

Research Article

Effectiveness of Structured Teaching Programme on Knowledge Regarding Maintenance of Warm Chain in Prevention of Hypothermia in Newborn Babies: A Quasi-experimental Study

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ABSTRACT

Background: Hypothermia is common in newborn born at hospitals (prevalence range, 32–85%) and homes (prevalence range, 11–92%), even in tropical environments. The lack of thermal protection is still an underappreciated major challenge for newborn survival in developing countries. **Aim:** The main was to assess the effectiveness of structured teaching programme (STP) on knowledge regarding maintenance of warm chain in the prevention of hypothermia in newborn babies among B.Sc. Nursing 4th-year students. **Methodology:** A quasi-experimental research design was used. A total of 116 students of B.Sc Nursing 4th-year were selected through convenient sampling. Self-structured questionnaire comprised 35 questions was used. After pre-test, STP was provided to the samples using powerpoint presentations. The post-test was conducted thereafter and knowledge scores of both pre-test and pot-test were compared. **Results:** In pre-test experimental group, 51 (87.9%) had average knowledge, 7 (12.1%) had below-average knowledge, whereas in post-test experimental group, 56 (96.6%) had good knowledge, and 2 (3.4%) had average knowledge. In pre-test control group, 49 (84.5%) had average knowledge, 9 (15.5%) had below-average knowledge, whereas in post-test control group 52 (89.7%) had average knowledge, and 6 (10.3%) had below average knowledge. It was found that there is significant change in post-test knowledge score of the experimental group with t value 62.916 at the degree of freedom at 57 at 0.05 level of significance. **Conclusion:** The findings concluded that the STP was effective in increasing knowledge of B.Sc nursing 4th-year students.

Keywords: Hypothermia, Knowledge, Structured teaching programme, Warm chain

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Introduction

Neonatal hypothermia is a factor contributing to morbidity and mortality risk of newborns has been recognized by the World Health Organization (WHO). Hypothermia has been defined by the WHO as body temperature below the normal range (36.5°C–37.5°C) and has been sub-classified into three grades: Mild (36.0°C–36.5°C), moderate (32.0°C–35.9°C), and severe (<32.0°C) hypothermia.^[1]

Hypothermia is associated with a number of adverse effects and complications. When the body temperature is below the normal level, the infant is at risk of cold stress. This can cause

complications such as increased oxygen consumption, lactic acid production, apnea, decrease in blood coagulability, and the most commonly seen hypoglycemia. In preterm infants, cold stress may also cause a decrease in surfactant secretion and synthesis. Letting infants get cold increases mortality and morbidity.^[2]

Hypothermia is common in infants born at hospitals (prevalence range, 32–85%) and homes (prevalence range, 11–92%), even in tropical environments. The lack of thermal protection is still an underappreciated major challenge for newborn survival in developing countries.^[3]

Mahvish Qazil, Najmus Saqib, Rohit Raina conducted a cross-sectional study on knowledge regarding the prevention of hypothermia in newborns among mothers in Northern India. The sample size of 108 post-natal mothers having LBW babies admitted in post-natal wards of Government Medical College, Jammu, Jammu and Kashmir, India, was included in the study. Pre-tested, pre-structured questionnaire was used as a research tool. Out of 108 mothers, maximum mothers were of age <25 years (51%), 60% were from rural areas, residing in the nuclear family was 62%. Mothers who attended hospital for confinement were 95% and 85% started breastfeeding their babies. About 45% had knowledge of keeping the baby warm by immediately wiping the baby, and only 3% of mothers had knowledge of Kangaroo Mother Care. Thus, the study concluded that training family members to support mothers in the provision of thermoprotection for their newborns could facilitate these practices. Those who fail to fully attend antenatal clinics should be targeted for newborn care education.^[4]

Neonatal hypothermia is increasingly recognized as a risk factor for newborn survival. The WHO recommends maintaining a warm chain and skin-to-skin care for thermoprotection of newborn children. The warm chain is a set of ten interlinked procedures carried out at birth and later, which will minimize the likelihood of hypothermia in all newborns. These are: Warm delivery room (>25°C), warm resuscitation, immediate drying, skin-to-skin contact between baby and the mother (the kangaroo method), breastfeeding (should start after half an hour), bathing and weighing postponed (postpone bath till next day and postpone weighing until baby is warm), appropriate clothing and bedding, mother and baby together (Rooming in) warm transportation, and training /awareness of healthcare providers.^[3]

