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A study to assess the knowledge, attitude, and practice regarding maintenance of warm chain for prevention of hypothermia of newborns among nursing personnel at labor rooms of selected health care facilities of West Bengal

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Abstract

Aim: To assess the knowledge, attitude, and practice regarding the maintenance of warm chain for the prevention of hypothermia of newborns among nursing personnel.

Design: Descriptive survey research design.

Methods: A descriptive survey approach with KAP conceptual framework model was used with 106 samples from selected Murshidabad District health care facilities using a non-probability purposive sampling technique, validated Structured Knowledge questionnaire, 5-point Likert scale, and observation checklist. Collected data were analyzed by using descriptive and inferential statistics.

Results: The mean and SD scores of the knowledge, attitude, and practice of nursing personnel were 15.6 (± 2.5), 45.3 (± 3.1), and 7.5 (± 0.7) respectively. The study revealed that 76.4% of respondents had average knowledge, 75% had moderately favorable attitudes and satisfactory practice was observed among 88.7% of nursing personnel.

Conclusion: There was a significant positive correlation between knowledge and practice ($r=0.4$, $t = 4.47$), and attitude and practice ($r= 0.5$, $t = 5.92$) regarding the maintenance of the warm chain at 0.01 level of significance.

Implication for the profession: In the clinical area the study will help increase knowledge, and confidence and improve necessary skills for effective practice and quality care.

Implication for practice/policy- Nursing personnel are directly involved in newborn care so they can use the knowledge regarding prevention of hypothermia, to prevent hypothermia. On the other hand, nursing personnel have the opportunity to educate the mother in the prevention of hypothermia.

Impact: It has a great implication in the practical field to increase awareness, create confidence, and enhancement of necessary skills. Periodical training will help to maintain the standard of practice.

Keywords: Hypothermia, knowledge, attitude, practice, newborn, nursing personnel

1. Introduction

Hypothermia is one of the major causes of newborn mortality and morbidity. The World Health Organization (WHO) considers hypothermia a “silent killer” during the neonatal period (Qazi *et al.*, 2019) [6]. The ambient temperature in a delivery room is approximately 10 degree less than the intrauterine temperature, so thermoregulation in clinical area is very much needed (Maniraju *et al.*, 2018) [2]. The important causes of hypothermia are physiological characteristics of newborn, ignorance about newborn care, cold environment, separation from the mother. Various signs of hypothermia are lethargy, cold skin to touch, weak cry, slow heart rate, irregular respiration (Qazi *et al.*, 2019) [6]. Neonatal hypothermia has major consequences likes hypoxic ischemic encephalopathy, accounts for approximately 23% of the four million annual neonatal deaths globally. Of the infants who survive 25% to 55% will suffer significant neurologic sequelae. (Openyamungu, 2017) [4]. Immediately after delivery if no action is taken to prevent hypothermia, the core and skin temperatures of a newborn can decrease at a rate of approximately 0.1 °C and 0.3 °C per minute respectively (Philip *et. al.*, 2019) [5]. Newborns are not able to maintain their thermoregulation by their own without thermal protection.

2. Background

WHO recommends maintaining a warm chain and skin-to-skin care of thermo-protection of newborns. No as such information is present about the practices related to newborn hypothermia (Lunze *et al.*, 2013) ^[1]. Thermal control remains poor in newborns due to immature thermoregulatory center and newborns become vulnerable to hypothermia especially premature babies, intrauterine growth retardation and low birth weight babies and even in normal babies the common consequences of neonatal hypothermia are hypoxia, hypoglycemia, respiratory distress, neonatal jaundice, sudden infant death syndrome. These are results from poor knowledge and practice of health personnel (Openyamungu, 2017) ^[4]. It is estimated that almost 99% of newborn deaths in the world occur primarily in Sub-Saharan Africa and South Asia. India contributes 76.6% to the regional burden of neonatal death. Newborns are vulnerable to become hypothermic especially at the time of delivery because the baby is soaked with amniotic fluid just after delivery. Once the baby is born it starts to lose heat immediately in the following ways: conduction, convection, evaporation and radiation (i.e. hypothermia).

