

A Quasi-Experimental Study to Assess the Effectiveness of a Structured Teaching Programme on Knowledge and Skill of Cardiopulmonary Resuscitation Among Students at Selected Colleges

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Abstract

A quasi-experimental study was conducted to evaluate the effectiveness of a structured teaching program (STP) on the knowledge and skills related to cardiopulmonary resuscitation (CPR) among students in selected colleges of Jodhpur. The objectives were to assess and compare the knowledge and skills of students in the control and experimental groups, determine the correlation between knowledge and skill levels, and identify associations with selected demographic variables. The study was guided by the Systems Theory framework, encompassing input, process, output, and feedback components. An evaluative approach and quasi-experimental design were adopted. A total of 60 students (30 in the control group and 30 in the experimental group) were selected using non-probability purposive sampling from RGM College of Nursing, Jodhpur. Data was collected using a structured knowledge questionnaire and a CPR skill checklist. In the control group pretest, 53.33% had moderate knowledge, while 26.67% and 20% had inadequate and adequate knowledge, respectively. Posttest results showed minimal improvement. In contrast, in the experimental group, 43.33% had inadequate and 6.67% adequate knowledge before the intervention, which improved markedly post-STP, with 66.67% demonstrating adequate knowledge. Skill performance also improved, with 60% of the experimental group showing good skills after the STP. A positive correlation was found between knowledge and skill scores. The findings indicate that STP was effective in improving both knowledge and skill levels regarding CPR. The study recommends extending such interventions to larger and more diverse student populations.

Keywords: Cardiopulmonary resuscitation, knowledge, skill, structured teaching programme, nursing students

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INTRODUCTION

The heart is one of the most vital organs of the human body. It is a hollow muscular organ approximately 10 cm in length, roughly the size of an individual's fist. As a muscular pump, the heart generates the force needed to circulate blood throughout the body, ensuring that tissues receive a constant supply of oxygen and nutrients, while also removing waste products. Without this essential circulation, cells begin to suffer irreversible damage within minutes, which leads to organ failure and death. Among these organs, the brain is especially vulnerable to oxygen deprivation, with irreversible damage occurring within 4 to 6 minutes of oxygen loss [1–6].

Cardiac arrest occurs when the heart suddenly stops pumping blood effectively, resulting in an immediate cessation of circulation to the brain and other vital organs. It is a serious emergency characterized by unresponsiveness, absence of pulse and blood pressure, stopped breathing, pale or bluish skin, and enlarged pupils. A common cause is ventricular fibrillation, which is an abnormal rhythm in which the heart quivers instead of pumping blood. Cardiopulmonary resuscitation (CPR) and defibrillation are vital measures in such situations. Defibrillation, often administered through an automated device, helps restore a normal rhythm by correcting abnormal electrical activity. CPR, which involves chest compressions and rescue breaths, supports blood flow and oxygen delivery to essential organs until advanced medical care becomes available. It is a fundamental component of Basic Life Support (BLS), which encompasses the initial care provided to individuals experiencing life-threatening events such as cardiac arrest, choking, or drowning. The BLS does not involve the use of medications or invasive procedures and can be effectively performed by trained laypersons, including students, teachers, lifeguards, police officers, firefighters, and social workers [7–12].

Traditionally, CPR followed the A-B-C sequence (airway–breathing–compressions), in which rescuers first cleared the airway, gave rescue breaths, and then performed chest compressions. However, the American Heart Association (AHA) revised the sequence to C-A-B (compressions–airway–breathing) in 2010 to emphasize the importance of immediate chest compressions, minimizing delays in circulating oxygenated blood. Chest compressions are now recognized as the foundation of effective CPR, and untrained bystanders are encouraged to perform hands-only CPR in emergencies.

Early initiation of CPR, especially by bystanders, significantly improves survival outcomes in out-of-hospital cardiac arrests. Starting CPR within the first few minutes of cardiac arrest greatly increases the chance of survival, whereas delays significantly reduce the likelihood of recovery. This emphasizes the importance of widespread awareness and training regarding CPR techniques [13–16].

Students, in particular, can be vital first responders both on- and off-campus. Equipping them with CPR and BLS knowledge and practical skills empowers them to act confidently and effectively during emergencies. Mastery of these lifesaving procedures through structured training ensures that victims receive timely and adequate support until professional medical assistance arrives.

In conclusion, understanding the principles and practices of CPR and BLS is crucial for reducing the mortality associated with sudden cardiac arrest. With proper training, laypersons, including students, can play a transformative role in improving survival rates and providing critical care during the golden minutes following cardiac arrest [17].

OBJECTIVES OF THE STUDY

Assess

1. The knowledge of students regarding CPR in the control and experimental groups.
2. The skills of students regarding CPR in the control and experimental groups.

Compare

1. The level of pretest and posttest knowledge in the control and experimental groups.
2. Pretest and posttest skill levels in the control and experimental groups.

To Correlate the Level of Knowledge with the Skill of CPR Among Students in the Control and Experimental Groups

Find Out

1. The association between posttest knowledge of CPR and selected demographic variables among students in the control and experimental groups.
2. The association between posttest skills of CPR and selected demographic variables among students in the control and experimental groups.

Operational Definition

1. *Assess*: This is a statistical measurement of students' knowledge and skills regarding CPR, as observed using a closed-ended questionnaire and checklist.
2. *Effectiveness*: This study refers to the improvement in knowledge and skill scores following the structured teaching program (STP), as assessed using a questionnaire and checklist.
3. *Structured teaching program*: In this study, it refers to a planned teaching strategy for cardiopulmonary resuscitation, which includes the meaning, purpose, steps, and complications of CPR.
4. *Knowledge*: This refers to the understanding of students regarding CPR, as measured by a structured questionnaire.
5. *Skill*: In this study, skill refers to the ability of students to perform CPR as measured by a checklist.
6. *CPR*: In this study, it refers to an emergency procedure used to temporarily maintain blood oxygenation and tissue perfusion, as well as to restore cardiac function, in a person who has suffered cardiopulmonary arrest.
7. *Students*: In this study, the term "students" refers to candidates studying degree courses in college in Jodhpur.
8. *College*: This study refers to an institution that offers degree courses located in Jodhpur.

Hypothesis

- H1*: There is a notable difference between students' pretest and posttest knowledge scores on CPR.
H2: There will be a notable difference between students' pretest and posttest skill scores on CPR.
H3: Posttest knowledge and skill scores are significantly associated with selected demographic factors.
H4: There will be a significant relationship between knowledge scores and skill scores.

Assumptions

- CPR is a lifesaving procedure; adequate knowledge and skill are required to perform CPR.
- Students may have some knowledge of CPR.
- Students may have knowledge of cardiopulmonary, but they may not demonstrate their skills properly.
- A structured teaching program helps the student to gain a clear knowledge of CPR.

Limitations

- The study was delimited to only the degree students at a selected college in Jodhpur.
- The generalization of the finding was limited to the population studied.
- The period of data collection was only 6 weeks.

Conceptual Framework

This conceptual framework facilitates communication and provides a systemic approach to nursing research, education, administration, and practice.

The conceptual framework in a study provides an abstract and logical structure that allows the researcher to connect findings to existing knowledge in nursing. It is derived from established theories and assists in identifying key concepts, defining them, and proposing relationships between them (Figure 1).

The framework used in this study was based on a system theory model consisting of input, process, output, and feedback. According to this model, a system comprises elements that interact to achieve a specific goal. An individual can be viewed as a system that receives input from the environment, processes it, and produces output. All living systems are open and continuously changing in terms of matter, energy, and information.

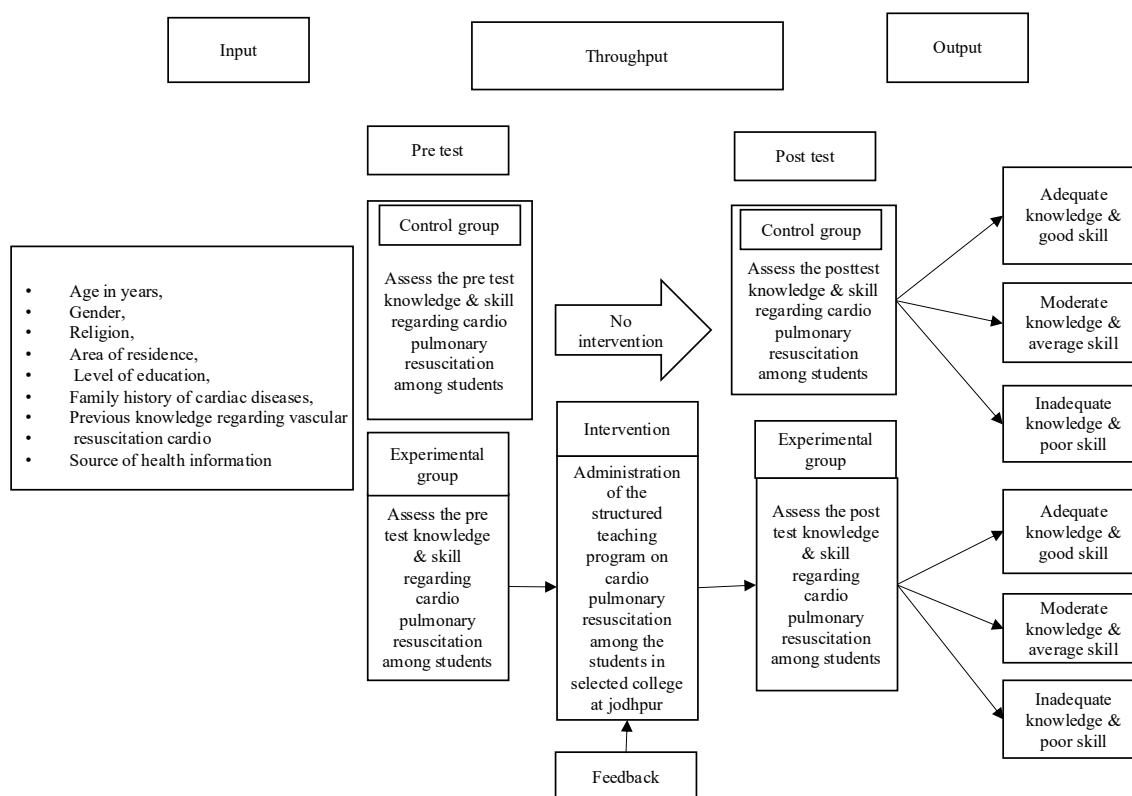


Figure 1. Conceptual framework based on general system theory by Ludwig von Bertalanffy.

