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Evaluating the Effect of Structured Lecture-Cum-Demonstration Method on Maternal Knowledge and Practice of Newborn Care Among the Primiparous Postnatal Mothers: A Kirkpatrick's Four-Level Model Approach

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ABSTRACT

Background: In a developing country like India, neonatal mortality is a significant public health concern due to preventable causes like infections, hypothermia, and poor hygiene. Lack of maternal knowledge and inadequate newborn care practices are major contributors to this. Therefore, it is very crucial to implement structured educational strategies that combine both theoretical knowledge and hands-on practice to improve maternal skills in neonatal care. The Kirkpatrick model evaluates educational interventions through reaction, learning, behavior, and results.

Objective: To evaluate the effect of structured lecture-cum-demonstration method on the knowledge and practice levels of primiparous postnatal mothers regarding selected aspects of neonatal care.

Methods: This study used quantitative quasi-experimental research approach and one-group pre-test post-test design. It involved 40 primiparous postnatal mothers from a tertiary health care, India. A non-probability purposive sampling technique was used. Data were collected using the structured knowledge questionnaires and observational checklists. The structured lecture-cum-demonstration method consisted of hand hygiene, thermoregulation, breastfeeding, care of umbilical cord, immunization, and identification of dangerous neonatal signs. Data were analyzed using descriptive statistics and inferential tests (paired t-test and chi-square). Statistical significance was considered at p-value <0.05.

Results: The structured lecture-cum-demonstration method significantly improved knowledge and practice scores among the primiparous postnatal mothers. The mean knowledge score increased from 13.40±2.25 to 27.33±2.25 ($t = 22.29$, $p < 0.05$), and the mean practice score improved from 5.85±1.33 to 13.20±1.21 ($t = 22.14$, $p < 0.05$). Educational status had a significant association with baseline knowledge related to newborn care.

Conclusion: The structured lecture-cum-demonstration method significantly improved the knowledge and practice related to neonatal care among the primiparous postnatal mothers, where baseline knowledge was impacted by maternal educational level.

Keywords: Lecture-cum-demonstration, Maternal knowledge, Newborn care practice, Postnatal mothers, educational intervention, Kirkpatrick's model.

INTRODUCTION

A healthy newborn was born between 38-42 weeks of gestation, had spontaneous cry, weighed ≥2500 grams and had no congenital anomaly. The initial 28 days of human life is called neonatal period, which further divided into the early (0 to 7 days) and the late neonatal period (8 to 28 days). This period is very crucial as the chances of infection, hypothermia and other risk factors are very high.[1,2]

Although institutional deliveries have increased, the quality of newborn care practices is poor in many low to middle income countries, such as India. Maternal knowledge, traditional practices, and cultural beliefs are the main influencing factors of essential newborn care. Infants from primigravid mothers are more vulnerable due to lack of knowledge and exposure to newborn care.[3]

The global neonatal mortality rate (NMR) is 17/1000 live births in 2023.[4] The NMR in India is 19 per thousand live births in 2021.[5] In India, especially in rural areas a neonatal mortality is serious threat. Infections, prematurity, birth asphyxia, and low birth weight are the major causes behind the high of neonatal mortality in India, especially in rural setup. This creates an urgent need to improve maternal knowledge and neonatal care practices to prevent avoidable neonatal deaths.

The essential newborn care practices are the evidence supported interventions build to improve the survival and well-being of the newborns. These interventions include delayed cord clamping, skin-to-skin care (kangaroo mother care), early initiation of breastfeeding, thermal protection, prevention of infection, immunization, and early referral for any complications. Lack of these maternal knowledges and practices can result in serious complications, demanding the importance of this intervention.[6]

Combining both theoretical knowledge and practical skills are very effective in upskilling the maternal competence in newborn care. In structured lecture-cum-demonstration method, verbal instructions are combined with hands-on practices, which helps the mothers to observe, learn and practice the correct techniques.

The Kirkpatrick four-level evaluation model evaluates the effectiveness of any educational intervention. This model evaluates it under four main categories: reaction, learning, behavior, and results. This model served as a conceptual framework for the study, helps in evaluating the effect of structured lecture-cum-demonstration method on maternal knowledge and practice level of newborn care among the primiparous postnatal mothers.[7]

Considering the high global and national NMR and the role of maternal newborn care practices to improve the newborn health and survival, this study aimed to assess the effect of the structured lecture-cum-demonstration method on knowledge and practice of primiparous postnatal mothers regarding selected newborn care services.

Aim of the Study:

To evaluate the effect of structured lecture-cum-demonstration method on maternal knowledge and practice level of selected newborn care among the primiparous postnatal mothers.