3. The study

3.1 Aims

This study aims to

- assess the knowledge regarding maintenance of warm chain for prevention of hypothermia of newborns among nursing personnel.
- determine the attitude of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn
- identify the practice regarding maintenance of warm chain for prevention of hypothermia of newborn among nursing personnel.
- iv. find out correlation between knowledge and practices regarding maintenance of warm chain for prevention of hypothermia of newborn among nursing personnel.
- find out co-relation between attitude and practices regarding maintenance of warm chain for prevention of hypothermia of newborn among nursing personnel.

4. Methods

4.1 Research Design

This descriptive survey research design with KAP Model as conceptual framework was conducted between 7th February 2022 to 4th march 2022.

4.2 Research Approach

Non-experimental quantitative research approach was adopted for this present study in order to fulfill the objectives of the study.

4.3 Variables under study

4.3.1 Research variable

The research variable included

- Knowledge regarding maintenance of warm chain for prevention of hypothermia of newborn.
- Practice regarding maintenance of warm chain, for prevention of hypothermia of newborn.
- Attitude regarding maintenance of warm chain for

prevention of hypothermia of newborn.

4.3.2 Demographic variables

- Age
- Educational Qualification
- Year of nursing service
- Year of experience in labour room.
- Any training related to prevention of hypothermia. (MAA, SBA, SKILL LAB NSSK)

4.4 Population

In this study population referred to all nursing personnel working at labor room of public health care facilities in West Bengal.

4.5 Sample

In this study samples were nursing personnel working at labor room of selected public health care facilities under Murshidabad District, in West Bengal

4.6 Setting and sampling

Pilot study was conducted from 10.1.2022 to 15.1.22 in labour room of North Bengal Medical College & Hospital, Sushrutanagar, Darjeeling and final study was conducted from 7.2.2022 to 4.03.2022 at Jangipur Sub Divisional Hospitals and Sagardighi, SSH, Rajanagar (Raghunathganj I), Teghory (Raghunathganj II), Ahiron (suti I) Mohisail, (suti II), Anupnagar BPHC of Jangipur Sub Division. Murshidabad Medical College, Murshidabad, West Bengal.

106 respondent were selected through non-probability purposive sampling technique. This technique was adopted in present study as researcher had some limitation in respect of time, work force and accessibility for randomly selected the entire population. So, the sample were selected on the basis of availability, accessibility, and purposive judgment of the researcher. The sample size was calculated on the basis of 50% prevalence of hypothermia among newborn, 95% confidence interval and 10% margin error. The formula used for sample size calculation is as below

$$n = z^2 * p(1-p) / m^2$$

n = Required sample size z = Confidence level at 95% (Standard value = 1.96)

P = Estimated prevalence of hypothermia among newborn (considering 50% = 0.5),

m = Margin of error at 10% = 0.1

$$n = z^2 * p(1-p) / m^2 \quad n = (1.96)^2 * 0.5(1-0.5) / (0.1)^2$$

$$n = 3.84 * (0.5 * 0.5) / 0.01$$

$$n = 96$$

By adding 10% mortality

Required sample size (n) = 96 + 9.6 n = 105.64

$$n = 106$$

4.7 Inclusion criteria

Nursing Personnel, working at labor room of all health care facilities of Jangipur subdivision & Murshidabad Medical College and Hospital.

4.8 Exclusion criteria

- Nursing personnel working in postnatal ward & SNCU
- Nursing personnel who are chronically ill

4.9 Data collection tools

A Semi structured questionnaire (Tool I) was developed to obtain background data of Nursing personnel. Tool II, A Structured Knowledge questionnaire for assessing Knowledge regarding maintenance of warm chain for prevention of hypothermia of newborns among nursing personnel. Tool III, Attitude scale (5-Point Likert scale) to assess the attitude regarding maintenance of warm chain for prevention of hypothermia in newborns. Observation Checklist to assess the practice of nursing personnel regarding the maintenance of warm chain for prevention of hypothermia of newborn. Content and construction validity of the tools were established by 9 experts from Department of Obstetrics and Gynecology. The reliability of the tool II, III and IV was established by using Split half method, Interrater method and Cronbach’s Alpha respectively.

