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Research Article

A Study to Assess the Effectiveness of a Planned Teaching Program on Emergency Triage Assessment and Management of Children among Staff Nurses in a Selected Hospital, Kolar

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Abstract

Background: Emergency triage assessment and management (ETA&M) is a systematic approach for early identification and prioritization of critically ill children requiring emergency care. Adequate knowledge among staff nurses is essential for timely management and improved pediatric outcomes. This study aimed to assess the effectiveness of a planned teaching program (PTP) on ETA&M of children among staff nurses.

Materials and Methods: A quantitative evaluative research approach with a pre-experimental one-group pretest-post-test design was adopted. The study was conducted among 30 staff nurses working in the Casualty, Pediatric Intensive Care Unit, Neonatal Intensive Care Unit, Special Newborn Intensive Care Unit, and General Pediatric Wards of Sri R.L. Jalappa Hospital and Research Centre, Kolar. Participants were selected using a non-probability purposive sampling technique. Data were collected using a validated structured knowledge questionnaire consisting of demographic variables and a 30-item knowledge assessment tool. The tool showed satisfactory reliability (Split-Half method, Spearman–Brown coefficient, r = 0.75). A PTP was conducted after the pre-test, and a post-test was performed after 7 days. Data were analyzed using descriptive statistics, paired *t*-test, and Chi-square test.

Results: The mean knowledge score increased significantly after the intervention, indicating the effectiveness of the PTP. A significant association was found between post-test knowledge scores and area of work, while no significant association was observed with age, gender, educational qualification, or years of experience.

Conclusion: The PTP was effective in improving staff nurses' knowledge regarding ETA&M of children. Regular in-service education and continuing nursing education programs are recommended to enhance pediatric emergency care competency.

Keywords: Emergency triage assessment and management, knowledge, pediatric emergency, planned teaching program, staff nurses

Introduction

Children with emergency conditions require immediate assessment and prompt management to prevent morbidity and mortality. Early triage enables prioritization of critically ill children and timely initiation of lifesaving interventions in emergency departments.[1,2] Pediatric triage requires adequate knowledge and clinical skills among nursing officers for rapid assessment and appropriate categorization of patients.[1] Structured training and implementation of standardized triage systems improve nurses' competency and the quality of emergency care.[2,3] Therefore, this study aimed to assess staff nurses' knowledge regarding Emergency Triage Assessment and Management (ETA&M), evaluate the effectiveness of a planned teaching program (PTP), and determine the association between knowledge scores and selected demographic variables.

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Materials and Methods

Study design

This study adopted a quantitative evaluative research approach using a pre-experimental one-group pretest-posttest design to assess the effectiveness of a PTP on ETA&M among staff nurses in a selected hospital, Kolar. The study assessed the existing knowledge of staff nurses regarding ETA&M, evaluated the effectiveness of the intervention by comparing pretest and post-test knowledge scores, and examined the association between post-test knowledge scores and selected demographic variables. The study was based on the null hypotheses that there would be no significant difference between the mean pre-test and post-test knowledge scores regarding ETA&M and no significant association between post-test knowledge scores and selected demographic variables.

Study setting

The study was conducted in the Casualty, pediatric intensive care unit (PICU), neonatal intensive care unit (NICU), sick neonatal intensive care unit (SNICU), and General Pediatric Wards of Sri R.L. Jalappa Hospital and Research Centre, Tamaka, Kolar. The hospital is a 1,036-bed tertiary care multispecialty teaching hospital with dedicated pediatric services, including 90 pediatric beds comprising 25 emergency beds, 10 PICU beds, 10 NICU beds, and 18 SNICU beds.

Study population

The target population comprised registered staff nurses working in the selected hospital. The accessible population included staff nurses employed in the Casualty, PICU, NICU, SNICU, and General Pediatric Wards during the study period.

Sample size and sampling technique

A total of 30 staff nurses were selected using a non-probability purposive sampling technique based on predefined eligibility criteria.

Eligibility criteria

The study included registered General Nursing and Midwifery (GNM) and Bachelor of Science in Nursing (B.Sc. Nursing) graduates working in the Casualty or Pediatric Wards who were willing to participate. Staff nurses who had received in-service education related to ETA&M within the preceding 6 months or who were absent during the data collection period were excluded.

