing Methods on Body Temperature and Crying Duration in Premature Infants: A Randomized Clinical Trial. Journal of Caring Sciences, 2014; 3(2): 83-91 doi:10.5681/jcs.2014.009
10. Murray J., Laakso T., Shibuya K., Hill K., Lopez D.Can we achieve Millennium Development Goal 4? New analysis of country trends and forecasts of under-5 mortalities, 2015; 370:1040–1054. doi: 10.1016/S0140-6736(07)61478-0.
11. Bloom E.,Jamison D., Lunze K., Hamer H. The global burden of neonatal hypothermia: systematic review of a major challenge for newborn survival. BMC Med, 2013; 11: 24.doi: 10.1186/1741-7015-11-24.
12. Yamane, T. Statistics an Introductory Analysis, 1967; 2nd Ed. New York Harper and Row CO.USA,213
13. www.nursesource.org. Jump up "Nurses for a Healthier Tomorrow". Retrieved 2017-10-28.
14. ScottA.,Guideline On Bathing an Infant. On Hospital Intranet and locally in department. Nurse Practice Development Unit,2015; Version Number: 3 GBIU1-12-2015-AS-1: 2 of 8.
15. Callaghan-K., Seifu A., Tholandi M., JohnsonG., Daniel E., Rawlins B., Worku B. and Baqui H. Newborn Care Practices at Home andin Health Facilities in 4 Regions Of Ethiopia. Correspondence: jcallagh@jhsph.edu 1 International Center for Maternal and Newborn Health, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA. BMC Pediatrics 2013, 13:198 http://www.biomedcentral. com/1471-2431/13/198.

16. Bryanton J., Walsh D., Barrett M., Gaudet D. Tub Bathing Versus Traditional Sponge Bathing for the Newborn Journal of Obstetric, Gynecologic & Neonatal NursingView issue TOC., 2004; 33(6): 704-712. doi: 10.1177/0884217504270651

17. Edraki1 M., Paran M., Montaseri S., NejadR. and Montaseri Z. Comparing the Effects of Swaddled and Conventional Bathing Methods on Body Temperature and Crying Duration in Premature Infants at Shiraz, Iran: A Randomized Clinical Trial Journal of Caring Sciences, 2014; 3(2): 83-91 doi:10.5681/jcs.2014.009 http:// journals.tbzmed.ac.ir/ JCS.

18. Taheri A., Fakhraee H. and Sotoudeh K. Effect of Early Bathing on Temperature of Normal Newborn Infants. Iranian J Publ Health,2007; 36(2): 82-86.

19. Lunze K., & Hamer H. Thermal protection of the newborn in resource-limited environments. Journal of Perinatology, 2012; 32(5): 317–324. doi:10.1038/jp.2012.11.

20. Loring, C., Gregory, K., Gargan, B., & Le Blanc, V., Lundgren, D., Reilly, J., Zaya, C. (2012): Tub bathing improves thermoregulation of the late preterm infant. Journal of Obstetric, Gynecologic & Neonatal Nursing, 41(2), 171–179. doi:10.1111/j.15526909.2011.01332.

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