4.10 Ethical and Administrative Permission

Ethical permission was taken from Institutional Ethics Committee of North Bengal Medical College, Durrutia and required administrative permissions were received from every single authority wherever necessary. Informed consent from the respondents was collected before the interview took place.

4.11 Data analysis and interpretation

The data were planned to be analyzed by using descriptive and inferential statistics, after data collection from 106 nursing personnel, data were coded and tabulated and master data sheet was prepared. Data were planned to be described using frequency & percentage distribution for selecting sample characteristics data. Mean, Median and standard deviation was calculated. Correlation coefficient to find out the relation between knowledge, attitude and practice. Analyzed data presented in the form of tables, pie diagram and bar diagram based on findings.

- To assess the knowledge regarding maintenance of warm chain for prevention of hypothermia of newborn among nursing personnel.
- To determine the attitude of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn among nursing personnel.
- To identify the practice regarding maintenance of warm chain for prevention of hypothermia of newborn among nursing personnel.
- To find out correlation between knowledge and practices regarding maintenance of warm chain for prevention of hypothermia of newborn among nursing personnel.

To find out correlation between attitude and practices regarding maintenance of warm chain for prevention of hypothermia of newborn among nursing personnel.

5. Results

5.1 Demographic characteristics of nursing personnel at labor room of different health care facility of Murshidabad District.

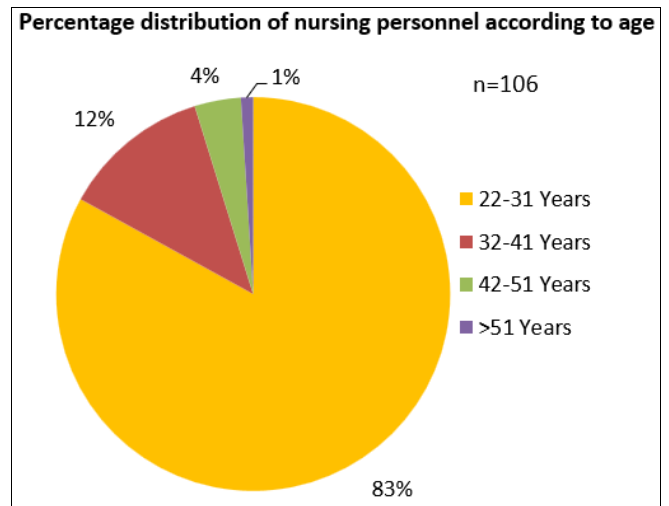


Fig 1: Pie diagram showing the percentage distribution of nursing personnel according to age

Data presented in fig 1 depict that 83% (88) of nursing personnel were within the age group of 22-31 years, 12.2% (13) of nursing personnel were between 32 to 41 years, 3.8% (4) nursing personnel were 42 to 51 years and 1% (1) nursing personnel were more than 51 years of age.

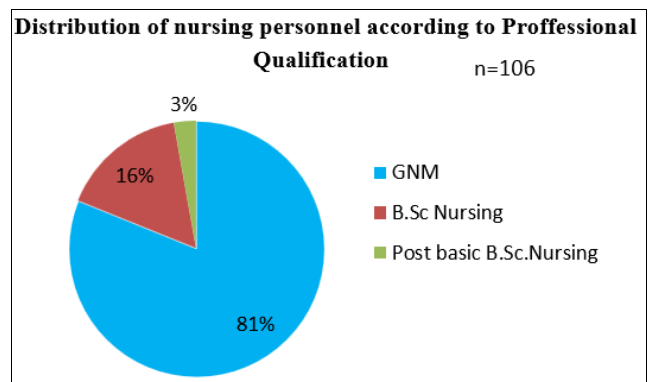


Fig 2: Pie diagram showing the percentage distribution according to professional qualification

Data depicted in fig.2 shows that 81.1% (86) nursing personnel were GNM passed and only 16.1% (17) nursing personnel were BSc nursing passed and 2.8% (3) nursing personnel were Post Basic B.Sc. nursing passed.