Study variables

The independent variable was the PTP on ETA&M. The dependent variable was staff nurses' knowledge regarding ETA&M. Selected demographic variables, including age, gender, educational qualification, years of experience, area of work, were considered extraneous variables.

Study instrument

Data were collected using a structured knowledge questionnaire developed after an extensive literature review, expert consultation, and review by pediatric nursing specialists. The instrument underwent blueprint preparation, content validation, item analysis, and reliability testing.

The questionnaire consisted of two sections. Section A included demographic variables such as age, gender, educational qualification, years of experience, area of work, and previous exposure to ETA&M. Section B comprised 30 multiple-choice questions covering five domains: general information on ETA&M (6 items), maintenance of temperature (3 items), airway and breathing (11 items), coma and convulsions (5 items), and dehydration (5 items).

Each correct response was awarded one mark, and each incorrect response received zero marks, with a maximum score of 30. Knowledge scores were classified as adequate (>22; ≥75%), moderate (15–22; 50–75%), and inadequate (<15; <50%).

Validity and reliability

Content validity was established by a panel of eight experts, and their recommendations were incorporated before finalization of the instrument. Item analysis demonstrated acceptable difficulty and discrimination indices.

Reliability was assessed among 10 staff nurses using the Split-Half method. The Spearman–Brown prophecy formula yielded a reliability coefficient of $r = 0.75$, indicating satisfactory internal consistency.

Intervention

The PTP was developed based on the facility-based integrated management of neonatal and childhood illness (IMNCI) guidelines and expert consultation. The program covered emergency triage principles, emergency and priority signs, triage categories, temperature maintenance, management of hypoglycemia, airway and breathing, coma and convulsions, and dehydration. The intervention was delivered through a lecture-cum-discussion method supported by audiovisual aids in small groups of three to five participants. Each session lasted approximately 1 h.

Pilot study

A pilot study was conducted from 20 August 2013 to 27 August 2013 at Sri R.L. Jalappa Hospital and Research Centre, Kolar, to assess the feasibility of the study. No major modifications were required before the main study.

Data collection procedure

Data were collected from October 15, 2013 to October 30, 2013. Following ethical approval and administrative permission, eligible staff nurses were recruited using purposive sampling, and written informed consent was obtained. Baseline knowledge was assessed using the structured questionnaire (pre-test). Immediately after the pre-test, the PTP was administered in groups of three to five participants. The post-test was conducted 7 days later using the same questionnaire to evaluate the effectiveness of the intervention.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee of Sri Devaraj Urs College of Nursing. Administrative permission was obtained from the Medical Superintendent and Chief Nursing Officer of Sri R.L. Jalappa Hospital and Research Centre. Written informed consent was obtained from all participants before enrolment. Participation was voluntary, and confidentiality was maintained throughout the study.

Statistical analysis

Data were coded and analyzed using descriptive and inferential statistics. Frequencies and percentages summarized demographic characteristics, while mean, median, range, and standard deviation described knowledge scores. The paired t-test was used to compare pretest and post-test knowledge scores, and the Chi-square (χ^2) test assessed the association between post-test knowledge scores and selected demographic variables. Statistical significance was set at $P < 0.05$.

Results

Participant characteristics

A total of 30 staff nurses participated in the study. Most participants were aged 22–29 years and were female. Nearly half held a B.Sc. Nursing qualification, while the remaining participants were GNM or Master of Science in Nursing graduates. Most participants had 1–5 years of professional experience and were working in the PICU, followed by the Casualty and General Pediatric Ward. None of the participants had received previous exposure to ETA&M training within the preceding 6 months [Table 1].

Table 1: Distribution of staff nurses according to their sociodemographic characteristics (*n*=30)

S. No.	Variables	Category	Frequency	Percentage
1.	Age (years)	22–29	27	90.0
		30–39	1	3.3
		40–49	2	6.7
2.	Gender	Female	20	66.7
		Male	10	33.3
3.	Qualification	GNM	13	43.3
		B.Sc. Nursing	14	46.7
		M.Sc. Nursing	3	10.0
4.	Experience (years)	1–5	24	80.0
		5–10	4	13.3
		≥15	2	6.7
5.	Area of experience	PICU	9	30.0
		Casualty/ Emergency	7	23.3
		General pediatric ward	6	20.0
		NICU	4	13.3
		SNICU	4	13.3
6.	Previous ETA&M exposure (within 6 months)	Yes	0	0.0
		No	30	100.0

