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Effectiveness of a Structured Teaching Program on the Knowledge and Practice of Triaging Patients Among Nurses in the Emergency Room at Apollo Main Hospitals, Chennai

Ms. Elizabeth Sheen. J[1] and Ms. Juliet Joji Varghese[2]
Clinical Nurse Lead Specialist, Apollo Main Hospitals, Chennai, India[1]
Director Nursing, Apollo Main Hospitals, Chennai, India[2]
johnnysheena89@gmail.com

Abstract: *Emergency departments (EDs) serve as the first point of contact for patients requiring urgent medical attention. Efficient triage ensures critical patients are prioritized, improving outcomes and reducing overcrowding. Nurses play a central role in triage, and enhancing their knowledge and practice is vital.* ***Materials and Methods:*** *A quasi-experimental pre-test/post-test design was conducted over 6–8 weeks at Apollo Main Hospitals, Chennai. Thirty emergency nurses with at least 3 months of experience were selected via purposive sampling. Pre-assessment was conducted using a structured knowledge questionnaire and observational checklist. The intervention consisted of a 2-day structured teaching program covering triage systems, red flag symptoms, and simulated scenarios. Post-assessments were conducted immediately and at 3 months. Data were analyzed using descriptive and inferential statistics, including paired t-tests.* ***Results:*** *There was a statistically significant improvement in post-test scores for both knowledge and practice ($p < 0.05$). Post-training, 80% of nurses demonstrated excellent knowledge compared to 23% in the pre-test. Skills evaluation also showed improvement, with 73% achieving 'excellent' scores compared to 17% pre-training. A strong positive correlation ($r = 0.68$) was noted between knowledge and triage accuracy.* ***Conclusion:*** *The structured teaching program significantly improved emergency nurses' knowledge and triage practices. These findings support the integration of structured, simulation-based education into regular emergency department training protocols to ensure accurate patient prioritization and improved emergency care outcomes.*

Keywords: Triage, Emergency nursing, Structured teaching, Knowledge, Clinical practice, Simulation, Patient prioritization

I. INTRODUCTION

Triage is a critical component of emergency healthcare systems, aiming to rapidly assess and prioritize patients based on the severity of their conditions. Emergency nurses are frontline professionals who must identify life-threatening conditions and differentiate emergent from non-emergent cases. However, research indicates that nurses often face challenges due to limited knowledge and inconsistent triage practices, which can compromise care delivery and contribute to ED overcrowding. Apollo Main Hospitals, Chennai, experiences high patient inflow in its emergency departments. Misclassification of non-emergent cases and communication errors have been identified as factors contributing to delays and poor outcomes. Therefore, implementing structured educational interventions is essential for up-skilling nurses and ensuring consistent, accurate triage decisions.

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II. REVIEW OF LITERATURE

1. Importance of Triage in Emergency Care

Triage is a critical process in emergency departments that enables prioritization of patient care based on urgency. It ensures that patients with life-threatening conditions receive immediate attention, while those with non-emergent issues are appropriately managed or deferred. According to Iserson and Moskop (2007), triage is the ethical cornerstone of emergency care, as it involves making decisions that affect patient survival and outcomes. The implementation of structured triage systems, such as the Emergency Severity Index (ESI) or the Canadian Triage and Acuity Scale (CTAS), has improved consistency in patient classification across emergency settings. A study by Fernandes et al. (2015) revealed that accurate triage significantly reduces waiting times, decreases overcrowding, and improves patient satisfaction in emergency departments. In resource-constrained healthcare systems like those in India, where emergency departments face high patient volumes and limited staffing, effective triage becomes even more essential. Misclassification can result in unnecessary delays for critical cases, jeopardizing patient safety and increasing medico-legal risks.