The system operates cyclically with four components—input, process, output, and feedback—constantly interacting. Any change in one component affects others, leading to adjustments throughout the system.

Input

Input refers to the information, materials, or energy that enters the system. In this study, college students in Jodhpur represent the system, receiving input both from themselves and from their surrounding environment. The input included background demographic variables such as age in years, gender, religion, area of residence, level of education, family history of cardiac diseases, previous knowledge regarding cardiovascular resuscitation, and source of health information regarding CPR.

Throughput

Once the system receives the input, it is processed through various operational mechanisms to produce the desired output. Here, it refers to the assessment of existing knowledge and skills among students regarding CPR, through an STP, followed by the administration of a teaching program on CPR.

Output

The output refers to the energy, matter, or information produced by a system as a result of its processes. This study represents the increase in knowledge and skills of college students in Jodhpur regarding CPR, as measured through a posttest using a knowledge questionnaire and checklist. Adequate knowledge and good skills lead to a positive outcome. Inadequate or moderate knowledge and poor or average skills lead to negative outcomes and, in turn, cause a lack of knowledge and skills regarding CPR. This can be improved by implementing an STP for CPR.

Feedback

This process enables the system to regulate itself and provides information about the output of the system and its feedback as input. Accordingly, higher knowledge scores obtained by the students in the

posttest indicate that the STP on cardiopulmonary resuscitation is effective and that they gained knowledge and skills regarding CPR. A low score in the posttest indicates the need to repeat the teaching program on CPR.

REVIEW OF LITERATURE

Best (1982) briefly summarizes previous research findings, and the writings of recognized experts provide evidence that the researcher is familiar with what is already known and with what is still unknown and interesting.

Literature review plays a key role in the research process. It refers to an extensive, exhaustive, and systematic examination of publications relevant to research projects; the literature review is discussed as follows.

Kumawat HK, Sharma G, Khan S, et al. (2023) [18] conducted a pre-experimental study to improve the CPR skills through a STP among students at a senior secondary school. Students aged 12-18 years from urban senior secondary schools in Udaipur were selected, and the results revealed that the mean standard deviation (SD) of the knowledge score of the pretest was 6.89 ± 2.89 , whereas the mean SD of the posttest knowledge score was 15.08 ± 2.43 . The mean SD of the practice score of the pretest was 3.40 ± 1.45 , whereas the mean SD of the practice score of the posttest was 7.28 ± 1.71 . There was a positive correlation ($r=0.58$) between the knowledge and practice scores. There was a significant association between the practice score and the occupation of the fathers of the students.

Sahni MB, Kumari MN, and Singh MB (2023) [19] carried out a descriptive study to assess the knowledge and attitude regarding BLS among non-medical students at SGT University, Gurugram, Haryana. 150 non-medical students were selected with a convenience sampling technique. The result of the study shows that out of 150 respondents, 18% (57) participants had inadequate knowledge, 74% (88) participants had moderate knowledge, and 8% (5) had adequate knowledge. The mean score of knowledge is 8.66; similarly mean percentage of knowledge was 37.66%, SD value was 2.9985. At the attitude level, no participants had an unfavorable attitude, 92% (152) of participants had a moderately favorable attitude, and 8% (8) had a favorable attitude towards BLS. The mean score of attitudes was 23.34; similarly mean percentage of attitudes was 66.68%, and the SD value was 2.1762.

Meenakshisundaram R, Ramavel AR, Banu N, et al. (2023) [20] conducted a quasi-experimental study to assess the effect of a training program on students' knowledge of CPR. A total of 680 students were included in this study. Results show that, initially, there were 666 (97.9%) in the fair category, most of whom improved after training, as seen in the post-training observation results, with 97 (14.3%) people in the fair category. There was not a single student in the good category of the score before intervention, which increased to 665 (45.6%) in the good category of knowledge. The mean pre-training score was 2.55, and the post-training score increased significantly to 9.5.

Kapoor D, Arora H, Kanojia S et al. (2022) [21] conducted a prospective cross-sectional study to determine the awareness and knowledge of performing high-quality CPR among junior resident doctors in the Government Medical College and Hospital, Chandigarh. Findings of the study revealed that among the 152 respondents, 31(20%) were interns, 74(49%) were postgraduate course junior residents (PG JR), 7(5%) were non-postgraduate course (non-PG JR), and 40 (26%) were senior residents (SR) doctors. Only 24% ($n=36$) of doctors have completed a previously certified CPR training course. The awareness of resuscitation among all doctors was 71%, which was highest among the PG JRs 73%). The core knowledge of BLS and ACLS was only 47% and 44%, respectively, among all doctors.

Ramesh AC, Hariprasad KV, et al. (2022) [22] conducted a study to assess the effectiveness of hands-only CPR (HO CPR) training for 8th-grade high school students in Bengaluru. Of the 530 enrolled students, 414 participated in this study. Findings of the study show that the mean overall pre-assessment

score for knowledge was $62.07 \pm 28.38\%$, and the post-assessment score was $72.42 \pm 26.58\%$ ($p < 0.001$). In addition, there was a statistically significant improvement in the post-training scores for HO CPR for all three parameters, namely compressions per minute, depth, and chest recoil.

Sachdeva S (2020) [23] conducted a cross-sectional study to assess the knowledge and practice of BLS among nursing officers working in a tertiary care hospital in Delhi, India. A total of 112 nursing officers working in various departments were included in this study. The results showed average knowledge and poor skills among the participants. In contrast, the subjects working in the intensive care unit (ICU) and emergency departments had better knowledge and performance than those in the other selected areas. Both Knowledge and skill were significantly associated with variables such as clinical area and in-service training on the BLS ($p < 0.05$). The results strongly indicate the need for regular BLS training sessions for healthcare professionals.

Mohammed Z, Arafa A, et al. (2020) [24] conducted a cross-sectional study to assess knowledge of and attitudes towards CPR among junior doctors and medical students in Upper Egypt. A total of 205 participants (60 junior doctors and 145 medical students) were included in this study. Results revealed that out of the 60 junior doctors who participated in the study, only 31.7% had adequate knowledge of CPR, but up to 95% reported positive attitudes towards CPR training. Among the 145 medical student participants, only 6.2% had adequate knowledge of CPR, while 91% reported positive attitudes towards training. Deficiency in CPR knowledge was more apparent in questions related to CPR in both children and neonates. Junior doctors and medical students with prior CPR training demonstrated significantly better CPR knowledge than their counterparts without prior training. A statistically significant positive correlation was detected between CPR knowledge and attitude towards CPR training among medical students ($r = 0.41$, $p < 0.001$).

Shrestha et al. (2020) [25] conducted a cross-sectional study to explore awareness regarding cardiac arrest and knowledge of CPR among visitors of patients at Alka Hospital Pvt. Ltd., Lalitpur, Nepal. A total of 394 visitors from admitted patients were included in the study. Results showed that 221 (56.1%) of the respondents had knowledge regarding CPR, and 201 (51.0%) of respondents had awareness about cardiac arrest through media (37.8%), like movies and television. We found a significant difference among age groups, occupation, and geographical location regarding the awareness of cardiac arrest. People of greater age and education were more knowledgeable about cardiac arrest. However, there was no significant difference between the groups regarding knowledge of CPR.

Akram F, Perveen K, Afzal M, et al. (2020) [26] conducted a cross-sectional, observational study to assess the knowledge and practices of CPR among nurses working in district headquarters hospitals, Jhelum, and the factors associated with these levels of knowledge and practices. Results showed that out of 110 respondents, 76 (69.1%), 11 (10%), 5 (4.5%), and 18 (7.3%) nurses showed excellent, good, fair, and poor knowledge of CPR, respectively, while 62 (56.3%), 13 (11.8%), 18 (16.4%), and 17 (15.5%) nurses scored excellent, good, fair, and poor practices of CPR, respectively. 98.7% of nurses showed excellent knowledge, and 96.8% of nurses exhibiting excellent practices of CPR had completed full course BLS training.

Tanna D, Bose N, Chandnani A, et al. (2019) [27] conducted an interventional study to determine the effectiveness of short CPR training based on these guidelines among doctors at GMERS Medical College and Hospital, Vadodara. A total of 108 doctors who attended the training were included in the interventional study. Results revealed that the mean posttest score (6.58) was significantly higher than the mean pretest score (2.94), p -value 91%, 8 scored 81-90%, 23 scored 71-80%. 28 participants (25.93%) scored less than 50% even after the training.

Ahmadi H, Naeimi S, Mohebifar M, et al. (2019) [28] conducted a descriptive cross-sectional study to determine the knowledge of basic CPR among high school students in Masjed-Soleyman, Iran. The

results showed that 165 students with a mean age of 16.72 ± 0.87 were enrolled. Out of these, 46.7% were boys, and the rest were girls. The mean score of knowledge and attitude of these people was 2.85 ± 2.40 , which indicates a very weak awareness of CPR. Pre-university students and those who received information from cyberspace had significantly better knowledge of CPR ($p < 0.05$). There were no statistically significant differences between the mean of knowledge and gender scores, grade Point average, place of residence, parents' job, and parents' education ($p < 0.05$).

Becker TK, Gul SS, Cohen SA, et al. (2019) [29] conducted a study to identify potential barriers to bystander CPR among participants at CPR training events in the USA. Findings revealed overall results of the 677 participants; 582 (86.0%) completed the survey, with 509 (88.1%) between 18 and 29 years of age, 341 (58.6%) without prior CPR training, and 556 (96.0%) without prior CPR experience. Across all four scenarios of patients in cardiac arrest, less than 65% of respondents reported that they would be „Extremely Likely“ (20.6%–29.1%) or “Moderately Likely” (26.9%–34.8%) to initiate CPR. The leading concerns were „causing injury to patient“ for geriatric (63.1%), female (20.5%), and adolescent (50.9%) patients. Lack of appropriate skills was the second leading concern when the victim was a geriatric (13.4%) or adolescent (23.4%) patient, whereas for female patients, 35 (14.1%) were concerned about exposing the patient or the patient's breasts interfering with the performance of CPR, and 15 (6.0%) were concerned about being accused of sexual assault. Significant differences were observed in race, ethnicity, and age with respect to the likelihood of starting CPR on female and adolescent patients.