ETA&M: Emergency triage assessment and management, PICU: Pediatric intensive care unit, NICU: Neonatal intensive care unit, SNICU: Sick neonatal intensive care unit, B.Sc.: Bachelor of Science, M.Sc.: Master of Science, Percentages are based on total sample size (*n*=30)

Knowledge of staff nurses regarding ETA&M

Baseline assessment showed that most staff nurses had inadequate to moderate knowledge regarding ETA&M, with only a few demonstrating adequate knowledge. Following the PTP, the proportion of participants with adequate knowledge increased markedly, while no participant remained in the inadequate knowledge category, indicating a substantial improvement in overall knowledge following the intervention [Table 2].

Table 2: Level of knowledge of staff nurses regarding ETA&M of children before and after intervention (*n*=30)

Level of knowledge	Score range (%)	Before intervention *n* (%)	After intervention *n* (%)
Adequate	23–30 (>75)	1 (3.3)	20 (66.7)
Moderate	15–22 (50–75)	10 (33.3)	10 (33.3)
Inadequate	0–14 (<50)	19 (63.3)	0 (0.0)

ETA&M: Emergency triage assessment and management, maximum possible knowledge score=30, percentages are calculated based on the total sample size (*n*=30)

Effectiveness of the PTP

Comparison of pre-test and post-test knowledge scores demonstrated a statistically significant improvement following the educational intervention ($P < 0.05$), indicating that the PTP effectively enhanced staff nurses' knowledge regarding ETA&M [Table 3].

Table 3: Comparison of mean knowledge scores of staff nurses regarding ETA&M of children before and after intervention

Intervention	Maximum score	Range	Mean±SD	*t*-value	Inference
Before intervention	30	7–24	13.33±4.37	11.587	SS
After intervention	30	17–29	22.93±2.63		

The difference between pre- and post-intervention knowledge scores was statistically significant (t=11.587, df=29, P<0.05). *n*=30. ETA&M: Emergency triage assessment and management, SD: Standard deviation

Area-wise knowledge improvement

Knowledge improved across all five domains of ETA&M following the intervention, including general information on triage, maintenance of temperature, airway and breathing, coma and convulsions, and dehydration. The proportion of staff nurses with adequate knowledge increased across all domains after the intervention, with a corresponding reduction in inadequate knowledge. In most domains, no participant remained in the inadequate knowledge category after the intervention, while only a small proportion remained inadequate in the domain of coma and convulsions [Table 4].

Table 4: Comparison of area-wise knowledge level of staff nurses regarding ETA&M of children before and after intervention (*n*=30)

Area-wise knowledge	Before intervention			After intervention		
	Adequate *n* (%)	Moderate *n* (%)	Inadequate *n* (%)	Adequate *n* (%)	Moderate *n* (%)	Inadequate *n* (%)
General information on triage	1 (3.33)	15 (50.00)	14 (46.67)	19 (63.33)	11 (36.67)	0 (0.00)
Maintaining temperature	2 (6.67)	26 (86.67)	2 (6.67)	10 (33.33)	20 (66.67)	0 (0.00)
Airway and breathing	2 (6.67)	18 (60.00)	10 (33.33)	21 (70.00)	9 (30.00)	0 (0.00)
Coma and convulsions	1 (3.33)	14 (46.67)	15 (50.00)	11 (36.67)	18 (60.00)	1 (3.33)
Dehydration	5 (16.67)	13 (43.33)	12 (40.00)	22 (73.33)	8 (26.67)	0 (0.00)

Values are expressed as frequency and percentage. Percentages are based on the total sample size (*n*=30). ETA&M: Emergency triage assessment and management

Comparison of area-wise mean knowledge scores demonstrated improvement across all five domains following the intervention. The post-intervention scores were higher than the pre-intervention scores in every domain, indicating an overall improvement in knowledge following the PTP [Table 5].

Area-wise paired *t*-test analysis showed that the improvement in knowledge was statistically significant across all five domains, including general information on triage, maintenance of temperature, airway and breathing, coma and convulsions, and dehydration ($P < 0.05$). These findings demonstrate that the PTP was effective in improving staff nurses' knowledge across all components of ETA&M of children [Table 6 and Figure 1].