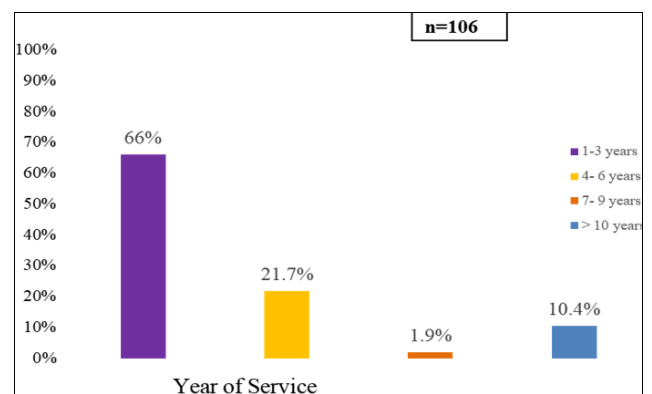


Fig 3: Bar diagram showing the percentage of nursing personnel according to Service experience

Data presented in fig. 3 showed that the 66% (70) nursing personnel had 1 to 3 year of service experience, 21.7% (23) nursing personnel had 4 to 6 years of service experience. 10.4% (11) nursing personnel had more than 10 years' service experience and 1.9% (2) nursing personnel had 7 to 9 years of service experience.

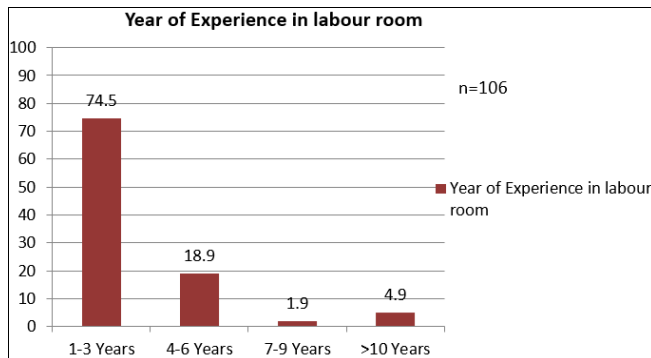


Fig 4: Bar diagram showing the percentage distribution of nursing personnel according to Year of experience in labour room.

Data presented in, fig 4 showed that 74.5% (79) nursing personnel had 1 to 3 years of labour room experience, 18.9% (20) had 4 to 6 years of labour room experience, 4.7% (5) nursing personnel had more than 10 years of labour room experience and only 1.9% (2) nursing personnel had more than 7 to 9 years of labour room experience.

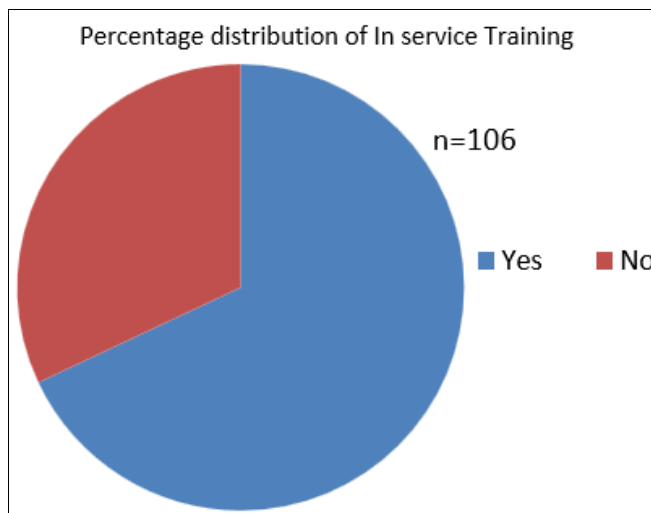


Fig 5: Pie diagram showing the percentage distribution of nursing personnel according to in-service training.

Fig 5 presented that 72 (68%) nursing personnel had attended in-service training, 34 (32%) had not attended any in-service training programme.

Data depicted in fig 6 showed that 32% (23) nursing personnel attended only SBA training, 24% (17) nursing personnel attended only skill lab training, 15% (11) nursing personnel attended only NSSK, 1% (1) nursing personnel attended only MAA training programme and 28% (20) nursing personnel attended more than one in -service training.

5.2 Findings related to knowledge of nursing personnel regarding maintenance of warm chain for the prevention of

hypothermia of newborns.