Huang EP, Chiang WC, Hsieh MJ, et al. (2019) [30] conducted telephone interviews to assess knowledge, attitudes, and willingness towards performing CPR and the barriers to implementation of bystander-initiated CPR in Taiwan. Of the 1073 respondents, half of them stated that they knew how to perform CPR correctly, although 86.7% indicated a willingness to perform CPR on strangers. The barriers to CPR performance reported by the respondents included fear of legal consequences (44%) and concerns about harming patients (36.5%). Most participants expressed willingness to attend only an hour-long CPR course. Respondents who were less likely to indicate a willingness to perform CPR were female, healthcare providers, those who had no cohabiting family members older than 65 years, those who had a history of stroke, and those who expressed a negative attitude toward CPR.

Vandali, and Kachare U (2018) [31] conducted a descriptive assessment of knowledge regarding CPR among 1st Year GNM (diploma nursing students) studying at SND College of Nursing. Fifty samples were included in the study, all of which fit the inclusion criteria, which clearly shows that no one student had poor knowledge regarding CPR among the 1st year RGNM students. There is 38% of adequate knowledge regarding CPR, and the majority of 62% students have good knowledge about CPR. None of the students of diploma nursing (GNM) had knowledge of CPR. Although the majority of the diploma nursing students (GNM) had good knowledge, perfection is still required to practice it whenever needed in an emergency.

Ko RJ, Lim SH, Wu VX, Leong TY, and Liaw SY (2018) [32] conducted a study to examine the effectiveness of simplified CPR training in improving lay rescuers' CPR performance compared to standard CPR in Singapore. A total of 85 laypeople were recruited. The results revealed that the simplified CPR group performed significantly better on the CPR algorithm than the standard CPR group ($p < 0.01$). No significant difference was found between the groups in terms of the time taken to initiate CPR. However, a significantly higher number of compressions and proportion of adequate compressions were observed in the simplified group than in the standard group ($p < 0.01$). The hands-off time was significantly shorter in the simplified CPR group than in the standard CPR group ($p < 0.001$).

Goduhan AK, Kshirsagar AY, et al. (2017) [33] conducted a pre-experimental study to determine the knowledge and skills of undergraduate college students after training in BLS at Jaipur. The study was

conducted with 1500 students. The overall findings of the study revealed that there was a significant increase in the knowledge of degree students regarding BLS training. Training was found to be an effective strategy for increasing the knowledge and Skills of Degree students regarding BLS. There were 883(58.8%). All participants in the poor category improved after training, as shown in the posttest results; none of the people in the poor category. There were only eight participants in the excellent score category before intervention, which increased to 1188(79.2%) in the excellent category of knowledge after training intervention. Before training on BLS, there was a mean knowledge score of 9.3 with SD3.9 before training on BLS, which increased to a mean score of 25.0, SD 2.4 a skills score of 7.5 with SD2.78 before training, which increased to 21.6 with SD 3.8 after training both these differences in knowledge. ($t=34.4$)

Akoijam Chhange L (2017) [34] conducted a cross-sectional study to assess knowledge and skills regarding CPR at RIMS, JNIMS, and Imphal. Eighty interns posted in the Community Medicine Department were included in the study. The results showed that more than half of them knew when to start CPR, but did not know when to put a victim in a recovery position or how to open the airway. Nearly three-fourths of them did not know when to stop CPR. Most of these patients were unaware of the correct site for chest compression. Very few of them checked for response and breathing, and most participants had incorrect positioning while performing it. None of the participants knew how to provide rescue breathing.

Devi CS N et al. (2017) [35] conducted a pre-experimental study to determine the effectiveness of a skill training program on knowledge and skills regarding CPR in selected colleges in Guwahati. The findings of the study revealed that none of the adolescents had adequate knowledge before the training program, but after the skill training program, 97.5% of the adolescents developed adequate knowledge, and 95% developed adequate skills regarding CPR. The mean posttest knowledge (13.98 ± 1.73) and skill (15.95 ± 0.22) scores of adolescents were significantly higher than their mean pretest knowledge (6.53 ± 2.21) and skill (2.35 ± 0.89) scores. The paired t-test revealed that the skill training program regarding CPR was effective in improving the knowledge ($t=13.72$) and skill ($t=95.56$) of adolescents.

Sharma T, and Sharma U (2017) [36] conducted a quasi-experimental study to train first year nursing students in CPR using a planned teaching program. At the MM College of Nursing, Mullana, Ambala, India, with a sample size of 81. Findings of the study reveal that the mean score of study participants for pretest was found to be 7.07 ± 2.12 with a mean percentage of 35.3%, which was significantly improved to 14.9 ± 3.25 with a mean percentage of 74.5% at $p<0.001$ for posttest score.

Stanly, Babu, and Unnikrishnan (2017) [37] conducted a study to assess the emergency preparedness level, training feasibility, and knowledge retention of BLS skills among high school students in the Medical Simulation Center at Manipal University, Manipal, Karnataka. Sixteen participants were included in the study. Results revealed that the mean pre-training score was $2.6 (\pm 1.9)$. The post-training and one-week recall scores were $12.44 (\pm 0.89)$ and $12 (\pm 1.05)$, respectively. A significant difference was found between the pre- and post-training scores ($p<0.001$). The post-training and one-week recall scores were similar, which implies that the students had good short-term knowledge retention of BLS skills.

Chen M, Wang Y, Li X, et al. (2017) [38] assessed the status of layperson CPR training to analyze the willingness of bystanders to perform CPR and to identify barriers to improving bystander CPR rates at Harbin Medical University, Heilongjiang. Findings of the study revealed that there were 25.6% laypersons who took CPR training. The majority (98.6%) of laypersons would perform CPR on their family members, but fewer laypersons (76.3%) were willing to perform CPR on strangers. Most respondents (53.2%) were concerned about legal issues. If laws were implemented to protect bystanders who provided aid, the number of laypersons who were not willing to perform CPR on strangers dropped from 23.7% to 2.4%. An increasing number of people in China are aware of CPR compared to the situation in the past. CPR training is much less common in China than in many developed countries.

Partiprajak S, and Thongpo P (2016) [39] conducted an experimental study to explore the retention of BLS knowledge, self-efficacy, and chest compression performance among Thai nursing students at a university in Thailand. The participants were 30 nursing students undergoing BLS training as care providers. Repeated measures analysis of variance was used to test the retention of knowledge and self-efficacy between the pretest, immediate posttest, and retest after three months. The findings of the study revealed that the training had an immediate significant effect on the knowledge, self-efficacy, and skill of chest compression; however, knowledge and self-efficacy significantly declined after post-training for 3 months. Chest compression performance after training for 3 months was positively retained compared to the first posttest, but this difference was not significant.

Kim MH, Lee ES, and Jun SE (2016) [40] conducted a study to examine the level of knowledge, attitude, and performance ability of automated external defibrillators (AED) and CPR among university students who were not in health-related courses in Seoul, South Korea. Findings revealed that 77.0% had never seen or heard of an AED, and 61.9% did not know how to use them. The levels of knowledge, attitudes, and performance ability differed significantly according to CPR training experience and AED awareness ($p < .002 \sim .001$). Performance ability significantly correlated with knowledge ($r = .42, p < .001$) and attitudes ($r = .55, p < .001$) of AED and CPR. These findings suggest that future AED and CPR training programs should be developed to promote a positive attitude towards the willingness to perform AED and CPR, as well as to increase participants' confidence through repeated training.

Hung MS, Lui JC, Lee DT, et al. (2014) [41] conducted a cross-sectional telephone survey to investigate public knowledge and attitudes about CPR in Hong Kong. Results showed that among the 1013 respondents, only 214 (21%) reported that they had received CPR training. The majority (72%) of these trained respondents had had their latest training more than 2 years earlier. Respondents who had received CPR training were more willing to try it if needed at home and on strangers on the street in case of emergencies. Overall, the respondents' CPR knowledge was low. Among all the respondents, only four of them (0.4%) answered all the questions correctly.

Onyeaso AO, and Achalu EI (2014) [42] conducted a quasi-experimental study to assess CPR knowledge among four purposively selected secondary schools in the Obio/Akpor Local Government Area of Rivers State, Nigeria, before and after training in CPR. 400 students were drawn from the schools, of whom 322 questionnaires were found to have been properly filled, giving a response rate of 80.5%. The findings revealed that the level of pre-training knowledge was 8.9%, compared to post-training knowledge of 88.6%. The difference in knowledge between pre- and post-training in CPR was statistically significant ($p < 0.05$).

Ravindra HN (2013) [43] conducted a pre-experimental study to evaluate the effectiveness of a planned teaching program on CPR. The sample of the study comprised 30 students studying for a B.S. degree in a selected college at Vadodara, Gujarat. The effectiveness of the Planned Teaching Programme (PTP) was tested using inferential statistics through a paired *t*-test. The difference between the pretest and posttest knowledge scores of degree students regarding cardiopulmonary resuscitation (CPR) techniques was found to be highly significant. This indicates that the Planned Teaching Programme was an effective strategy for improving students' knowledge of CPR techniques.

Chowdari A, Niranjana GM, and Dinesh B (2013) [44] conducted a cross-sectional study among undergraduate medical students to understand their knowledge and perceptions of BLS. A total of 377 undergraduate medical students were included in this study. Results revealed that the majority (84.6%) had heard of BLS/CPR. Some of them (30.6%) could give the correct order for performing CPR according to the AHA guidelines (Year 2010). Only a few participants (18.9%) had undergone prior training in basic life support (BLS), and only 17.7% had encountered a situation requiring BLS/CPR. Nearly half of the participants (50.2%) were not confident in performing BLS/CPR.

Rajapakse, and Kersnik J (2010) [45] carried out a cross-sectional telephone survey to determine the extent of knowledge about and attitude towards CPR in the lay population in the Republic of Slovenia. Five hundred participants were interviewed. Results show that nearly 70% of subjects attended courses on CPR, but nearly 80% of them did so more than ten years ago. Less than half of the participants knew that CPR included rescue breathing (47%) and chest compression (44.6%). Subjects who passed received CPR training twice as often ($p < 0.001$). Their knowledge of resuscitation skills was generally poor. Only 1.2% knew the rate of chest compressions, 2.2% knew the correct compression-to-ventilation ratio in adult CPR, and only 3 out of 500 subjects (0.6%) knew both. Correct site and correct strength for chest compressions were reported in 37.6% and 13.0%, respectively. Both the correct site and strength were stated more often in the CPR-trained group.