Research Objectives:

1. To evaluate the effect of structured lecture-cum-demonstration method on

the neonatal care among the primiparous postnatal mothers.

2. To assess the association between the pretest knowledge and practice level with selected demographic variables.

Assumptions of the Study:

The structured lecture-cum-demonstration method may have an effect on the knowledge and practice levels of primiparous postnatal mothers regarding newborn care.

Research Hypotheses:

- H1: There is significant difference between pretest and posttest knowledge scores among postnatal mothers regarding newborn care after the lecture-cum-demonstration intervention at significant level of 0.05.
- H2: There is a significant difference between pretest and posttest practice scores among postnatal mothers regarding newborn care after the lecture-cum-demonstration intervention at significant level of 0.05.

Conceptual Framework:

The conceptual framework used for the study is grounded on the Kirkpatrick's four-levels model, which is used for evaluating the effectiveness of any training programs, originally developed in late 1950s by Donald Kirkpatrick.

Kirkpatrick's Four-Levels of Evaluation:

- Level 1 (Reaction): Measures the immediate reaction of the participants to the intervention. It gauges their satisfaction, engagement, and perceived relevance of the interventional content.
- Level 2 (Learning): Assesses the how much the participants acquired the intended knowledge, practice level, or attitudes as a result of the training. It measures the change in knowledge and practice level from before to after the training.
- Level 3 (Behavior): Evaluates the extent to which the participants' behavior has changed on the practice as a result of the intervention. It examines whether the learned knowledge and practice level are being applied in the real-world context.
- Level 4 (Results): This is the ultimate level of evaluation, measuring the impact of the intervention on broader organizational goals or outcomes. It looks at the tangible benefits or results achieved due to the intervention.

Application of Kirkpatrick's four-levels to this Study:

For this study, the four levels of Kirkpatrick's model are applied as follows:

- Level 4: Measure the effectiveness of knowledge and practice level of newborn care among the primiparous postnatal mothers by using a structured questionnaire and observation checklist.
- Level 3: Follow-up observation by observation checklist. Observe mothers interacting with newborns in the hospital ward.
- Level 2: To assess pretest score and posttest score knowledge gain about newborn cares. Observation checklist about newborn care may efficiently improve the practice level of postnatal mothers
- Level 1: Measure the knowledge and practical level about newborn care among postnatal mothers.