Objectives

1. To assess the knowledge of B.Sc. Nursing 4th-year students regarding maintenance of warm chain in the prevention of hypothermia in newborn babies
2. To develop and administer a structured teaching programme (STP) to B.Sc. Nursing 4th-year regarding maintenance of warm chain in the prevention of hypothermia in newborn babies

3. To evaluate the effectiveness of STP regarding the maintenance of warm chain in the prevention of hypothermia in newborn babies
4. To compare the pre-test and post-test knowledge scores regarding maintenance of warm chain in the prevention of hypothermia in newborn babies
5. To find out the association between the levels of knowledge scores regarding maintenance of warm chain in the prevention of hypothermia in newborn babies with selected demographic variables.

Methodology

In this study, quantitative research approach and quasi-experimental research design were used to collect the data from the sample size of 116 B.Sc. Nursing 4th-year students and were willing to participate in the study. The study was conducted in the selected Nursing Colleges of Shimla, H.P.

A convenience sampling technique was used to select the study sample, and self-structured knowledge questionnaire was used to collect the data from the students. The questionnaire comprised two sections; section first had questions related to personal variables (age in years, academic qualification, name of the institution, previous knowledge, and source of the previous information regarding warm chain) while section two consisted self-structured questionnaire regarding warm chain and hypothermia which consists of 35 items. This tool consisted of multiple-choice questions regarding warm chain and hypothermia.

To ensure content validity the tool was submitted to 11 experts, in which five experts (four from nursing department and one obstetrician) were from obstetrics and gynecology department, and six experts (five from nursing department and one pediatrician) were from pediatric department.

Reliability of the tool was computed using the Karl Pearson's correlation coefficient formula. The reliability of structured knowledge questionnaire was found to be 0.87. Since the normal range is 0.5–0.9 so the tool was found to be reliable. Ethical approval was taken from the research and ethical clearance committee of Sister Nivedita Government Nursing College (SNGNC), Indira Gandhi Medical College (IGMC), Shimla, Himachal Pradesh. For conducting pilot study, permission was taken from Principals of Shimla Nursing College Annandale H.P and Modern Nursing College Annandale H.P. For final study, permission was taken from Principals of Shivalik College of Nursing Bhattakuffar Shimla H.P and Sister Nivedita Government Nursing College (SNGNC), IGMC, Shimla, H.P. Subjects were informed that their participation was purely on voluntary basis. The confidentiality of the information was maintained.

The analysis and interpretation of data were done according to the objectives and using descriptive and inferential statistics. Mean, frequency, standard deviation, mean

percentage, paired *t*-test, and Chi-square test determine the association between knowledge with selected variables were planned for analysis of obtained data. The level of significance chosen was $P = 0.001$, $P = 0.01$, and $P < 0.05$.

Results

Table 1 represents frequency and percentage distribution of B.Sc. Nursing 4th-year students according to their personal variables revealed that majority of the student's age in experimental group 34 (59%) were between 22 and 23 years of age, whereas in control group 33 (57%) were between 22 and 23 years of age. Academic qualification of B.Sc. Nursing 4th-year students in experimental group 58 (100%) was 12th pass, whereas in control group, 58 (100%) were 12th pass. Name of the Institution of B.Sc. Nursing 4th-year students in the experimental group 58 (100%) was from SNGNC, IGMSC Shimla, whereas in control group 58 (100%) were from Shivalik College of Nursing Bhattakufer Shimla. The previous knowledge of B.Sc. Nursing 4th-year

in experimental group 50 (86%) had previous knowledge regarding maintenance of warm chain, whereas in control group, 48 (83%) had previous knowledge regarding maintenance of warm chain. Source of the previous information among B.Sc. Nursing 4th-year students in the experimental group 34 (59%) is curriculum, whereas in control group, 22 (38%) is curriculum.