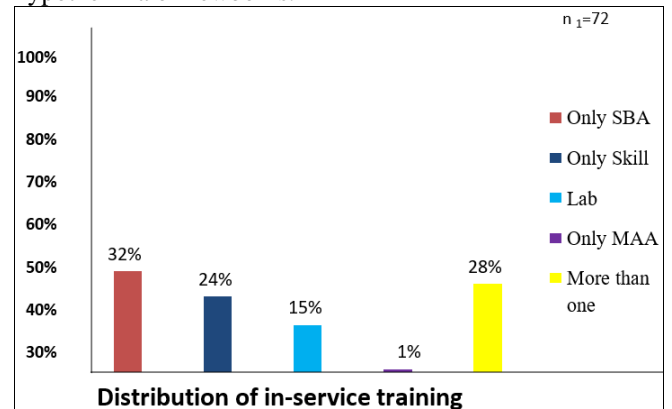


Fig 6: Diagram showed the percentage distribution of nursing personnel according to in-service training.

Table 1: Frequency & percentage distribution of the level of knowledge score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. n=106

Level of Knowledge	Score	Frequency	Percentage.
Good	>18	14	13.2
Average	13 to 18	81	76.4
Poor knowledge	< 13	11	10.4

Minimum possible score 0 Maximum possible score 20

It is evident from table 1, that 76.4% (81) of nursing personnel had average knowledge 13.2% (14) had good knowledge and 10.4% (11) had poor knowledge regarding maintenance of warm chain for prevention of hypothermia of newborn.

Table 2: Range, Mean, Median & Standard deviation of knowledge score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. n=106

Variable	Obtained range	Mean	Median	SD
Knowledge	10-20	15.6	16	± 2.5

Maximum possible score 20 Minimum possible score 0

The data presented in table no 2 revealed that the knowledge score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn was obtained range 10-20, Mean 15.6, Median was 16 and Standard Deviation ± 2.5

So, it can be inferred that knowledge of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn was normally distributed with mild dispersion as evident by SD value of ± 2.5.

Table 3: Area wise knowledge score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. n=106

Area of knowledge	Maximum possible score	Mean	Median	SD	Mean score percentage	Rank
Hypothermia	12	9.3	9.5	±1.96	77.5	2 nd
KMC (Skin to skin)	3	2.4	2	±0.59	80	1 st
Regulation of body Temperature	1	.75	1	±0.43	75	4 th
Procedure related to warm chain	4	3.1	3	±0.84	76	3 rd

Minimum score obtained 10 Maximum score obtained 20

Data presented in table 3 showed that in the area of knowledge regarding KMC (skin to skin contact) maximum possible score was 3, mean was 2.4, median was 2, so it can be said that data in this area was normally distributed with mild dispersion as SD value was 0.59 In this area mean percentage was 80 which ranked as first.

Data presented in table 3 showed that in the area of knowledge regarding hypothermia maximum possible score was 12, mean was 9.3, median was 9.6,

so it can be said that data in this area were normally distributed with mild dispersion as SD value was 1.96. In this area Mean percentage was 77.5 which ranked as second.

Data presented in table 3 showed that in the area of knowledge regarding procedure related to warm chain, maximum possible score was 4, mean was 3.1, median was 3, so it can be said that data in this area was normally distributed with mild dispersion as SD value was 0.84. In this area Mean percentage was 76 which ranked as third.

Data presented in table 3 showed that in the area of knowledge regarding regulation of body temperature maximum possible score was 1, mean was 8, median was 1, so it can be said that data in this area was normally distributed with mild dispersion as SD value was 0.43. In this area Mean percentage was 75 which ranked as fourth.

5.3 Findings related to the level of attitude of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn.

It is evident from table 4 that 75% (79) nursing personnel had moderately favourable attitude, 15% (16) nursing personnel had unfavourable attitude and only 10% (11) had favourable attitude regarding maintenance of warm chain

Table 6 Area wise attitude score distribution attitude of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn n=106.