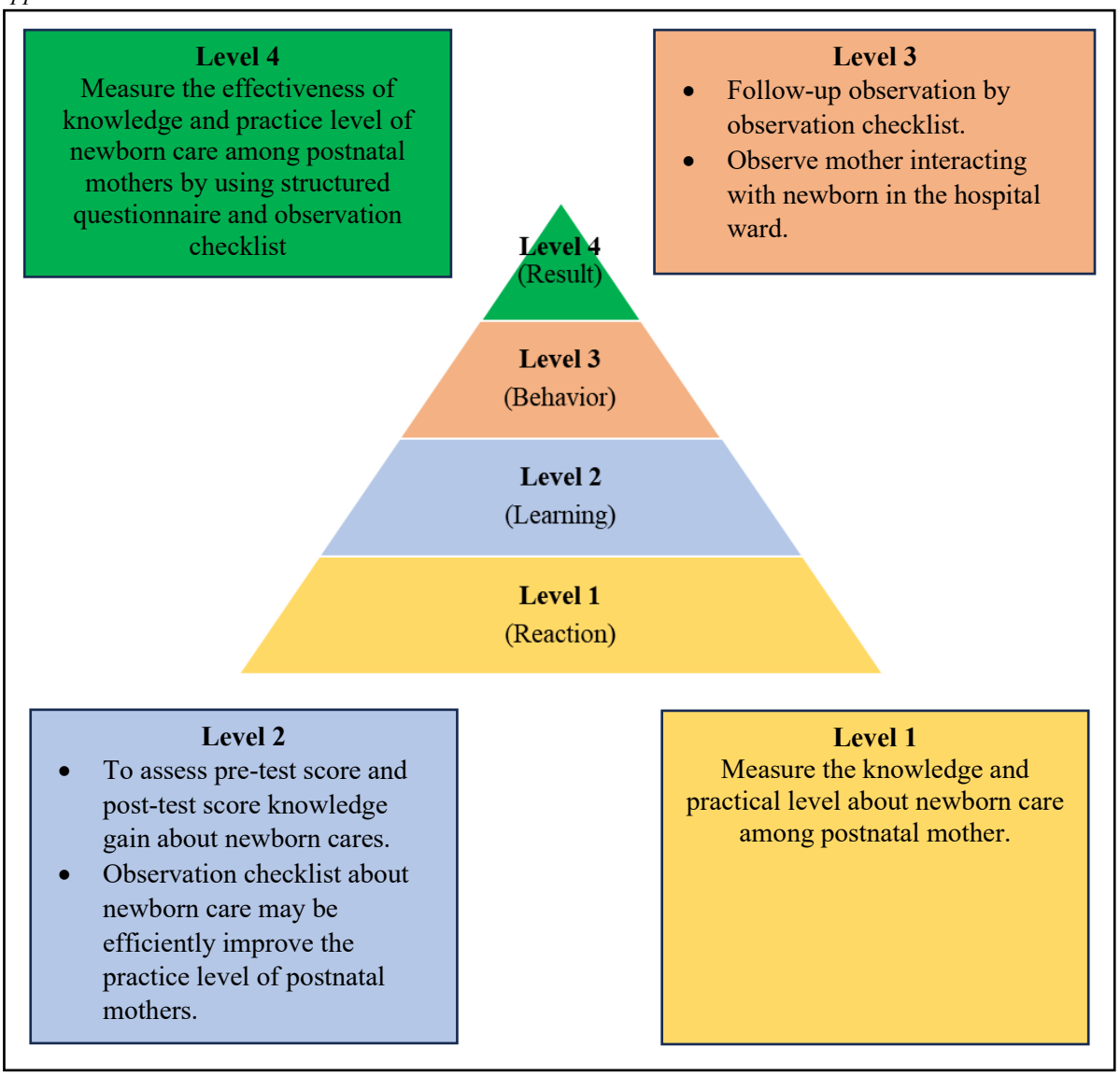

Figure 1: Kirkpatrick's model concept used for the study

MATERIALS & METHODS

Research Design:

The research design was quantitative quasi-experimental one-group pretest posttest study, which allowed the researchers to measure the knowledge and practice levels before the intervention (pretest), implement the structured lecture cum demonstration intervention, and then measure the outcomes after the intervention (posttest) to evaluate its effectiveness.

Research Setting and population:

This research was done in the Indira Gandhi memorial (IGM) Hospital, Agartala, Tripura, India, a tertiary healthcare facility serving a diverse urban and peri-urban population. The target population was all the postnatal mothers in West Tripura District and the population accessible consisted of the primiparous postnatal mothers who were admitted to the selected Hospital and delivered live babies.

Sample and Sampling Technique:

Forty primiparous postnatal mothers were selected through the non-probability purposive sampling.

Inclusion Criteria:

Primiparous mothers between 17 and 25 years of age, pregnant women admitted at the time of data collection and willing to participate.

Exclusion Criteria:
The mothers were excluded from the study those were multiparous mothers, high-risk cases and those with postpartum complications.

Variables of the Study:
- Research Variables: The research variables in this study are knowledge and practice level of newborn care.
- Demographic Variables: The demographic variables in this study include: age, religion, types of family, area of residence, education, occupation, per-capita income, previous knowledge regarding newborn care.

Tools and Techniques of Data Collection:
Three validated tools were utilized:
- Tool I: Structured demographic questionnaire was used to collect the demographic data. This demographic questionnaire including 8 items: Age, religion, types of family, area of residence, education of the mother, occupation of the mother, per capita income of the family, and previous knowledge regarding newborn care.
- Tool II: Structured questionnaire to assess knowledge on newborn care including 30 items covering hand hygiene, thermoregulation, breastfeeding, cord and eye care, vaccination, and danger signs.
- Tool III: Observation checklist of 15 steps to assess practical performance in umbilical cord care.

The interview method for knowledge and the observation method for practice evaluation was used in collecting the data.

Procedure for Data Collection:
Data were gathered in postnatal wards after administrative and ethical approval.
- Day 1: Pretest on knowledge and practice, followed by the structured lecture-cum-demonstration method.
- Day 2: Practice session for mothers to perform demonstrated care.
- Day 3: Posttest assessment of knowledge and practice levels.

Validity and Reliability:
The tools were made to have content validity where 11 subject experts established the necessary changes. The value of Scale Content Validity Index (S-CVI) was between 0.94 and 0.96 which proved a high level of validity. The determination of reliability was done with the interobserver method to have consistency in the results.

Ethical Permission:
The ethical permission was granted from the Institutional Ethics Committee (IEC), the Director of Medical Education, Agartala, West Tripura, and from the Medical Superintendent of the IGM Hospital. The written consents were undersigned by all the participants, and the confidentiality was maintained.