Association between post-test knowledge and demographic variables

Chi-square analysis demonstrated a statistically significant association between post-intervention knowledge level and the participants' area of experience. However, no statistically significant association was observed between post-intervention knowledge level and age, gender, professional qualification, or total years of professional experience ($P > 0.05$) [Table 7].

Table 5: Comparison of range, mean, and SD of area-wise knowledge scores of staff nurses regarding ETA&M of children before and after intervention

Area of knowledge	Maximum score	Before intervention	After intervention
		Mean±SD	Mean±SD
General information on triage	6	2.30±1.26	4.67±0.95
Maintaining temperature	3	1.63±0.71	2.07±0.78
Airway and breathing	11	5.63±2.39	8.97±1.18
Coma and convulsions	5	1.60±1.22	3.23±0.97
Dehydration	5	2.10±1.29	3.93±1.08

Values are expressed as Mean±SD. Paired *t*-test was used to compare pretest and post-test scores. ($P<0.05$ at df=29). (*n*=30). ETA&M: Emergency triage assessment and management, SD: Standard deviation

Discussion

ETA&M is a crucial component of pediatric emergency care that enables early identification, prioritization, and management of critically ill children. Since staff nurses are often the first healthcare professionals involved in pediatric emergency assessment, adequate knowledge and competency in ETA&M are essential for timely interventions and improved patient outcomes. The World Health Organization (WHO) recommends competency-based Emergency Triage Assessment and Treatment (ETAT) training to enhance healthcare providers' knowledge and clinical skills in pediatric emergency management.[4] The present study demonstrated that the PTP was effective in improving staff nurses' knowledge regarding ETA&M, emphasizing the importance of structured educational interventions in strengthening pediatric emergency preparedness.

The demographic profile of participants included nurses with varied educational qualifications, professional experience, and clinical work areas, indicating that the educational program was applicable across diverse nursing groups. A notable finding was that most participants had not received previous formal ETA&M training, highlighting the need for regular continuing nursing education and refresher training programs. Similar studies have reported that healthcare providers often have inadequate baseline knowledge regarding pediatric emergency triage; however, structured ETAT-based training significantly improves their knowledge and clinical competencies.[1,5,6]

The pre-intervention assessment revealed inadequate knowledge regarding ETA&M among staff nurses, suggesting that routine clinical exposure alone may not be sufficient to maintain competency in pediatric emergency assessment and management. Following the PTP, a significant improvement in knowledge scores was observed, demonstrating the effectiveness of structured teaching in enhancing understanding of pediatric triage principles and emergency management approaches. Similar improvements following educational interventions have been reported among healthcare workers trained in ETAT and integrated management of childhood illness (IMCI) programs.[7,8]

Knowledge improvement was observed across all major domains of ETA&M, including pediatric triage, temperature maintenance, airway and breathing management, coma and convulsions, and dehydration assessment and management.

Table 6: Area-wise comparison of knowledge scores of staff nurses regarding ETA&M of children before and after intervention

S. No.	Area	No. of Items	Maximum Score	Before Intervention Range	Mean±SD	After Intervention Range	Mean±SD	*t* value	*P*-value
1.	General information on triage	6	6	0–5	2.30±1.26	2–4	4.67±0.95	8.94	0.001
2.	Maintaining temperature	3	3	0–3	1.63±0.71	1–3	2.07±0.78	2.64	0.013
3.	Airway and breathing	11	11	1–10	5.63±2.39	6–11	8.97±1.18	6.80	0.001
4.	Coma and convulsions	5	5	0–4	1.60±1.22	1–5	3.23±0.97	5.35	0.001
5.	Dehydration	5	5	0–4	2.10±1.29	2–5	3.93±1.08	6.85	0.001

t-value was tested at df=29, Critical *t*-value=2.045 at $P<0.05$. *n*=30. ETA&M: Emergency triage assessment and management

Table 7: Association between post-intervention knowledge level of staff nurses

S. No.	Demographic variable	Category	Adequate	Moderate	χ^2	df	*P*-value	Inference
1.	Age	Below 30 years	14	13	0.238	1	0.167	NS
		Above 30 years	3	0				
2.	Gender	Female	9	11	3.326	1	0.068	NS
		Male	8	2				
3.	Professional qualification	GNM	7	6	0.074	1	0.785	NS
		UG or PG	10	7				
4.	Total years of experience	1–5 years	13	11	0.672	1	0.469	NS
		>5 years	4	2				
5.	Area of experience	Emergency ward	16	8	4.887	1	0.027	SS
		General pediatric ward	1	5				

