



“EFFECT OF SIMULATION BASED PALS TRAINING PROGRAMME ON KNOWLEDGE AND SKILL RETENTION AMONG NURSES WORKING IN PEDIATRIC TERTIARY CARE UNIT, CHENNAI”

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Abstract

Adequate CPR management will improve the critically ill children outcome. Hence nurses are the major part of health care services must be train with adequate Life support knowledge and skill towards assessment and management of paediatric emergencies based on American Heart Association (AHA) training module 2020.

Objectives: To assess the effectiveness of Simulation based PALS training programme among nurses in Tertiary care hospital

Design: Quasi experimental where One group pre-test post-test design.

Setting: The main study was conducted after the Pilot study at Institute of Child health and Hospital for Children, Egmore, Chennai. The 175 Nurses working in ICH & HC who fulfilling the inclusion criteria were selected by Simple Random sampling technique. The inclusion criteria was Nurses who are not attended previous Simulation based PALS training were selected. A structured knowledge questionnaire and standardized practice checklist (AHA 2020) were used for the data collection in the study from July 2022 to June 2023. Post-test was assessed based on OSCE check list over time interval of 3 months and 6 months. The following OSCE stations were used in Post-test to assess the Knowledge retention for Nurses.

Station I: CPR- Cardio pulmonary resuscitation and Defibrillation

Station II: Intravenous / Intra osseous (IO) access

Station III: Emergency Drugs – Crash Cart

Station IV: Management of Paediatric Emergencies - Shock, Foreign body, Head trauma, Drowning, SIDS (sudden infant death syndrome).

Station V: Equipments requirement in Emergency unit.

Results: Frequency and percentage distribution of pre and post test scores on PALS among nurses depicts that, the Nurses **knowledge retention** about Simulation based PALS maximum score and difference in mean percentage in pre-test - 46%, post- test I – 65%, post-test II – 69%, post-test III – 84%. The Nurses **practice** of Simulation based PALS maximum score and difference in mean percentage is in pre-test - 23%, post- test I – 46%, Post - test II – 73%, post- test III – 90%. Comparison of posttest score I (on the day of PALS training), II (3 months) and III (6 months) of knowledge displayed a significance difference among nurses. The significance of the P value I (0.0008), P value II (0.3739), P value III (0.40961). This reveals that Periodical simulation based PALS training programme was effective on knowledge retention and good practice score among nurses. It seems that PALS training programme was effective among nurses.

Conclusions: Findings indicate that PALS simulation training over the time of knowledge retention for nurses was effective. The pre and post test scores on PALS among nurses depicts that, The comparison of Paired ‘t’ test value of pre-test and post-test knowledge scores of PALS among nurses is 19.21, the level of significance is $P < 0.05$ Significant. The association between post-test knowledge scores of PALS among nurses with selected demographic variables age in years ‘F’ test value = 3.156 and ‘P’ value is 0.046 is significant. The years of experience as a Pediatric nurses were ‘F’ test value = 3.361 and ‘P’ value is 0.038 is significant. The gender, educational level, year of experience as nurse values are not significant.

Key words: Simulation, PALS, Sudden Cardiac arrest, Defibrillation, Foreign body and SIDS (sudden infant death syndrome).

Introduction:

American Heart Association 2000 study reveals, PALS for infants and children using Health Care Provider Standards (American Heart Association, 2015). Acquisition of PALS knowledge and skill was the cognitive application of PALS related knowledge and psychomotor performance with a PALS course. PALS is ALS specifically designed for the care of infants and children who have not yet reached puberty. PALS is an AHA course designed to enhance the treatment skills of health care providers who deliver direct patient care or may need to provide resuscitation to pediatric patients (American Heart Association, 1992a, 1992b, 2005b, 2010, 2015, 2018 and 2020; American Heart Association & International Liaison Committee on Resuscitation, 2000). Through experiential learning, participants study and practice resuscitation techniques, complete critical thinking activities, and are involved in situations leading to and during cardiopulmonary arrests. Resuscitation

skills can be difficult to learn. In an attempt to increase participants comfort with recognition of symptoms and action based on symptoms, the PALS course reinforces a systematic experiential approach.