Sharma K, Ahwal S, Ponnappan K, and Parel JT (2021) [46] conducted a pre-experimental study to evaluate simulation-based training on compression-only life support in terms of Knowledge & Skill among General Duty Assistants. At the ILBS in Vasant Kunj, India. A total of 139 General Duty Assistants (GDA) were included in the study. The results showed that the mean posttest knowledge score was 12.30 ± 2.84 , which was significantly higher than the pretest knowledge score of 8.09 ± 2.86 . The paired value was 16.76, which was significant at 0.05. The mean posttest skill score, 15.56 ± 2.77 , was significantly higher than that of the pretest skill 6.71 ± 3.24 . The paired t value was 31.07, which was significant at 0.05. There were improvements in knowledge and skill after the simulation-based intervention on COLS, which were found to be statistically significant at the 0.05 level.

RESEARCH METHODOLOGY

Research methodology is a way to systematically solve the research problem. It describes various steps that are generally adopted by the researcher in studying the research problem, along with the logic behind them, and explains why he uses a particular method or technique so that research results can be evaluated by him or by others.

The research methodology was the framework used to conduct the study. It includes the research approach, design, setting, population, sample, and sampling technique, development and description of the tool, content validity, reliability, pilot study, procedure for data collection, and plan for data analysis.

The present study aimed to determine the knowledge and skills of CPR among students at selected colleges in Jodhpur.

RESEARCH APPROACH

The research approach was an overall plan chosen to conduct the study. The selection of the research approach is the basic procedure or blueprint for conducting a research inquiry. A quantitative experimental research approach was found to be suitable for assessing the knowledge and skills regarding CPR among students at selected colleges of Jodhpur. It tells the researcher what data is collected and how to analyze it, and suggests possible conclusions to be drawn from the data.

An evaluative research approach was used to assess the effectiveness of an STP on knowledge and skills regarding CPR among students at selected colleges in Jodhpur.

Table 1. Schematic representation of the study design.

| Group | O1{Pretest} | X{Intervention} | O2{Posttest} |
|--------------------------------|---|---|---|
| Control group of students | Assess the knowledge and skills of the student. | | Assess the knowledge and skills of the student. |
| Experimental group of students | Assess the knowledge and skills of the student. | Administration of an STP to the students. | Assess the knowledge and skill of the student after giving STP. |

RESEARCH DESIGN

Research design refers to the researchers' overall plans to obtain answers to the research questions, and it spells out strategies that the researcher adopts to develop information that is adequate, accurate, objective, and interpretable (Figure 2).

A quasi-experimental research design with a two-group pre- and posttest design was adopted in this study to evaluate the effectiveness of the STP for the present study.

A pretest was administered by means of a questionnaire method depicted as O1, then an STP was delivered, depicted as X, and a posttest was conducted using the same questionnaire depicted as O2. A schematic representation of the study design is shown in Table 1.

VARIABLES

Variables are the characteristics in the research study that the experimenter manipulates, controls, and observes. Variables are as follows.

Independent Variable

An independent variable is a variable that stands alone or is not dependent on any other variable. In this study, the independent variable refers to an STP on CPR.

Dependent Variable

The outcome variable of interest was the dependent variable. The variable hypothesized depends on or is caused by another variable, the independent variable. In this study, the knowledge and skills of students are the dependent variables.

Demographic Variable

The demographic variables under study were age in years, sex, religion, area of residence, level of education, family history of cardiac diseases, previous knowledge regarding cardiovascular resuscitation, and source of health information regarding CPR.

SETTING OF THE STUDY

Setting referred to the area in which the study was conducted. This may be a natural setting depending on the study topic, and the research setting of the study was RGM College of Nursing in Jodhpur.

POPULATION

A population is any group of individuals with one or more characteristics that are of interest to the researcher.

The target population in the present study included students from the RGM College of Nursing in Jodhpur.

SAMPLE AND SAMPLE SIZE

A sample was a subset of the population selected to participate in a research study for observation and analysis. Students who fulfilled the inclusion criteria in selected colleges in Jodhpur.

The sample size consisted of 60 students (30 in the control group and 30 in the experimental group) in the RGM College of Nursing in Jodhpur.

SAMPLING TECHNIQUE

Sampling is the process of selecting a portion of a population to represent the entire population.

A non-probability purposive sampling technique was used to select the sample for this study. The purposive sampling technique is a judgment-sampling technique that involves conscious selection from the research of certain subjects or an element to include in the study.

Criteria for Sample Selection

The sample frame structure of the research included the following criteria.

Inclusion Criteria

- Students studying a degree course in a selected college in Jodhpur.
- Students who are willing to participate in the study.
- Students who were not present at the time of data collection.

Exclusion Criteria

- Students who had a similar kind of training within 6 months.
- Students who are not available at the time of data collection.
- Students who are willing to participate in the study.

SELECTION AND DEVELOPMENT OF TOOL

Data collection tools are instruments used by the investigator to observe or measure the variables in the research problem.

Based on the research problem and objectives of the study, the following steps were taken to select and develop the data collection tool.

SELECTION OF THE TOOL

A structured questionnaire including sociodemographic characteristics, knowledge, and skills associated with different aspects of CPR was selected based on the objectives of the study, as it was the most appropriate instrument to elicit responses from the participants.

Development of the Tool

The tool for data collection was developed in English after an extensive review of relevant literature, based on the investigator's own experiences, and through consultation with subject experts in nursing and emergency care. The final tool consists of the following three sections:

Section A: Demographic Data

This section collected demographic information of the participants, including:

- Age (in years)
- Gender
- Religion
- Area of residence
- Level of education
- Family history of cardiac diseases
- Previous knowledge regarding cardiopulmonary resuscitation (CPR)
- Source of health information regarding CPR

Section B: Structured Knowledge Questionnaire

This section consisted of 30 multiple-choice questions designed to assess students' knowledge regarding CPR. Each question had four options with one correct answer. The items covered various aspects of CPR, such as its importance, indications, steps, and safety precautions.

Section C: Skill Assessment Checklist

This section includes a checklist of 18 performance items to evaluate students' practical skills in performing CPR. Each action item represents a critical step in the CPR procedure to ensure objective skill evaluation.

Scoring Procedure

Section A: Demographic Data

Scores were not assigned to this section. The collected information was used for descriptive analysis to understand the characteristics of the participants and to determine any association between demographic variables and their knowledge and skills.

Section B: Knowledge Assessment

Each correct answer in the knowledge questionnaire was awarded one mark, and each incorrect or omitted answer received zero. The maximum possible score was 30, and the minimum score was 0. The level of knowledge was interpreted as follows.

- Less than 50%—Inadequate knowledge
- 50–75%—Moderately adequate knowledge
- More than 75%—Adequate knowledge

Section C: Skill Assessment

Each correct action performed during CPR was given one mark, and each incorrect or omitted action received zero marks. The maximum possible score is 18. The level of skill performance was interpreted as follows:

- Less than 50%—Poor skill
- 50–75%—Average skill
- More than 75%—Good skill

CONTENT VALIDITY

To ensure content validity, the tool was submitted to six experts in the field of medical-surgical nursing. The experts were asked to give their opinions and suggestions regarding the relevance, adequacy, and appropriateness of the items included. Based on the expert's suggestion, the items were modified, and the tool obtained its final form.

RELIABILITY OF TOOLS

Reliability is the degree of consistency of the instrument or the procedure, regardless of the measurement. This does so consistently. The data collected during the pilot study were used to establish reliability. After obtaining informed consent from the students, the tool was administered to six students in the RS Vishnoi Memorial B.Sc. Nursing College in Jodhpur. Reliability was established using the product-moment Spearman's rho formula. The coefficient of correlation of the knowledge test was $r=0.86$; therefore, the structured questionnaire was found to be reliable.

The reliability of the checklist was tested using an inter-rater method. The students had to perform CPR after obtaining informed consent from them. The reliability of the checklist was ($r=0.88$). Therefore, the checklist was found to be reliable.

PILOT STUDY

The pilot study was a small-scale version or a trial run of the main study. Its function is to obtain information for bringing up the project or assessing its feasibility. The principal focus was to assess the adequacy of the measurements.

A pilot study was conducted in the RS Vishnoi Memorial B.Sc. Nursing College in Jodhpur. The study was conducted on six students who fulfilled the criteria for sample selection using a non-probability purposive sampling method. This was carried out in the same manner as in the final study. To test feasibility and practicability, the study was conducted after obtaining permission from the department. A pilot study was conducted using a knowledge questionnaire and checklist. The results were analyzed based on student scores.

DATA COLLECTION PROCEDURE

Before collecting the data, formal administrative permission was obtained from the Principal, Mai Khadija Institute of Nursing Sciences, Jodhpur, and the Principal, RGM College of Nursing, Jodhpur. The students were approached, the purpose of the study was explained, and confidentiality was assured. Informed consent was obtained from the students before data collection.

The actual data collection period was four weeks from 01/11/ 2023 to 28/2023. Data were collected from 60 students (30 in the control group and 30 in the experimental group) using a structured questionnaire to assess their knowledge and a checklist to assess the skill of CPR. They were comfortable and relaxed. The average time taken by each student to complete the questionnaire and perform CPR was 35–40 minutes. During the data collection period, the students were highly cooperative. Structured teaching was provided after the pretest. Seven days after the structured teaching, a posttest was conducted using the same questionnaire and checklist. Upon completion of the posttest, each participant was given time to clarify their doubts and ask questions.

PLAN FOR DATA ANALYSIS

Data analysis is a systematic organization and synthesis of research data and testing of research hypotheses using data. In the present study, we analyzed the data based on these objectives. The data obtained from the 100 participants were analyzed using descriptive and inferential statistics, as follows:

- Sociodemographic data is analyzed by using descriptive statistics, i.e., frequency and percentage.
- Knowledge and skill regarding CPR among students were analyzed using descriptive statistics such as frequency, percentage, mean percent, and SD.
- Association is analyzed by the Chi-Square Test.
- Correlation is analyzed by the Correlation coefficient 'r.'
- Data is presented in the form of Tables and Diagrams.

DATA ANALYSIS AND INTERPRETATION

Descriptive and inferential statistics were used to analyze the data. The findings were finalized and organized in accordance with the plan for data analysis. This is presented in the following sections.

Section I: Demographic profile of the control group and experimental group of students.

Section II: Knowledge of the control and experimental groups of students regarding CPR.

Section III: Comparison of the pre- and posttest knowledge scores of the control and experimental groups of students regarding CPR.

Section IV: Skills of the control and experimental groups of students regarding CPR.