Pilot Study:
It was conducted at Mohanpur Community Health Centre (CHC), Agartala, Tripura, after obtaining permission from the Chief Medical Officer, Mohanpur CHC. For pilot study, ten primiparous postnatal mothers were selected through purposive sampling from the postnatal ward. Baseline knowledge and practice levels were assessed on Day 1, followed by a structured lecture-demonstration intervention. Day 2 involved supervised practice of newborn umbilical cord care, and a post-test on Day 3 evaluated improvements. Results showed increased knowledge and practice levels after the intervention.

Statistical Analysis

For data analysis descriptive and inferential statistics were used. Demographics and pretest posttest scores were described as the frequency, percentage, mean and standard deviation. To compare the efficiency of the lecture-cum-demonstration method, paired t-test was utilized, whereas the chi-square test was used to find the associations

between the pretest scores and the chosen demographic variables. p <0.05 was considered as statistically significant. The Statistical Package for the Social Sciences (SPSS) version 26 was used for data analysis.

RESULT

The data were organized, tabulated, interpreted and presented as follows. The demographic distribution of participants is presented below.

Table 1: Distribution of demographic characteristics of the postnatal mothers by frequency and percentage. (N=40)

Variables	Categories	Frequency (n)	Percentage (%)
Age (years)	17–19	18	45.0
	20–22	20	50.0
	23–25	2	5.0
Religion	Hindu	27	67.5
	Muslim	13	32.5
Types of family	Nuclear	24	60.0
	Joint	16	40.0
Area of residence	Rural	25	62.5
	Urban	15	37.5
Education of mother	Secondary	21	52.5
	Higher secondary	12	30.0
	Graduation & above	7	17.5
Occupation of mother	Housewife	38	95.0
	Job	1	2.5
	Business	1	2.5
Per capita income (₹)	2000–4000	29	72.5
	5000–6000	11	27.5
Previous knowledge of newborn care	Yes	28	70.0
	No	12	30.0

Table 1 showed the demographic characteristics of the 40 postnatal mothers, where half were aged 20-22 years and most were Hindu (67.5%). A majority belonged to nuclear families (60%) and lived in rural areas (62.5%). Over the half had completed secondary education (52.5%), and most were housewives (95%). The majority had monthly family income ranged between ₹2000-4000 (72.5%), and 70% reported having previous knowledge on newborn care.

Table 2: Distribution of the pretest and posttest knowledge levels among the postnatal mothers by frequency (n) and percentage (%). (N=40)

Knowledge Level	Score Range	Pretest [n (%)]	Posttest [n (%)]
Inadequate	1–10	5 (12.5%)	0 (0%)
Moderate	11–20	35 (87.5%)	0 (0%)
Adequate	21–30	0 (0%)	40 (100%)

Table 2 described the pretest and posttest knowledge scores of the 40 postnatal mothers. Initially (pretest), none of the mothers scored within the 'Adequate' knowledge range of 21-30 (0%). After the intervention (posttest), all 40 mothers (100%) achieved scores within this range, demonstrating that every participant reached an adequate level of knowledge.

Table 3: Comparison of mean pretest and posttest knowledge scores. (N = 40)

Test	Mean	Mean Difference	Standard Deviation	t-value	p-value
Pretest	13.40	13.93	2.25	22.29	$p < 0.05$*
Posttest	27.33		2.25		

*** = significant at p<0.05**

Table 3 showed the mean pretest and posttest knowledge scores comparison. The results showed a significant improvement in the participants' knowledge scores *(t(39) = 22.29, p<0.05)*, following the intervention, with the mean posttest score (27.33±2.25) notably higher than the mean pretest score (13.40±2.25) among the 40 participants. This finding confirmed that the structured lecture-cum-demonstration method effectively enhanced mothers' understanding of newborn care.

Table 4: Comparison of mean pretest and posttest practice scores. (N = 40)

Test	Mean	Mean Difference	Standard Deviation	t-value	p-value
Pre-Test	5.85	7.35	1.33	22.14	$p < 0.05$*
Post-Test	13.20		1.21		

*** = significant at p<0.05**

Table 4 showed a statistically significant increase in mean practice scores following the intervention *(t(39) = 22.14, p<0.05).* The mean pretest score of 5.85±1.33 improved following intervention to mean posttest score of 13.20±1.21. This demonstrated that the structured lecture-cum-demonstration method was effective in improving mothers' practical skills related to newborn care.