Area of attitude	Maximum possible score	Mean	Median	SD	Mean Percentage	Rank
Attitude regarding maintenance of warm environment	10	9.2	9	±0.72	92	2 nd
Attitude regarding prevention of hypothermia during delivery.	35	31.3	32	±2.4	89	3 rd
Attitude regarding transportation of newborn to postnatal unit/ SNCU	5	4.8	5	±0.52	96	1 st

Minimum score obtained 37 Maximum score obtained 50

Data presented in table 6 showed that in the area of attitude regarding maintenance of warm environment maximum possible score was 10, mean was 9.2, median was 9, so it can be said that data in this area was normally distributed with mild dispersion as SD value was 0.72. In this area mean percentage was 92 which ranked as second.

Data presented in table 6 showed that in the area of attitude regarding prevention of hypothermia during delivery maximum possible score was 35, mean was 31.3, median was 32, so it can be said that data in this area was normally distributed with mild dispersion, as SD value was 2.4. In this area mean percentage was 89 which ranked as third.

5.4 Findings related to the level of practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn.

It is evident from table 7 that 88.7% (94) nursing personnel had satisfactory practice, 7.5% (8) nursing personnel had fully satisfactory practice and 3.8% (4) had unsatisfactory practice regarding maintenance of warm chain for prevention of hypothermia of newborn.

for prevention of hypothermia of newborn.

Table 4: Frequency and percentage distribution of the level of attitude of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. n=106

Level of attitude	Score	Frequency	Percentage
Favourable	> 48	11	10
Moderately favourable	42 to 48	79	75
Unfavourable	< 42	16	15

Minimum possible score 10 Maximum possible score 50

Table 5: Range, Mean, Median & Standard deviation of attitude of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. n=106

Variable	Obtained range	Mean	Median	SD
Attitude	37-50	45.3	46	± 3.1

Minimum possible score 10 Maximum possible score 50

The data presented in table no 5 revealed that, the attitude score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn was obtained range 37-50 with Mean 45.3, Median was 46, and Standard Deviation ± 3.1.

So it can be inferred that attitude score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn was normally distributed with mild dispersion as evident by SD value of ± 3.1.

Data presented in table 6 showed that in the area of attitude regarding transportation of newborn to postnatal unit/ SNCU, maximum possible score was 5, mean was 4.8, median was 5, so it can be said that data in this area was normally distributed.

Table 7: Frequency & percentage distribution of the level of practice score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn n=106

Level of practice	Score	Frequency	Percentage
Fully satisfactory	>8	8	7.5
Satisfactory	7 to 8	94	88.7
Unsatisfactory	< 7	4	3.8

Minimum possible score 0 Maximum possible score 11

Table 8: Range, Mean, Median & standard deviation of practice score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. n=106

Variable	Obtained range	Mean	Median	SD
Practice	6-9	7.5	7	± 0.7

Minimum possible score 0 Maximum possible score 11

The data presented in table no 10 revealed that, the practice score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn was obtained range 6-9, mean 7.5, median was 7 and Standard Deviation± 0.7

So, it can be inferred that practice score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn was normally

distributed with mild dispersion as evident by SD value of ± 0.7 .

Table 9 Area wise practice score of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn n=106

Area of practice	Maximum possible score	Mean	Median	SD	Mean Percentage	Rank
Practice during delivery	4	3.5	4	± 0.5	88	2 nd
Practice after delivery	6	2.9	2	± 1	49.2	3 rd
Practice during transportation of newborn	1	.96	1	± 0.2	96	1 st

Minimum score obtained 6 Maximum score obtained 9

Data presented in table 9 showed that in the area of practice during transportation of newborn to postnatal unit/ SNCU maximum possible score was 1, mean was 0.96, median was 1, So it can be said that data in this area was normally distributed with mild dispersion as SD value was 0.2. In this area mean percentage was 96 which ranked as first.

Data presented in table 9 showed that in the area of practice during delivery regarding maintenance of warm environment maximum possible score was 4, mean was 3.5, median was 4, so it can be said that data in this area was normally distributed with mild dispersion as SD value was 0.5. In this area mean percentage was 88 which ranked as second.

Data presented in table 9 showed that in the area of practice regarding prevention of hypothermia after delivery maximum possible score was 6 mean was 2.9 median was 2. So it can be said that data in this area was normally distributed with mild dispersion as SD value was 1(one).