Table 2 depicts that in pre-test experimental group 0 (0%) had good knowledge, 51 (87.9%) had average knowledge, and 7 (12.1%) had below-average knowledge, whereas in post-test experimental group, 56 (96.6%) had good knowledge, 2 (3.4%) had average knowledge, and 0 (0%) had below-average knowledge. In pre-test control group, 0 (0%) had good knowledge, 49 (84.5%) had average knowledge, and 9 (15.5%) had below-average knowledge, whereas in post-test control group 0 (0%) had good knowledge, 52 (89.7%) had average knowledge, and 6 (10.3%) had below-average knowledge. Thus, it is concluded that there is an increase in the post-test knowledge scores of the experimental group as compared to the control group.

Table 1: Findings related to the frequency and percentage distribution of demographic variables. $n=116$

Socio-demographic variables	Experimental group ($n_1=58$)		Control group ($n_2=58$)	
	Frequency (f)	Percentage	Frequency (f)	Percentage
Age (in years)				
18–19 years	-	-	-	-
20–21 years	23	40	24	41
22–23 years	34	59	33	57
>23 years	1	2	1	2
Academic qualification				
12 th pass	58	100	58	100
Graduate	-	-	-	-
Any other	-	-	-	-
Name of the institution				
SNGNC, IGMSC Shimla	58	100	-	-
Shivalik College of Nursing	-	-	58	100
Previous knowledge				
Yes	50	86	48	83
No	8	14	10	17
Source of the previous information				
Curriculum	34	59	22	38
Mass media	12	21	20	34
Workshop/conference/seminar/teaching	4	7	6	10
Any other specify/no source	8	14	10	17

Table 2: Pre/post-test knowledge scores of B.Sc Nursing 4th-year students regarding maintenance of warm chain among experimental and control group. $n=116$. ($n_1=58$, $n_2=58$)

Criteria for assessing knowledge score				
Score level	Pre-test		Post-test	
	Experimental group (%)	Control group (%)	Experimental group (%)	Control group (%)
Good (25–35)	0 (0)	0 (0)	56 (96.6)	0 (0)
Average (13–24)	51 (87.9)	49 (84.5)	2 (3.4)	52 (89.7)
Below average (0–12)	7 (12.1)	9 (15.5)	0 (0)	6 (10.3)

Maximum score=35, minimum score=0

Table 3 shows a comparison within the group with paired *t*-test. In the experimental group, the mean post-test knowledge score of B.Sc. Nursing 4th-year students was 30.53 and mean pre-test knowledge score was 16.09 with mean difference of 14.44 which was found to be statistically significant as evidence from *t*-value 62.916* for df (57) at $P \leq 0.05$ level of significance. In control group, the mean post-test knowledge score of B.Sc. Nursing 4th year students was 15.76 and mean pre-test knowledge score was 15.41 with mean difference of 0.62 which was found to be statistically non-significant as evidence from *t*-value 1.288 for df (57) at $P \leq 0.05$ level of significance.

Table 3 shows comparison between the groups with unpaired *t*-test, The mean pre-test knowledge scores of B.Sc Nursing 4th-year students in the experimental group was 16.09 and pre-test knowledge scores of control group was 15.41 with mean difference 0.68 which was found to be statistically non-significant as evident from *t*-value of 1.549 for df 114 at $P \leq 0.05$ level of significance. The mean post-test knowledge scores of B.Sc. Nursing 4th-year students in the experimental group were 30.53 and post-test knowledge scores of control group were 15.76 with mean difference 14.77 which was found to be statistically significant as evident from *t*-value of 34.887* for df 114 at $P \leq 0.05$ level of significance.

Thus, the above table concludes that there is significant increase in the mean knowledge scores of the experimental group in the post-test as compared to the mean knowledge scores of the control group in the post-test. Hence, it was found that the STP was effective in improving the post-test knowledge scores in the experimental group and also the alternative hypothesis (H1) was accepted. H1: There will be a significant difference between the pre-test and post-test knowledge scores on warm chain among B.Sc. Nursing 4th-year students. Association of knowledge score of adults with selected personal variables was computed using inferential statistics, i.e., Chi-square which revealed that there is a significant association of knowledge score with age and previous knowledge of the selected sample.