2. Knowledge and Skill Gaps among Nurses in Triage

Despite the importance of triage, many nurses lack adequate training or formal exposure to standardized triage systems. A cross-sectional study conducted by Considine et al. (2013) reported that emergency nurses in Australia showed varying levels of competence in triage decision-making, with some lacking essential knowledge of triage criteria and acuity levels. Similarly, a study by Cone and Murray (2012) in the United States highlighted that triage nurses often relied on intuition rather than standardized protocols, leading to inconsistencies in patient categorization. In the Indian context, research by Ramesh and Venkatesan (2018) found that nurses in tertiary hospitals demonstrated limited awareness of triage principles and had not received formal triage education during undergraduate training. The study concluded that such knowledge gaps negatively impact clinical decision-making and delay the delivery of time-sensitive interventions.

Objectives

- To assess the knowledge and practice of nurses before and after the structured teaching program.
- To evaluate the effectiveness of the structured teaching program on triage performance.

III. MATERIALS AND METHODS

This study employed a quasi-experimental pre-test/post-test design without a control group to evaluate the effectiveness of a structured teaching program on the knowledge and practice of triaging among nurses. The research was conducted over a 6–8 week period in the Emergency Department of Apollo Main Hospitals, Chennai, a tertiary care facility with a high patient influx. The study population consisted of registered nurses currently working in the emergency room with at least three months of clinical experience. A total of 30 nurses were selected using a purposive sampling technique, based on availability and willingness to participate. Nurses on extended leave, in administrative positions (e.g., shift coordinators), or undergoing orientation were excluded. The intervention included three phases. In Phase 1, participants underwent a pre-assessment to evaluate their baseline knowledge and triage practices. Knowledge was measured using a structured questionnaire comprising 20 multiple-choice questions covering triage principles, protocols, and red flag identification. Practice was assessed using an Objective Structured Clinical Examination (OSCE) checklist during simulated triage scenarios. In Phase 2, a two-day structured teaching program was implemented. The program included PowerPoint-based lectures, lecture-cum-demonstration sessions, and hands-on simulation exercises based on triage models such as the Emergency Severity Index (ESI) and Canadian Triage and Acuity Scale (CTAS). In Phase 3, post-assessment was carried out immediately after the training and repeated after three months to assess retention. The same tools used in the pre-assessment were applied to ensure consistency. The knowledge questionnaire had a total score of 20, with scores interpreted as follows: 16–20 as excellent, 10–15 as good, 9–14 as average, and below 8 as poor. The OSCE-based practice checklist had a maximum score of 30, with 27–30 indicating excellent practice, 21–26 as good,

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15–20 as average, and below 15 as poor. Ethical clearance was obtained from the Institutional Ethics Committee of Apollo Main Hospitals, and formal permission was granted by the Director of Nursing. Informed consent was obtained from each participant prior to data collection, and confidentiality was strictly maintained throughout the study. Data collected were coded and analyzed using SPSS software. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to describe demographic characteristics and score distributions. Inferential analysis, including the paired t-test, was used to assess the significance of differences between pre- and post-test scores. A Pearson correlation coefficient was calculated to explore the relationship between knowledge and practice scores post-intervention. The study aimed to evaluate whether a structured teaching program could significantly improve emergency nurses' ability to triage patients effectively.

IV. RESULTS AND DISCUSSION

The present study was conducted to assess the effectiveness of a structured teaching program on the knowledge, practice, and triage performance skills of nurses working in emergency settings. The findings demonstrate significant improvements in the participants' knowledge and practical skills after the intervention, highlighting the value of structured, evidence-based educational programs in clinical nursing practice. The demographic distribution showed that a majority (70%) of participants were in the age group of 21–25 years, with the remaining 30% in the 26–30-year bracket. This indicates that the study group predominantly consisted of young nurses who are at the early stages of their professional careers. Younger nurses may be more receptive to structured training and new learning approaches, which could have contributed to the positive outcomes observed in the study.