In this area mean percentage was 49.2 which ranked as 3rd.

5.5 Findings related to correlation between knowledge and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn.

Table 10: Correlation co-efficient between knowledge and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. n=106

Variable	Mean	'r'	't' value
Knowledge	15.6	0.4	4.47**
Practice	7.5		

t' (df n-2) = 2.62, p < 0.01

The data presented in table 10 shows that mean knowledge score of nursing personnel were 15.6 and mean practice score of nursing personnel were 7.5. Calculated 'r' value between knowledge and practice score was 0.4 which shows that there was weakly positive correlation between knowledge and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn and it was significant correlation at 0.01 level of significance as evident by 't' value 4.47 which was more than table value at df 104 at 0.01 level of significance. So, it can be concluded that knowledge of nursing personnel is significantly correlated with practice.

So, research hypothesis (H1) can be developed as there is significant correlation between knowledge and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn, at 0.01 level of significant.

5.6 Findings related to correlation coefficient between attitude and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia

of newborn.

Table 11 Correlation - co-efficient between attitude and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. n=106

Variable	Mean	'r'	't' value
Attitude	45.3	0.5	5.92**
Practice	7.5		

t' (df n-2) = 2.62, p < 0.01

The data presented in table 13 shows that mean attitude score of nursing personnel was 45.3 and mean practice score of nursing personnel was 7.5. Calculated 'r' value between knowledge and practice score was 0.5 which shows that there was weakly positive correlation between attitude and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn and it was significant correlation at 0.01 level of significance as evident by 't' value 5.92 which was more than table value at df 104 at 0.01 level of significance. So, it can be concluded that attitude of nursing personnel is significantly correlated with practice.

So, research hypothesis(H2) can be developed as there is significant correlation between attitude and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn.at 0.01 level of significance.

6. Discussion

6.1 Discussion related to knowledge of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn

The present study shows that the nursing personnel have average knowledge 76.4%, good knowledge 13.2% and poor knowledge 10.4% regarding maintenance of warm chain for prevention of hypothermia of newborn. Mean knowledge score 15.6 with Standard Deviation ± 2.5 .

A similar study by Maniraju *et al.* (2017) [2] was conducted to assess the knowledge and practice of staff nurses regarding thermoregulation of neonates at selected Hospital at Mysuru. The study was conducted among 60 staff nurses and the findings revealed that 66.6% had average knowledge, good knowledge 16.7% and poor knowledge 16.7%. The total knowledge questionnaire mean value 19.9 and S.D was 0.860. Another similar study conducted by Dr. Kawther Mohammed Mokhtar *et al.* (2017) [3]. A descriptive cross-sectional study was conducted at Omdurman maternity hospital and National Ribat teaching hospital. Purpose of the study to assess knowledge and practice of nurses regarding neonatal hypothermia. Result showed that 72.73% had good knowledge. So the present study is supported by both the studies.

6.2 Discussion related to practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn.

In this present study majority of nursing personnel were doing satisfactory practice (88.7%), 7.5% were doing fully satisfactory practice and only 3.8% doing unsatisfactory practice.

Similarly, Moniraju *et al.*, also shows in their study that 96.6% had good practice and only 3.4% had poor practice regarding thermoregulation of neonates.

Similarly, Sunita Lairikyengbam *et al.* (2021) [7] had conducted this study by using descriptive research design and convenience sampling technique for obtaining adequate sample for the study. Study sample were 60 nurses in selected hospitals of Kamrup (M) The result revealed majority (62%) of nursing personnel had fair practice, 38% had good practice and there was no poor practice on prevention of neonatal hypothermia.

- Mean of practice score 9.20
- Standard deviation ± 1.31

So, the present study is supported by the both studies.

6.3 Discussion related to correlation between knowledge and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn.

In present study, there was significant positive correlation coefficient (calculated $r = 0.4$) between knowledge and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn at 0.01 level of significance.