Discussion

The present study was done to assess the knowledge regarding the maintenance of warm chain in the prevention

of hypothermia in newborn babies among B.Sc. Nursing 4th-year students of Selected Nursing Colleges of Shimla, H.P. The present study according to the first objective revealed that in pre-test experimental group none of the subjects had good knowledge, 51 (87.9%) had average knowledge, 7 (12.1%) had below-average knowledge, and none of the subjects had good knowledge, whereas in control group none of the subjects had good knowledge, 49 (84.5%) had average knowledge, and 9 (15.5%) had below-average knowledge. In post-test experimental group, 56 (96.6%) had good knowledge, 2 (3.4) had average knowledge, and 0 (0%) had below-average knowledge, whereas in control group 0 (0%) had good knowledge, 52 (89.7%) had average knowledge, and 6 (10.3%) had below-average knowledge.

The another study was conducted by Bhandari *et al.*, (2008), to evaluate the effectiveness of planned teaching program (PTP) on knowledge of mothers on prevention of hypothermia among newborns in selected hospitals of Belgaum, Karnataka. Thirty post-natal mothers were selected by nonprobability sampling and pre-test questionnaire was administered through structured interview schedule. The post-test mean knowledge score, i.e., 29.7% was apparently higher than pre-test mean knowledge scoring, i.e., 17.9%. The study concluded that the PTP was the best teaching strategy as it has enhanced the knowledge of mothers on the prevention of hypothermia.^[5]

The second, third, and fourth objective was to develop and administer STP, to evaluate the effectiveness of STP and to compare the pre-test and post-test knowledge scores regarding maintenance of warm chain in the prevention of hypothermia in newborn babies. In experimental group, the mean difference between post-test and pre-test was 14.44 which was found to be statistically significant as evidence from *t*-value 62.916* for df (57) at 0.05 level of significance. In the control group, the mean difference between post-test and pre-test was 0.35 which was found to be statistically non-significant as evidence from *t*-value 1.288 for df (57) at 0.05 level of significance. The mean difference between pre-test knowledge score of experimental and control group was 0.68 which was found to be statistically non-significant as evident from *t*-value of 1.549 for df 114 at 0.05 level of significance. The mean difference between post-test knowledge score

Table 3: Comparison within the group with paired *t*-test and comparison between the groups with unpaired *t*-test regarding maintenance of warm chain. $n=116$. ($n_1=58$, $n_2=58$)

Group	<i>n</i>	Knowledge score				Paired <i>t</i> -test		
		Pre-test		Post-test		df	T	Result
		Mean	SD	Mean	SD			
Experimental group	58	16.09	2.138	30.53	1.635	57	62.916	Significant*
Control group	58	15.414	2.520	15.76	2.780	57	1.288	Non-significant
Unpaired <i>t</i> -test	df	114		df	114			
	<i>t</i>	1.549		T	34.887			
	Result	Non-significant		Result	Significant*			

Maximum score=35, minimum score=0. *Level of significance $P \leq 0.05$

of the experimental and control group was 14.77 which was found to be statistically significant as evident from t-value of 34.887* for df 114 at 0.05 level of significance. Hence, it is concluded that the STP was effective in improving the knowledge of B.Sc Nursing 4th-year in post-test.

The fifth objective was to find out the association between the levels of knowledge scores regarding maintenance of warm chain in the prevention of hypothermia in newborn babies with selected demographic variables. The study revealed that in pre-test knowledge of the experimental group regarding maintenance of warm chain among B.Sc Nursing 4th-year was significantly associated with the previous knowledge (0.017* df 1) at $P < 0.05$ and there was no significant association of pre-test knowledge scores of the experimental group with age, name of institution, academic qualification, and source of previous information. In pre-test knowledge score of control group regarding maintenance of warm chain among B.Sc Nursing 4th year was significantly associated with age in years (0.007* df 2) at $P \leq 0.05$ and there was no significant association of pre-test knowledge scores of control group with an academic qualification, name of the institution, previous knowledge, and source of the previous information.

A similar study was conducted by Tambakad and Sumitra (2015) to assess the effectiveness of PTP on knowledge regarding prevention of neonatal hypothermia among post-natal mothers. Data collection was done through structured knowledge questionnaire the mean post-test knowledge score (36.6) was higher than the mean pretest knowledge score (17.9). There was significant gain in knowledge of post-natal mothers and is statistically significant at $P \leq 0.05$ level of significance.^[6]

Conclusion

On the basis of findings of the study, it is concluded that there was a significant increase in the post-test knowledge of experimental group. Hence, STP was found to be effective to enhance the knowledge of the students.

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