Table 5: Association between pretest knowledge scores and selected demographic variables. (N = 40)

Variables	χ^2 Value	df	p-value
Age	3.761	2	0.153 ^{NS}
Religion	0.026	1	0.871 ^{NS}
Type of family	1.538	1	0.215 ^{NS}
Area of residence	0.372	1	0.542 ^{NS}
Education	7.169	2	0.028*
Occupation	2.573	2	0.276 ^{NS}
Income	1.161	1	0.281 ^{NS}
Prior knowledge	0.440	1	0.507 ^{NS}

NS = Not significant; * = significant at p<0.05

Table 5 showed the association between the baseline (pretest) knowledge scores and the selected demographic characteristics using the chi-square test. It demonstrated that the education was the only demographic variable significantly associated with pretest knowledge scores (χ^2 = 7.169, df = 2, p = 0.028). This indicates that mother's level of education had a statistically significant influence on their baseline knowledge levels related to newborn care.

Table 6: Association between pretest practice scores and selected demographic variables. (N = 40)

Variables	χ^2 Value	df	p-value
Age	2.328	2	0.153 ^{NS}
Religion	0.311	1	0.871 ^{NS}
Type of family	1.069	1	0.215 ^{NS}
Area of residence	0.327	1	0.542 ^{NS}
Education	0.425	2	0.028*
Occupation	2.010	2	0.276 ^{NS}
Income	0.302	1	0.281 ^{NS}
Prior knowledge	0.807	1	0.507 ^{NS}

NS = Not significant; * = significant at p<0.5

Table 6 showed the association between pretest practice scores and selected demographic characteristics. Results showed that no significant association between pretest practice scores and maternal selected demographic variables. This finding suggests that, unlike knowledge, the practice level of the primiparous postnatal

mothers regarding newborn care was not influenced by any of the demographic variables.

DISCUSSION

The present study findings showed a distinct demographic scenario of the 40 primiparous postnatal mothers, among them half (50%) were 20-22 years old, the majority (67%) were identified as Hindu, 60% were from nuclear families, 62.5% were residing in the rural areas, over half (52.5%) had completed their secondary education and vast majority (95%) were housewives. Family income mainly ranged between ₹2000-4000 per month for 72.5% mothers and the majority (70%) had previous knowledge of newborn care.

The structured lecture-cum-demonstration intervention significantly improved the knowledge and practice skills among the primiparous postnatal mothers related to newborn care. Before intervention, none of the mothers (0%) showed adequate knowledge (score 21-30). Whereas after intervention, all the mothers (100%) achieved adequate knowledge levels. This was supported by a significant increase in the mean knowledge score from 13.40±2.25 (pretest) to 27.33±2.25 (posttest), with $t(39) = 22.29$, $p < 0.05$. Similarly, a significant rise in the mean practice score from pretest value of 5.85±1.33 to posttest value of 13.20±1.21, with, $t(39) = 22.14$, $p < 0.05$.

This finding supports the existing evidence of superiority of the demonstration-based learning approaches than traditional informative methods in enhancing maternal competencies. A systematic review conducted by Kehinde (2022) reported that structured educational intervention on breast feeding practice increased the women's knowledge of breastfeeding.[8] Similarly, another study conducted by Cheng (2018) showed that the structured learning portfolio on preterm newborn care significantly improved the maternal confidence and knowledge and skills on preterm newborn care.[9]

Analysis of demographic variables showed that education was the only factor significantly associated with baseline knowledge ($\chi^2 = 7.169$, $df = 2$, $p = 0.028$), emphasizing the influence of educational status on initial knowledge of newborn care. Similar study by Efa et al. (2020) also reported that maternal education was a strong predictor of awareness and understanding of essential newborn care practices.[10]

Overall, the study confirmed that the structured lecture-cum-demonstration method significantly improved both the knowledge and practice skills among the primiparous postnatal mothers, with education played a pivotal role in their baseline knowledge acquisition.

Limitations

The study included non-probability purposive sampling may result in selection bias. As the study was conducted in a single hospital and the posttest was carried-out just immediately after the lecture-cum-demonstration intervention, which resulted in loss of assessment of long-term knowledge and practice habits improvement in household setup among the mothers.

CONCLUSION

Based on this study findings, we can conclude that the structured lecture-cum-demonstration method effectively improved both the knowledge and practical skills of newborn care among the primiparous postnatal mothers. This study also highlighted that the maternal educational status influenced the baseline knowledge and the intervention helped the mothers with lower educational levels to improve their competencies.

Recommendations

This study recommends to incorporate this lecture-cum-demonstration method into routine postnatal education across the hospitals and community fields to enhance newborn care. Similar studies can be

conducted through other methods like video-assisted or simulation-based trainings.

Declarations by Authors

Ethical Approval: The study was approved by the Institutional Ethics Committee (IEC).
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Conflict of Interest: The authors declare no conflict of interest.

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