Section V: Correlation between knowledge and skill of the control and experimental groups of students regarding CPR.

Section VI: Association of posttest knowledge scores of the control and experimental groups with selected demographic variables.

Section VII: Posttest skill scores of the control and experimental groups of students with selected demographic variables.

Section I: Demographic Profile of Control Group and Experimental Group of Students

Table 2 depicts that in the control group, 36.67% of the students were aged between 17 and 19 years, followed by 26.67% of them were aged between 20 and 22 years, and 23 and 25 years, and the remaining 10% of them were aged above 25 years.

Table 2 depicts that in the experimental group, 36.67% of the students were aged between 17 and 19 years, followed by 33.33% of them were aged between 23 and 25 years, 16.67% of them were aged between 20 and 22 years, and the remaining 13.33% of them were aged above 25 years (Figure 3).

Table 3 depicts that in the control group majority, 53.33% of the students were male, and the remaining 46.67% of the students were female.

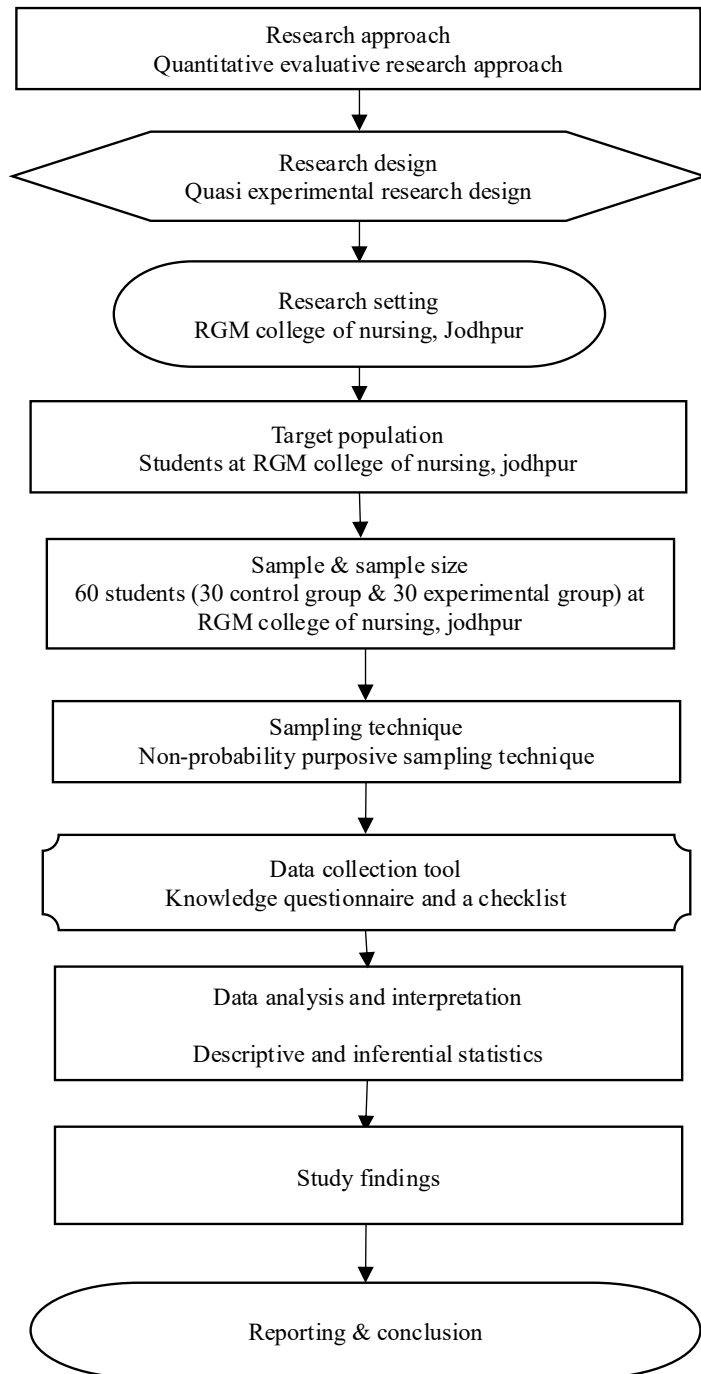


Figure 2. Schematic representation of research design.

Table 2. Frequency and percentage distribution of students by their age, N=60 (30+30).

| 1. Age in years | Control group | | Experimental group | |
|-----------------|------------------|-------------------|--------------------|-------------------|
| | <i>Frequency</i> | <i>Percentage</i> | <i>Frequency</i> | <i>Percentage</i> |
| a. 17–19 | 11 | 36.67 | 11 | 36.67 |
| b. 20–22 | 8 | 26.67 | 5 | 16.67 |
| c. 23–25 | 8 | 26.67 | 10 | 33.33 |
| d. Above 25 | 3 | 10.0 | 4 | 13.33 |
| Total | 30 | 100.0 | 30 | 100.0 |

Table 3 depicts that in the experimental group, 63.33% of the students were male, and the remaining 36.67% of the students were female (Figure 4).

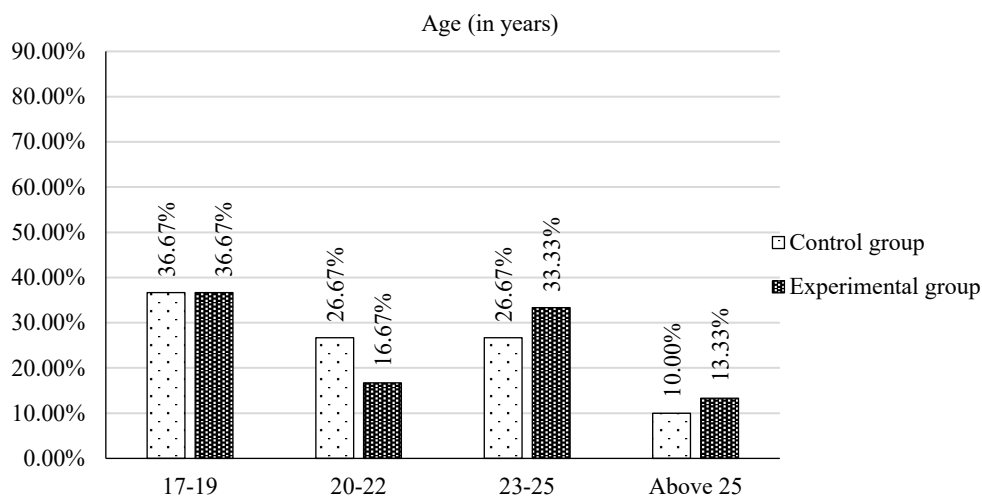


Figure 3. The bar diagram shows the percentage distribution of students by their age.

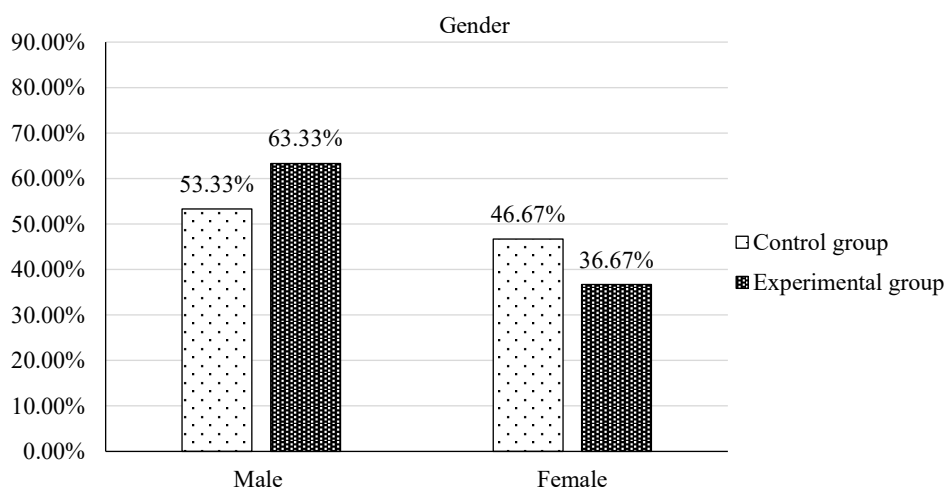


Figure 4. The bar diagram shows the percentage distribution of students by their gender.

Table 3. Frequency and percentage distribution of students by their gender, N=60 (30+30).

| 2. Gender | Control group | | Experimental group | |
|-----------|---------------|------------|--------------------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Male | 16 | 53.33 | 19 | 63.33 |
| b. Female | 14 | 46.67 | 11 | 36.67 |
| Total | 30 | 100.0 | 30 | 100.0 |

Table 4. Frequency and percentage distribution of students by their religion, N=60 (30+30).

| 3. Religion | Control group | | Experimental group | |
|--------------|---------------|------------|--------------------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Hindu | 21 | 70.0 | 21 | 70.0 |
| b. Muslim | 6 | 20 | 7 | 23.33 |
| c. Christian | 3 | 10 | 2 | 6.67 |
| d. Others | 0 | 0.0 | 0 | 0.0 |
| Total | 30 | 100.0 | 30 | 100.0 |

Table 4 shows that in the control group majority, 70% of students belonged to the Hindu religion, followed by 20% of them belonging to the Muslim religion, the remaining 10% of the students belonged to the Christian religion, and none of them belonged to other religions.

Table 4 shows that in the experimental group majority, 70% of students belonged to the Hindu religion, followed by 23.33% of them belonging to the Muslim religion, the remaining 6.67% of the students belonged to the Christian religion, and none of them belonged to other religions (Figure 5).

Table 5 shows that in the control group, 56.67% of the students were from rural areas, and the remaining 43.33% of the students were from urban areas.

Table 5 shows that in experimental groups, 70% of the students were from rural areas, and the remaining 30% of the students were from urban areas (Figure 6).