Need for study:

American Heart Association 2020. Early recognition of life threatening events in pediatric patients and rapid action means the difference between life, death, or permanent disability. Through specialty certification courses like the American Heart Association's (AHA) Pediatric Advanced Life Support (PALS), health care providers are trained in assessment and interventions specific to critically ill and or injured pediatric patients for Nurses - health care providers, regularly renewing PALS certification may be difficult due to a variety of limitations. Furthermore, the number of pediatric patients nurses see in practice is often limited. As a result of this limited exposure to pediatric patients, Nurses do not have the opportunity to use knowledge and practice skills they have learned in PALS. Hence, they may lose valuable knowledge over time due to a lack of usage. When faced with a life threatening pediatric emergency and the need to rapidly access knowledge and skills, Nurses may not be able to retain and apply what they have previously learned. The result is that precious minutes are lost in a rush to save a child's life. I proposed to study the problem of PALS knowledge retention and skill acquisition among Nurses and offered an educational technique, simulated training (ST), as a potential solution to the aforementioned problem.

Simulation is an ideal educational platform by imitating a situation for the adult learner because it provides an opportunity to build an existing knowledge base. Good simulation-based practice addresses the health care professional's needs in a practical and clinically relevant way that has immediate application to daily professional activities. Simulation provides immediate feedback and gives the health care professional a chance to complete the task using knowledge of errors or complications experienced during the first practice session. The simulation activity should have clearly delineated performance expectations that are defined by an expert and can be objectively measured and used to provide very specific feedback.

STATEMENT OF THE PROBLEM: "EFFECT OF SIMULATION BASED PALS TRAINING PROGRAMME ON KNOWLEDGE AND SKILL RETENTION IN NURSES WORKING IN PEDIATRIC TERTIARY CARE UNIT", CHENNAI, TAMILNADU, INDIA.

Objectives of the Study

1. To compare the pre-test and post-test level of knowledge retention and skill in pediatric advanced life support course among nurses.
2. To associate the post- test level of knowledge retention and skill in pediatric advanced life support course among nurses with their selected demographic variables. examine the relationship between participants

The overall goal of this research is to improve the nurse's knowledge and skill in CPR techniques and management of pediatric emergencies outcome of children requiring resuscitation in tertiary care hospital by periodically updated PALS trained nurses.

Hypothesis

- **H1:** There is a significant correlation between Simulation based PALS training knowledge and skill retention among Nurses.
- **H2:** There is a significant association between Simulation based PALS training knowledge and skill retention and selected demographic variables among Nurses.

Projected Outcome

- Improvement in the knowledge and skill retention of the Nurses on Simulation based Pediatric Advanced Life Support.
- Reduction in the Infant Mortality INFANT Mora Rate (IMR), during and after the Simulation based PALS training and improve the work efficiency of nurses in future at Pediatric tertiary care unit.

MATERIALS AND METHODS.

Research Approach: Evaluative research approach.

Research design : Quasi experimental design, where one group pre-test and post-test only design was selected.

Setting : Institute of Child Health and Hospital for Children, Chennai.

Population : Nurses Working at Paediatric Tertiary Care hospital, Chennai-8.

Samples : Nurses who were not attending Simulation based PALS training.

Sample size : 175 Nos

Sample technique: Simple random sampling technique

Data collection procedure :- the inclusion criteria was nurses who were not attended PALS training, willing to participate in PALS Simulation training and present during the period of data collection. Nurses Practice While Watching and/or Practice Skills, they practiced using a static manikin, then assign to participate in stimulation training with the critically ill children at Emergency room, ICH& RI, Chennai.

Period of Data Collection Data was collected from July 2022 to June 2023. The investigator collected the data from 175 Nurses working in ICH & RI, Chennai-8.

Pre-test data collected based on structured questionnaire

Post-test In this Pilot study the Post test was conducted by using OSCE check list on 30days interval.

OSCE Skill stations

Station I: CPR- Cardio pulmonary resuscitation and Defibrillation

Station II: Intravenous / Intra osseous (IO) access

Station III: Emergency Drugs – Crash Cart

Station IV: Management of Pediatric Emergencies - Shock, Foreign body, Head trauma, Drowning, SIDS (sudden infant death syndrome).

Station V: Equipments requirement in Emergency unit.

Development of the Tool

There are 2 sections of tools were used. They are,

Section –A

Demographic Variables – It consists of demographic characteristics of Nurses

- Age
- Sex
- Education level
- Years of experience in service
- Years of experience in PALS

Section – B

PART I - Structured knowledge questionnaire consists of 40 knowledge items each correct answer will be scored 1

PART II - The standardized practice OSCE checklist consists of 14 practice items based on the content on Advanced Pediatric life support, 2020 AHA guidelines.