Similarly, Sunita Lairikyengbam *et al.* (2021) [7] had conducted a study by using descriptive research design and convenience sampling technique for obtaining adequate sample for the study. Study sample were 60 nurses in selected hospitals of Kamrup (M). Their study revealed that the mean score of knowledge was 15.20 ± 3.74 and the mean score of practice was 9.20 ± 1.31 . The calculated Karl Pearson's Correlation Value of $r = 0.259$ shows a positive correlation between knowledge and practice score.

Similarly, another study by Moniraju *et al.* inferred that there was a significant relation between knowledge and practice of staff nurses regarding thermoregulation of neonates, their study findings revealed that there was significant relationship between the knowledge and practices of staff nurse as their calculated 'r' (3.86) value was greater than table value $r(58) = 0.273$.

In present study findings are supported by both the studies conducted by Sunita Lairikyengbam *et al.* and Mr. Maniraju *et al.*, study findings.

7. Conclusion

Nursing personnel have average knowledge regarding maintenance of warm chain for prevention of hypothermia of newborn, the lowest knowledge was identified in late sign of hypothermia, postponing bathing, initiation of breastfeeding, methods of transportation, minimum session of KMC.

Majority of nursing personnel have moderate positive attitudes. Majority of nursing personnel practice satisfactorily. But, lowest practice have been observed after delivery like postpone weighing up to stable body temperature, initiation of breast milk within 1 hour after

birth, bedding in, head and feet of newborn cover with front open cotton cloth.

There is positive correlation coefficient between knowledge and practice of nursing personnel regarding maintenance of warm chain for prevention of hypothermia of newborn. Practice regarding maintenance of warm chain for prevention of hypothermia of newborn is positively influenced by their knowledge and attitude regarding maintenance of warm chain for prevention of hypothermia of newborn.

8. Implication of the study

It has a great implication at clinical area to increase knowledge, increase confidence and improvement of necessary skills for effective practice and quality care. This study is an evidence for health care facilities and provides many evidence based data and statistical analysis which can be very well helpful to newer evidence-based strategies for prevention of hypothermia.

8.1 Implication for nursing education

Education and repeated training of the nursing personnel are needed in the different area of quality care specially prevention of hypothermia. Several measures should be taken for updating knowledge and developing skilled manpower in health care delivery system. Nursing curriculum should provide opportunity to plan and conduct teaching programme on this regard in different setting like level I, II, III. In regular basis so, nursing personnel remain up-to date regarding the knowledge of prevention of hypothermia.

8.2 Implication on nursing administration

In different health care level (I to level III) supervisor can make supervisory round in different area like labour room, postnatal ward, SNCU covering the different aspects of this study by giving emphasis on maintaining warm chain for prevention of hypothermia. so it will help to improve the quality of care as a whole.

8.3 Implication for nursing practice

It has a great implication in clinical field because nursing personnel are directly involved in newborn care so they can use the knowledge regarding prevention of hypothermia to prevent hypothermia. On other hand nursing personnel has got the opportunity to educate the mother to prevent hypothermia.

8.4 Implication on nursing research

It will be important to conduct research into other factors that influence maintenance of warm chain for prevention of hypothermia and provide various information for making necessary planning strategies to prevent hypothermia. Evidence based direction of this study may help to enhance research initiatives at various health care setting. These study findings would be utilized as a reference for further research.

9. Limitations

The limitation of the study

- The study was confined to nursing personnel working in labour room.
- The study has been based on data collected from different health facility, Block Primary Health Centre,

Super Specialty Hospital, Medical College & Hospital. Hence staff strength, equipment supplies, working load may not be same.

- The study findings should not be generalized because of the non-probability purposive sampling technique.
- Researcher had self-developed structure questionnaire to collect data. So, responses were restricted.

10. Recommendations

The following recommendations can be offered for further research

- The study can be replicated on large sample to generalize the findings.
- A study may be conducted to assess the knowledge, attitude and practice of staff nurses working at postnatal ward.
- A study may be conducted to assess the knowledge, attitude and practice by using different tool (standardized tool).
- The study can be replicated on different setting.
- A comparative study can be conducted between level I and level II health care setting.
- A planned teaching program can be conducted to improve the knowledge, attitude and practice regarding warm chain maintenance for prevention of hypothermia.

11. Conflict of interest

Not available

12. Financial support

Not available

13. Reference

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