Table 5. Frequency and percentage distribution of students according to their area of residence, N=60 (30+30).

| 4. Area of residence | Control group | | Experimental group | |
|----------------------|---------------|------------|--------------------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Urban | 13 | 43.33 | 9 | 30.0 |
| b. Rural | 17 | 56.67 | 21 | 70.0 |
| Total | 30 | 100.0 | 30 | 100.0 |

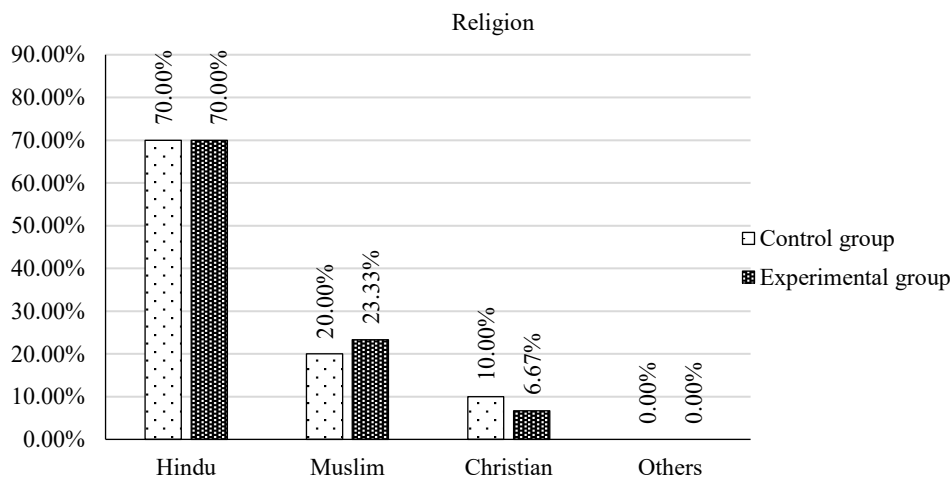


Figure 5. Bar diagram showing the percentage distribution of students by their religion.

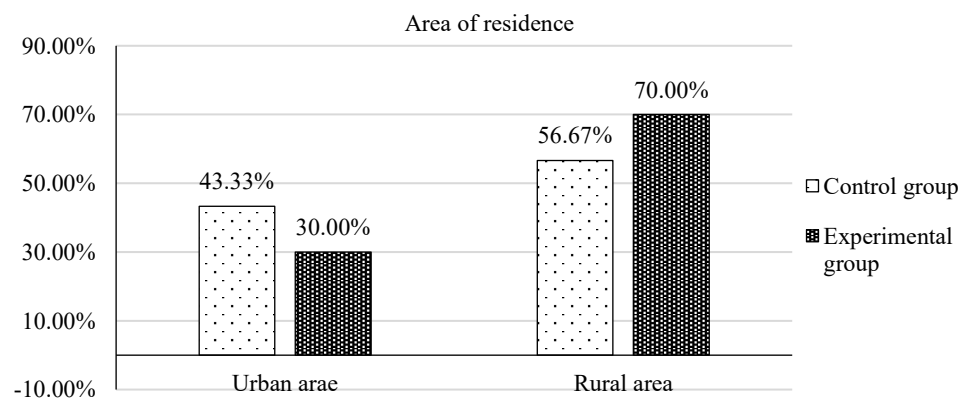


Figure 6. A bar diagram showing the percentage distribution of students according to their area of residence.

Table 6 shows that in the control groups, 53.33% of the students studied in the first year, followed by 30% of them studying in the third year, and the remaining 16.67% of the students studied in the second year.

Table-6 depicts that the majority of the experimental group, 46.67% of the students, were studying in the first year, followed by 33.33% of them studying in the third year, and the remaining 20% of the students were studying in the second year (Figure 7).

Table 6. Frequency and percentage distribution of students by their level of education, N=60 (30+30).

| 5. Level of education | Control group | | Experimental group | |
|-----------------------|---------------|------------|--------------------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. First year | 16 | 53.33 | 14 | 46.67 |
| b. Second year | 5 | 16.67 | 6 | 20.0 |
| c. Third year | 9 | 30.0 | 10 | 33.33 |
| Total | 30 | 100.0 | 30 | 100.0 |

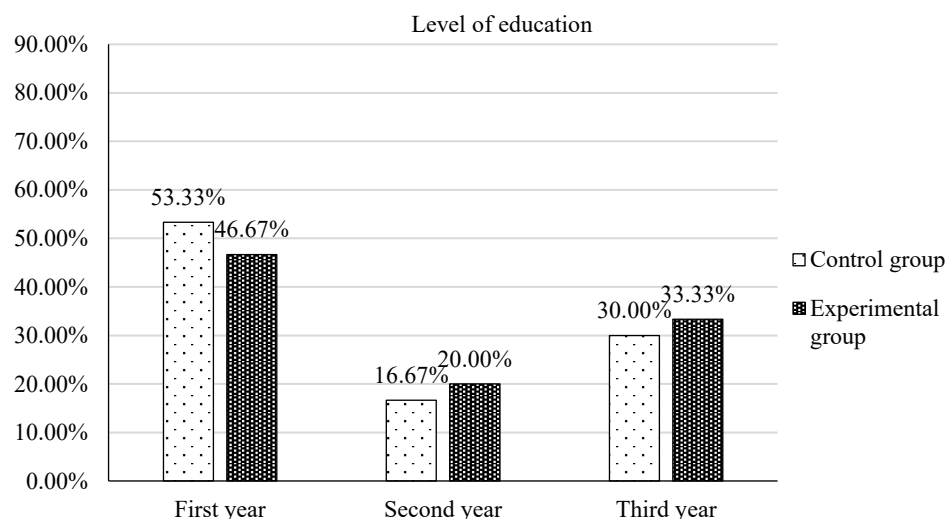


Figure 7. The bar diagram shows the percentage distribution of students by their level of education.

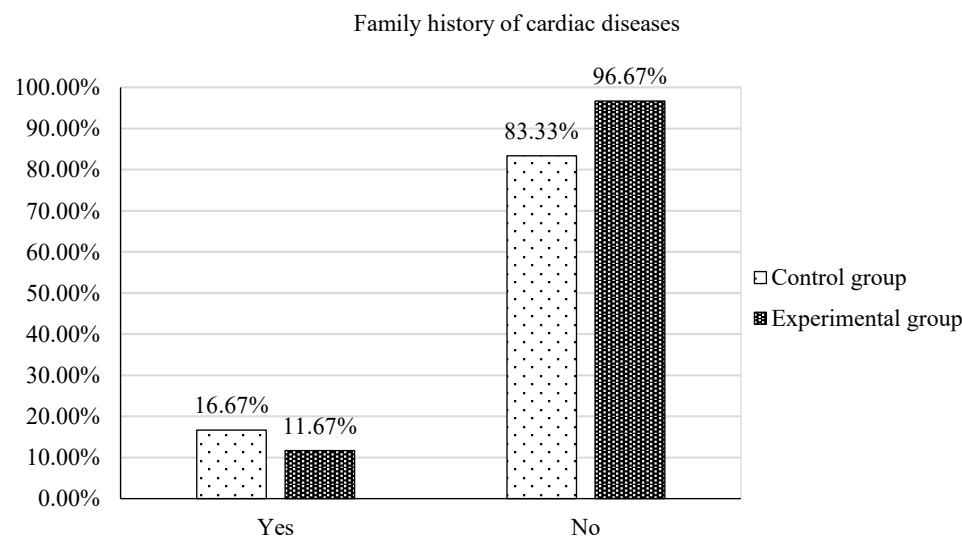


Figure 8. The bar diagram shows the percentage distribution of students according to their Family history of cardiac diseases.

Table 7 shows that in the control group, 83.33% of the students do not have any family history of cardiac diseases, and the remaining 16.67% of the students have a family history of cardiac diseases.

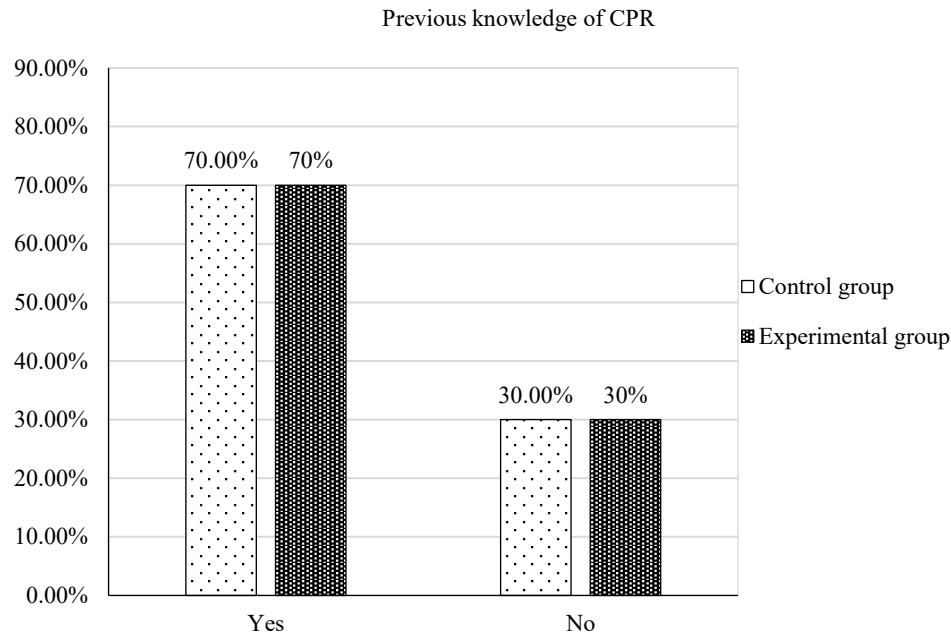


Figure 9. The bar diagram shows the percentage distribution of students by their previous knowledge regarding cardiovascular resuscitation.

Table 7. Frequency and percentage distribution of students according to their Family history of cardiac diseases, N=60 (30+30).

| 6. Family history of cardiac diseases | Control group | | Experimental group | |
|---------------------------------------|---------------|------------|--------------------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Yes | 5 | 16.67 | 1 | 3.33 |
| b. No | 25 | 83.33 | 29 | 96.67 |
| Total | 30 | 100.0 | 30 | 100.0 |

Table 8. Frequency and percentage distribution of students by their previous knowledge regarding cardiovascular resuscitation, N=60 (30+30).

| 7. Previous knowledge regarding cardiovascular resuscitation | Control group | | Experimental group | |
|--|---------------|------------|--------------------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Yes | 21 | 70.0 | 21 | 70.0 |
| b. No | 9 | 30.0 | 9 | 30.0 |
| Total | 30 | 100.0 | 30 | 100.0 |

Table 9. Frequency and percentage distribution of students according to their source of health information, N=60 (30+30).

| 8. Source of health information | Control group | | Experimental group | |
|---------------------------------|---------------|------------|--------------------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Media | 6 | 20 | 6 | 20 |
| b. Health professionals | 22 | 73.33 | 19 | 63.33 |
| c. Family members and relatives | 0 | 0.0 | 2 | 6.67 |
| d. Friends and neighbors | 2 | 6.67 | 3 | 10.0 |
| Total | 30 | 100.0 | 30 | 100.0 |

Table 7 shows that, in experimental groups, 96.67% of the students do not have any family history of cardiac diseases, and the remaining 11.67% of the students had a family history of cardiac diseases (Figure 8).