ETA&M: Emergency triage assessment and management, GNM: General nursing and midwifery, UG: Undergraduate, PG: Postgraduate, χ^2: Chi-square, df: Degrees of freedom, NS: Not significant, SS: Statistically significant

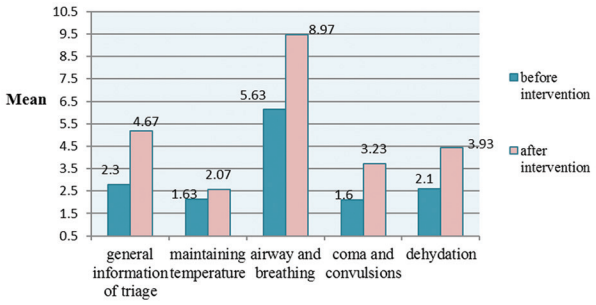

Figure 1: Bar diagram showing area-wise distribution of mean knowledge scores of staff nurses regarding emergency triage assessment and management of children before and after intervention. A significant difference was observed between pre- and post-intervention knowledge scores ($P<0.05$)

This indicates that the intervention provided a comprehensive understanding of pediatric emergency care rather than focusing on individual components. The findings support WHO ETAT recommendations, which emphasize systematic assessment, stabilization, and prioritization of critically ill children.[4,8]

The improvement in pediatric triage knowledge observed in this study is supported by previous research demonstrating that standardized triage training improves clinical decision-making and emergency assessment skills among nurses. Gerdtz and Bucknall reported that triage nurses' decisions depend on clinical knowledge, experience, and structured urgency assessment approaches. Bergeron *et al*. demonstrated that standardized pediatric triage systems improve agreement between pediatric nurses and emergency physicians during emergency assessment.[9,10]

The present study also identified a significant association between clinical work area and post-test knowledge scores, whereas variables such as age, gender, educational qualification, years of professional experience, and previous training were not significantly associated with knowledge levels. This suggests that the PTP was beneficial across nurses with different demographic and professional characteristics. Similar findings have been reported in educational intervention studies where structured training improved healthcare providers' knowledge irrespective of baseline characteristics.[5,6]

The findings of the present study are further supported by evidence from IMCI and IMNCI programs. Previous studies have demonstrated that competency-based training improves healthcare workers' ability to recognize childhood danger signs, make appropriate referral decisions, and provide evidence-based management for pediatric illnesses.[11,12]

The importance of continuous training in pediatric emergency care has also been emphasized in resource-limited settings, where delays in recognition and management of critically ill children contribute significantly to preventable morbidity and mortality. Strengthening nursing education through simulation-based learning, emergency drills, and periodic competency assessment can improve preparedness and quality of emergency services.[8]

The study had certain limitations, including the use of a pre-experimental one-group pre-test post-test design, limited sample size, and single study setting, which may affect the generalizability of findings. In addition, the study assessed knowledge improvement only and did not evaluate long-term knowledge retention or the impact on actual clinical practices.

Overall, the findings support the effectiveness of competency-based educational programs in improving nurses' preparedness for pediatric emergency care. Regular in-service education, ETAT-based training, simulation-based training, emergency drills, and periodic competency assessments should be incorporated into nursing education programs to sustain knowledge and promote evidence-based pediatric emergency practices. Future multicenter studies with larger sample sizes and extended follow-up periods are recommended to assess knowledge retention and determine the impact of educational interventions on clinical performance and pediatric patient outcomes.[8,11]

Conclusion

The present study concluded that the PTP was effective in improving staff nurses' knowledge regarding ETA&M in pediatric emergency care. A significant improvement was observed in post-test knowledge scores compared with pre-test scores, with enhanced knowledge across all domains, including triage, temperature maintenance, airway and breathing, coma and convulsions, and dehydration management. The findings showed that area of work was significantly associated with post-test knowledge level, whereas other assessed socio-demographic variables showed no significant association. The study highlights the importance of regular ETAT-based training and continuing nursing education programs to strengthen nurses' competency and improve the quality of pediatric emergency care.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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