Scoring Procedure:

Level of knowledge	Percentage of scores	Actual scores
Very poor	<20%	0 – 8
Poor	21% to 40%	9 – 16
Average	41% to 60%	17 – 24
Good	61% to 80%	25 – 32
Very Good	81% to 100%	33 – 40

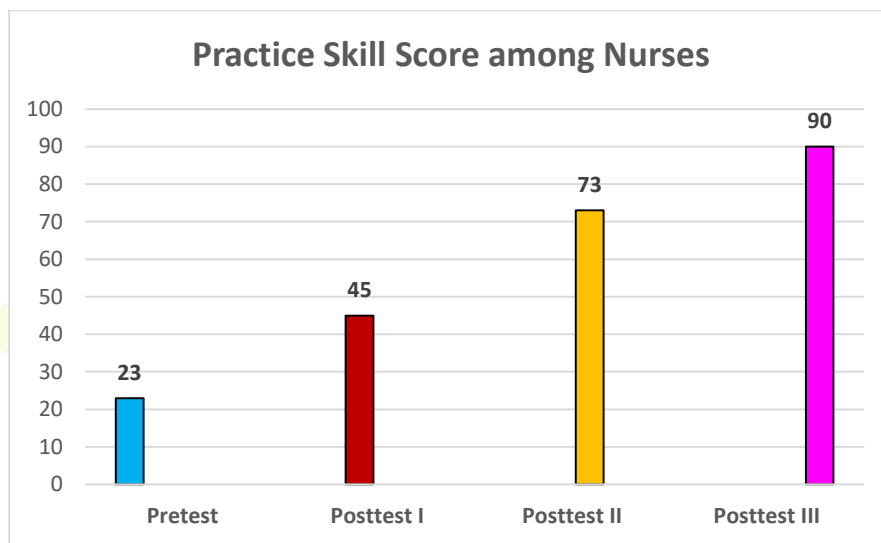
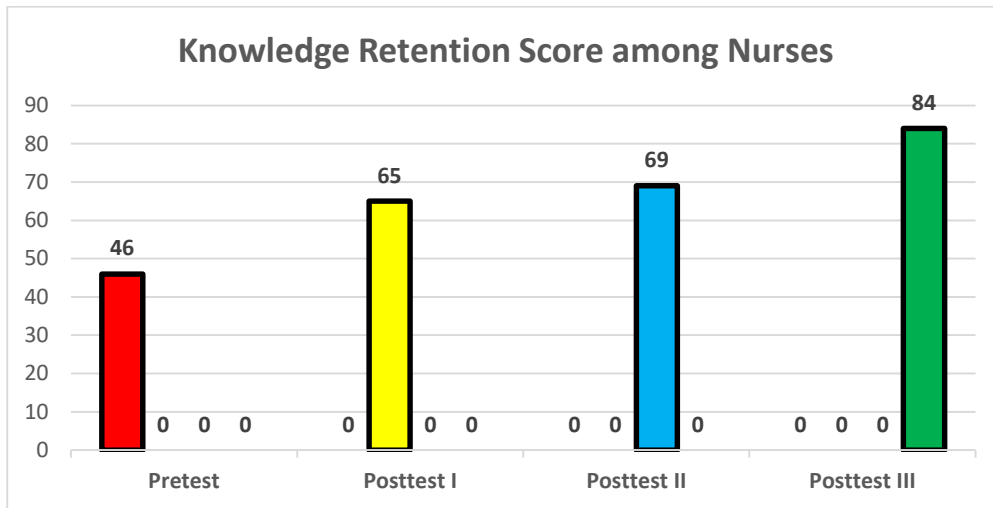
Ethical Consideration

1. Written permission were obtained from the Institutional higher officials and Ethical permission obtained from Chairperson of Ethical committee, Madras Medical College, Chennai- 3.
2. Prior informed consent was obtained from Nurses working in ICH & RI, Chennai-8.

Validity and reliability The content validity of the tools like demographic variables, structured Questionnaire related to PALS (AHA) and OSCE check list for post-test evaluation were validated in consultation with the guide and Pediatric experts. The experts are Paediatricians, Pediatric Nurse Educators and Statistician. The tool was modified according to the suggestion and recommendation of the experts.

Results:

Comparison of Pre-test and Post test score of Knowledge retention and Practice skill among Nurses about Simulation based PALS training.