Table 8 depicts that in the control group majority, 70% of the students, had previous knowledge regarding CPR, and the remaining 30% of the students did not have previous knowledge regarding CPR.

Table 8 shows that in the experimental groups, 70% of the students had previous knowledge regarding cardio CPR, and the remaining 30% of the students did not have previous knowledge regarding cardiopulmonary resuscitation (Figure 9).

Table 9 depicts that in the control group majority of 73.33% of the students acquired information from health professionals, followed by 20% of them acquired information from the media, 6.67% of them acquired information from friends and neighbors, and none of them acquired information from family members and relatives.

Table 9 depicts that, in the control group majority of 63.33%) of the students acquired information from health professionals, followed by 20% of them acquired information from the media, 10% of them acquired information from friends and neighbors, and the remaining 6.67% of them acquired information from family members and relatives (Figure 10).

Section II: Knowledge of the Control Group and Experimental Group of Students Regarding CPR

Table 10 shows that in the control group majority, 53.33% of the students had moderate knowledge, followed by 26.67% of them having inadequate knowledge, and 20% of the students had adequate knowledge regarding CPR in the pretest. In the posttest without administration of structured teaching programs, 50% of the students had moderate knowledge, followed by 30% of them had adequate knowledge, and 20% of the students had inadequate knowledge regarding CPR in the posttest (Figure 11).

Table 10. Frequency and percentage of knowledge of the control group of students regarding cardiopulmonary resuscitation, N=30.

| Knowledge level | Pretest | | Posttest | |
|-------------------------|-----------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Inadequate knowledge | 8 | 26.67 | 6 | 20.0 |
| b. Moderate knowledge | 16 | 53.33 | 15 | 50.0 |
| c. Adequate knowledge | 6 | 20.0 | 9 | 30.0 |
| Total | 30 | 100.0 | 30 | 100.0 |

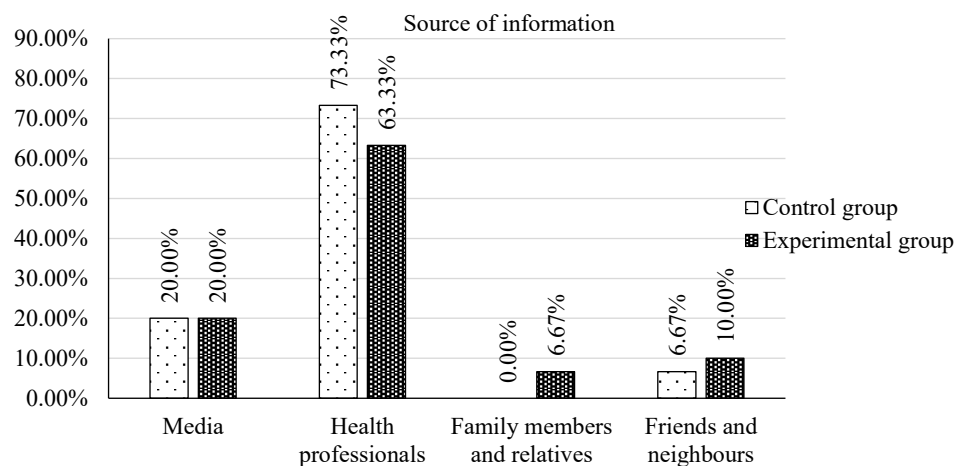


Figure 10. Bar diagram showing the percentage distribution of students according to their previous source of knowledge.

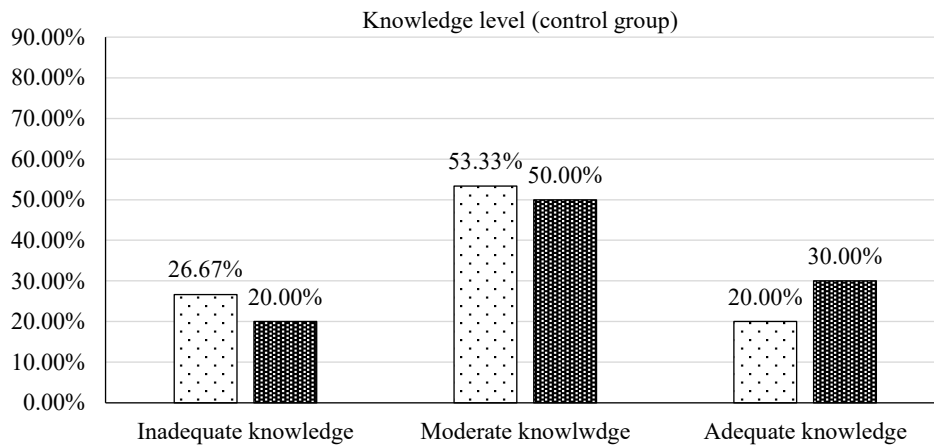


Figure 11. The bar diagram shows the percentage distribution of the knowledge level of the control group of students.

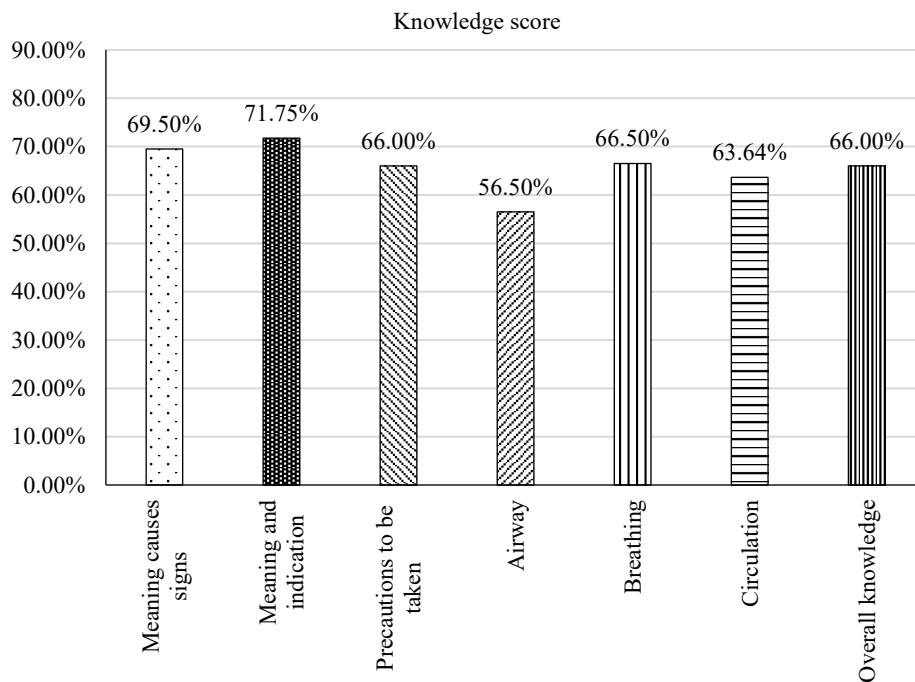


Figure 12. The bar diagram shows the mean percentage of knowledge score of the control group of students in the pretest.

Table 11. Mean, mean percentage, and standard deviation for the knowledge score of the control group of students in the pretest, N=30.

| S.N. | Domains | No. of items | Max score | Mean | Mean% | Median | SD |
|------|---|--------------|-----------|-------|-------|--------|------|
| 1 | Meaning, causes, signs, and symptoms of cardiac arrest. | 6 | 6 | 4.17 | 69.50 | 3 | 1.37 |
| 2. | Meaning and indication for CPR | 4 | 4 | 2.87 | 71.75 | 3 | 0.82 |
| 3. | Precautions to be taken during CPR | 5 | 5 | 3.3 | 66.0 | 3 | 1.26 |
| 4. | Airway | 2 | 2 | 1.13 | 56.50 | 1 | 0.78 |
| 5. | Breathing | 2 | 2 | 1.33 | 66.50 | 1 | 0.66 |
| 6. | Circulation | 11 | 11 | 7 | 63.64 | 5 | 1.62 |
| | Overall knowledge | 30 | 30 | 19.80 | 66.0 | 15 | 4.25 |

Table 11 shows that in control group, the maximum pretest mean percentage obtained by the students was found in the aspect of meaning and indication for CPR (71.75%), followed by 69.50% in the aspect of meaning, causes, signs, and symptoms of cardiac arrest, 66.50% in the aspect of breathing, 66% in the aspect of precautions to be taken during CPR, 63.64% in the aspect of circulation, and least mean percentage obtained in the aspect of airway (56.60%). The overall mean \pm SD of pretest knowledge score of students was 19.80 \pm 4.25, and the mean percentage was 66% (Figure 12).

Table 12 shows that in control group, the maximum posttest mean percentage obtained by the students was found in the aspect of meaning and indication for CPR (72.50%), followed by 71.67% in the aspect of meaning, causes, signs, and symptoms of cardiac arrest, 68.60% in the aspect of precautions to be taken during CPR, 66.50% in the aspect of breathing, 66.09% in the aspect of circulation, and least mean percentage obtained in the aspect of airway (56.50%). The overall mean \pm SD of posttest knowledge score of students was 20.37 \pm 4.28 and a mean percentage of 67.90% (Figure 13).

Table 13 shows that in the experimental group majority, 50% of the students had moderate knowledge, followed by 43.33% of them having inadequate knowledge, and 6.67% of the students had adequate knowledge regarding CPR in the pretest. After administration of the STP, 66.67% of the students had adequate knowledge, followed by 30% of them having moderate knowledge, and 3.33% of the students had inadequate knowledge regarding CPR in the posttest (Figure 14).