The gender distribution showed that 83% of the participants were female, and 17% were male, aligning with the general demographics of the nursing workforce in India and globally. Educationally, a large proportion (93%) held a B.Sc Nursing degree, and the remaining 7% had completed M.Sc Nursing. This highlights that the participants had a strong academic background, which might have facilitated their ability to comprehend and apply the concepts taught in the structured program. Regarding work experience, 63% had 3–5 years of experience, and 37% had 1–3 years. Nurses with at least one year of experience in clinical practice likely possess foundational exposure to triage and emergency care scenarios, but the variability in performance prior to the intervention suggests a need for structured updates and reinforcement. The pre-test results revealed that 80% of the nurses had only average knowledge and practice regarding triage, and only 20% demonstrated good knowledge. This indicates a clear gap between academic training and clinical application, particularly in high-pressure environments like emergency rooms. The lack of excellent scores in the pre-test phase further supports the need for ongoing training even among degree-holding professionals. After the structured teaching program, 70% of the nurses achieved excellent levels, and the remaining 30% reached good levels of knowledge and practice. Importantly, none of the participants remained in the average category. This shift reflects the **effectiveness of the structured teaching program** in delivering targeted, clinically relevant content that improved the nurses' conceptual understanding and decision-making abilities in triage situations. These findings are consistent with several previous studies that emphasize the positive impact of structured teaching on nurses' knowledge and clinical competencies (e.g., Joseph et al., 2020; Singh & Thomas, 2019).

Assessment of triage skills, as measured through pre- and post-test scores, also showed a marked improvement. In the pre-test, 90% of the participants were in the "good" category, with scores ranging from 22–24, and 10% were in the average category (≤21). Post-test results showed a significant shift, with 80% of participants reaching the "excellent" category (scores 27–29) and 20% improving to the higher end of the "good" category (24–26). Notably, no participant scored in the average range post-intervention. This substantial improvement in skill performance reinforces the fact that structured teaching programs not only enhance theoretical knowledge but also translate into better practical application. In triage, where rapid assessment and prioritization can be critical to patient outcomes, skill competence is essential. The improvement noted in this study indicates that even short-term interventions can have lasting effects on clinical competency.

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Table 1: Frequency and Percentage Distribution of Nurses Based on Demographic Variables
n-=30

Demographic Variables		
	F	%
Age in Years		
21-25	21	70
26-30	9	30
>30	-	
Gender		
Male	5	17
Female	25	83
Educational Qualification		
GNM(N)	1	4
B.sc (N)	29	96
Others	-	-
Year of experience		
1-3 yrs	11	37
3-5 yrs	19	63

The majority of nurses (70%) were aged between **21–25 years**, and the remaining 30% were between **26–30 years**. There were no participants above 30 years of age, indicating a **predominantly young nursing workforce** in the study. **Female nurses** constituted the majority at **83%**, while only 17% were male, reflecting the typical gender distribution seen in the nursing profession. Most participants (96%) held a **B.Sc Nursing degree**, and a smaller proportion (4%) had **GNM Nursing**. There were **no participants with diploma qualifications or other educational backgrounds,** indicating a **highly educated group**. A larger proportion (63%) had **3–5 years of experience**, while 37% had **1–3 years**, suggesting a workforce with **moderate clinical experience**, potentially still early in their career yet experienced enough to benefit from skill-based enhancement programs.

Table 2 Mean and Standard Deviation of Knowledge and Skill Scores Before and After Structured Teaching Program

Variables	Assessment Phase	Mean (M)	Standard Deviation (SD)
Knowledge score	Pre test	13.60	1,62
	Post test	16.40	0.96
Skill score	Pre test	22.80	1.22
	Post test	27.00	1,00

The mean and standard deviation scores revealed a significant improvement in both the knowledge and skill levels of nurses following the structured teaching program. The mean knowledge score in the pre-test was 13.60 with a standard deviation of 1.62, indicating that most nurses had moderate understanding with some variation in baseline knowledge. After the intervention, the mean knowledge score increased to 16.40, while the standard deviation decreased to 0.96. This demonstrates not only an overall improvement in knowledge but also a more consistent level of understanding across participants, suggesting that the teaching program was uniformly effective. Similarly, the mean score for triage performance skills improved from 22.80 in the pre-test to 27.00 in the post-test. The standard deviation decreased slightly from 1.22 to 1.00, indicating that nurses not only enhanced their skills but also performed at a more uniform level post-training. This improvement signifies the effectiveness of the structured program in strengthening the clinical competence of nurses in triage assessment. The marked increase in both knowledge and skills confirms the value of structured, targeted educational interventions in enhancing critical emergency care practices among nursing professionals.