Paired 't' test value of pre-test and post-test knowledge scores of Simulation based PALS among nurses

Knowledge of PALS	Paired 't' test value	Table value	Level of significance
Introduction	14.21	2.84	P <0.05 Significant
Cardiac arrest	13.54		P <0.05 Significant
Respiratory assessment	18.12		P <0.05 Significant
Airway	17.54		P <0.05 Significant
Breathing	18.21		P <0.05 Significant
Circulation	14.52		P <0.05 Significant
Total	19.21		P <0.05 Significant

Paired 't' test value of pre-test and post-test practice scores of PALS among nurses

Practice of PALS	Paired 't' test value	Table value	Level of significance
Introduction/ Pre briefing	13.21		P <0.05 Significant
Identifying the correct position	15.02		P <0.05 Significant
CPR procedure	16.17		P <0.05 Significant

Drugs	15.12	2.84	P <0.05 Significant
ECG interpretation	16.54		P <0.05 Significant
Complications	15.42		
Emergency management of different conditions	16.07		P <0.05 Significant
Total	18.24		P <0.05 Significant

Repeated measures of ANOVA to compare the effectiveness of simulation based PALS training programme among nurses in knowledge post test score I, II and III

Experimental Group	P value	Standard Error of difference	F- test	Hypothesis
Post - test I	0.0008	0.917	1.1578	Accepted
Post - test II	0.3739	0.583	1.0	Accepted
Post - test III	0.40961	0.600	0.99997	Accepted

Comparison of post-test score I (on the day), II (3 months) and III (6 months) of knowledge displayed a significance difference among nurses.

Find out the association between post-test knowledge retention scores of PALS among nurses

Demographic variables	F test	P value	Level of Significance
Age in years	3.156	0.046	Significant
Gender	2.644	0.056	NS
Education level	0.257	0.856	NS
Year of experience	1.381	0.567	NS
Years of experience as a Pediatric Nurse	3.361	0.038	Significant

The table values show the association between post-test knowledge scores of PALS among nurses with selected demographic variables age in years and years of experience as a Pediatric nurses were significant ($P < 0.05$).

Find out the association between post-test practice scores of PALS among nurses

Demographic variables	F test	P value	Level of Significance
Age in years	0.555	0.576	Not significant
Gender	2.949	0.036	Significant

Education level	1.135	0.338	Not significant
Year of experience	1.320	0.531	Not significant
Years of experience as a Pediatric Nurse	3.158	0.017	Significant

The table values show the association between post-test practice scores of PALS among nurses with selected demographic variables gender and years of experience as a Pediatric nurse is significant ($P < 0.05$).

Level of Acceptability of Nurses in simulation based Pediatric Advanced Life Support Module - All the participants (100%) among Nurses are highly accepted the PALS simulation learning module.

Results: Findings indicate that simulation training given on knowledge and practice regarding PALS was effective. The level of knowledge retention was increased for the nurses.

Conclusion:

Indian Academy of Pediatrics (IAP) -2010 A critical clinical reality when nurses educated in PALS encounter a child in need of life saving intervention, especially if it has been more than six months since the nurses took the PALS course. Participants in the experimental arm of the study entered the ELM as they progressed from PALS lessons to practice stations, followed by scenario training and finally in scenario testing.

New Change: Infant/Child Chest Compression Depth—Rescuers should provide chest compressions that depress the chest at least $1/3^{\text{rd}}$ of the antero-posterior diameter of the chest in pediatric patients (approximately 1.5” in infants up to one year---to 2” in children up to the onset of puberty.) Once children have reached puberty – the recommended depth of compression is, again, same as the adult, at least 2” but not over 2.4”. A pediatric study observed improved 24 Hours survival when compression depth is at least 2 inches. Judgment of compression depth is difficult at the bedside and the use of a feedback device that provides such information may be useful if available –

IOM report (2016) Nurses need to be empowered to act. In light for the introduction of innovations in health care education, the results of this study suggest that high-fidelity simulation deserves incorporation in this approach. The population of focus for this study was Nurses working in a federally recognized institution. Therefore the delimitation of this study was that it cannot and should not extend beyond the studied population, Nurses practicing treasury care level of institutions. Potential limitations of this study included challenges related to recruitment and retention of participants over the timeline of the study.

- The nursing shortage and the need to increase enrollment in educational programs,
- A need to supplement limited numbers of clinical sites and learning opportunities,
- A lower cost of simulator equipment
- Emphasis on evidence based practice and related competencies
- Acceptance of simulation training as a useful tool
- Increased awareness of the need to address patient safety
- The potential of Simulation based PALS to enhance clinical practice.
- Nurses need to be empowered to act. In light of the call from the IOM report (2010) for the introduction of innovations in health care education, the results of this study suggest that high-fidelity simulation deserves incorporation in this approach.

The main study result shows knowledge and skill retention over time of PALS simulation training programme for nurses improved the nurse's confidentiality in managing pediatric emergencies. The study shows the feasibility, will helps the researcher to conduct main study in future with large samples to improve the nurse's knowledge by periodical PALS training programme.

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