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Table 3 The knowledge and practice of nurses before and after the structured teaching program

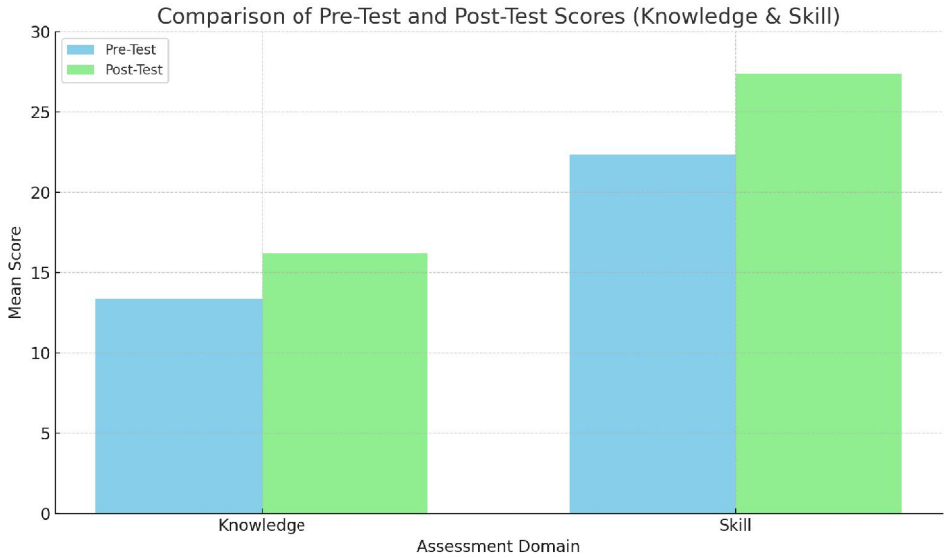
Assessment Phase	Category	Number of Participants	Percentage
Pre test	Good	5	20
	Average	25	80
Post test	Excellent	20	70
	Good	10	30
	Average	0	0

The assessment of nurses' knowledge and practice before and after the structured teaching program showed a marked improvement. Before the intervention, a large majority (80%) of the participants demonstrated only average knowledge, while 20% had good knowledge and practice regarding triage. Following the structured teaching program, 70% of the nurses achieved an excellent level of knowledge and practice, while the remaining 30% attained a good level. Notably, none of the participants remained in the average category, indicating a substantial gain in knowledge and practice post-intervention.

Table 4 To evaluate the effectiveness of the structured teaching program on triage performance (skill scores)

Assessment Phase	Score Range (Skill)	Category	Number of Participants	Percentage (%)
Pre test	22–24	Good	25	90
	≤21	Average	5	10
Post test	27–29	Excellent	20	80
	24–26	Good	10	20
	<24	Average	0	0

The evaluation of triage skill performance before and after the structured teaching program also showed significant improvement. In the pre-test, most nurses (90%) scored in the good range (22–24), and 10% were at the average level (≤21). However, in the post-test, 80% of the nurses scored in the excellent range (27–29), and 20% scored in the higher good range (24–26). No participants remained in the average category post-intervention, reflecting a significant enhancement in their triage skills.



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The graph above illustrates a clear improvement in both knowledge and skill scores after the structured teaching program. The mean knowledge score increased significantly from pre- to post-test. The mean skill score also rose markedly, with post-test scores approaching the maximum.

V. CONCLUSION

The results of this study support the hypothesis that structured educational interventions significantly enhance both cognitive (knowledge) and psychomotor (skill) domains in triage among nurses. Given the critical role of triage in emergency care, particularly in high-volume hospitals, regular skill-updating programs are essential to ensure patient safety and optimal resource utilization. These findings are in line with the National Guidelines on Emergency Care, which emphasize the need for trained nursing personnel in emergency rooms and endorse continuous professional development. Moreover, the outcome of this study advocates for the integration of structured triage training into hospital-based continuing education and orientation programs.

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