Table 12. Mean, Mean percentage, and standard deviation for the knowledge score of the control group of students in posttest (N=30).

| S.N. | Domains | No. of items | Max. score | Mean | Mean% | Median | SD |
|-------------------|--|--------------|------------|-------|-------|--------|------|
| 1 | Meaning, causes, signs, and symptoms of cardiac arrest | 6 | 6 | 4.3 | 71.67 | 5 | 1.39 |
| 2. | Meaning and indication for CPR | 4 | 4 | 2.9 | 72.50 | 3 | 0.84 |
| 3. | Precautions to be taken during CPR | 5 | 5 | 3.43 | 68.60 | 4 | 1.22 |
| 4. | Airway | 2 | 2 | 1.13 | 56.50 | 1 | 0.78 |
| 5. | Breathing | 2 | 2 | 1.33 | 66.50 | 2 | 0.66 |
| 6. | Circulation | 11 | 11 | 7.27 | 66.09 | 8 | 1.72 |
| Overall knowledge | | 30 | 30 | 20.37 | 67.90 | 24 | 4.28 |

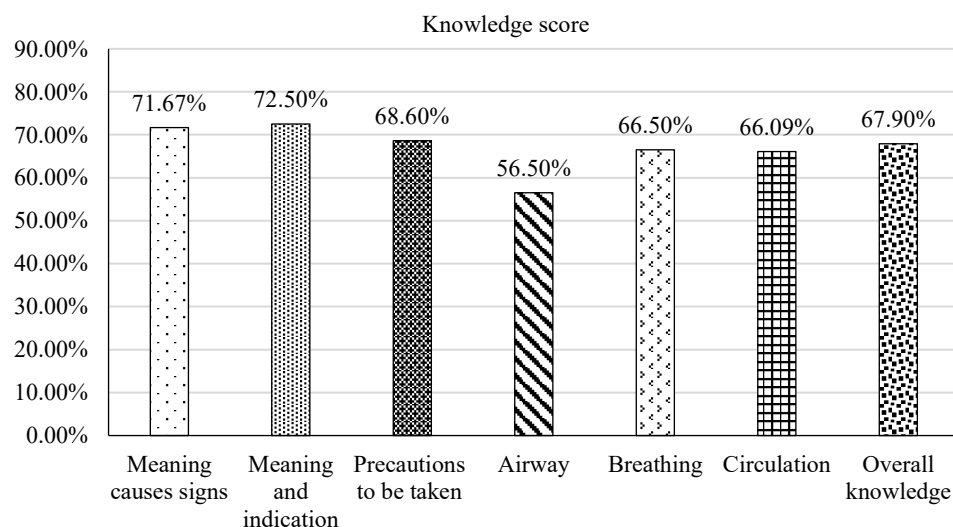


Figure 13. The bar diagram shows the mean percentage of knowledge score of the control groups of students in the posttest.

Table 14 shows that in experimental group, the maximum pretest mean percentage obtained by the students was found in the aspect of meaning and indication for CPR (71.75%), followed by 60.50% in the aspect of meaning, causes, signs, and symptoms of cardiac arrest, 58% in the aspect of precautions to be taken during CPR, 48.50% in the aspect of airway, 48.50% in the aspect of circulation, and least mean percentage obtained in the aspect of breathing (43.50%). The overall mean±SD of pretest knowledge score of experimental groups of students was 16.57±4.96, and the mean percentage was 55.23% (Figure 15).

Table 15 shows that in experimental group, the maximum posttest mean percentage obtained by the students was found in the aspect of meaning, causes, signs, and symptoms of cardiac arrest (85.50%), followed by 83.50% in the aspect of breathing, 82.50% in the aspect of meaning and indication for CPR, 76% in the aspect of precautions to be taken during CPR, 73.50% in the aspect of airway, and least mean percentage obtained in the aspect of circulation (73%). The overall mean±SD of posttest knowledge score of experimental groups of students was 20.37±4.28 and a mean percentage of 78% (Figure 16).

Table 13. Frequency and percentage of knowledge of the experimental group of students regarding CPR, N=30.

| Knowledge level | Pretest | | Posttest | |
|----------------------|-----------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| Inadequate knowledge | 13 | 43.33 | 1 | 3.33 |
| Moderate knowledge | 15 | 50.0 | 9 | 30.0 |
| Adequate knowledge | 2 | 6.67 | 20 | 66.67 |
| Total | 30 | 100.0 | 30 | 100.0 |

Table 14. Mean, mean percentage, and standard deviation for the knowledge score of experimental groups of students in the pretest (N=30).

| S.N. | Domains | No. of items | Max score | Mean | Mean% | Median | SD |
|-------------------|---|--------------|-----------|-------|-------|--------|------|
| 1 | Meaning, causes, signs, and symptoms of cardiac arrest. | 6 | 6 | 3.63 | 60.50 | 4 | 1.59 |
| 2. | Meaning and indication for CPR | 4 | 4 | 2.87 | 71.75 | 3 | 1.08 |
| 3. | Precautions to be taken during CPR | 5 | 5 | 2.9 | 58.0 | 3 | 1.42 |
| 4. | Airway | 2 | 2 | 0.97 | 48.50 | 1 | 0.72 |
| 5. | Breathing | 2 | 2 | 0.87 | 43.50 | 1 | 0.82 |
| 6. | Circulation | 11 | 11 | 5.33 | 48.45 | 5 | 1.79 |
| Overall knowledge | | 30 | 30 | 16.57 | 55.23 | 17 | 4.96 |

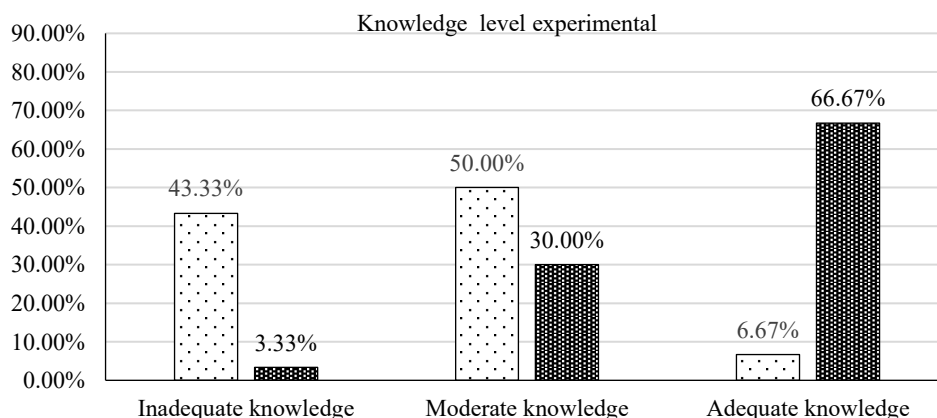


Figure 14. The bar diagram shows the percentage distribution of the knowledge level of the experimental group of students.

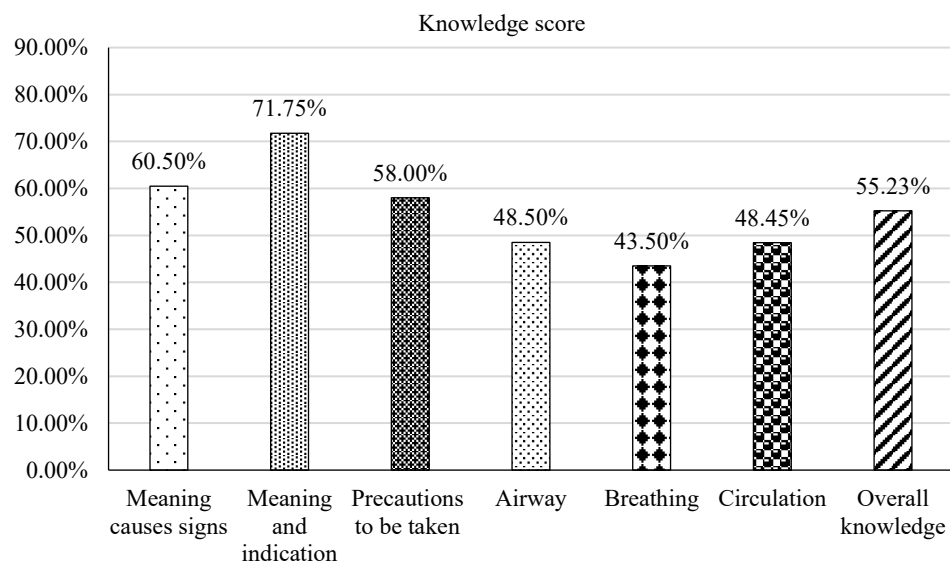


Figure 15. The bar diagram shows the mean percentage of knowledge score of experimental groups of students in the pretest.

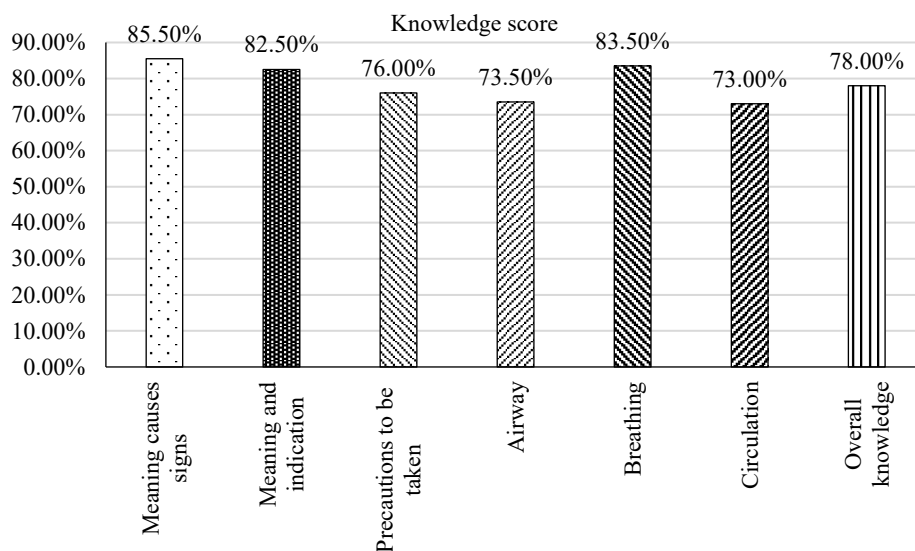


Figure 16. The bar diagram shows the mean percentage of knowledge scores of experimental groups of students in the posttest.

Table 15. Mean, Mean percentage, and standard deviation for the knowledge score of experimental groups of students in posttest (N=30).

| S.N.. | Domains | No. of items | Max score | Mean | Mean% | Median | SD |
|-------|---|--------------|-----------|-------|-------|--------|------|
| 1 | Meaning, Causes, Signs, and Symptoms of Cardiac Arrest. | 6 | 6 | 5.13 | 85.50 | 6 | 1 |
| 2. | Meaning And Indication For CPR | 4 | 4 | 3.3 | 82.50 | 3 | 0.84 |
| 3. | Precautions to be Taken During CPR | 5 | 5 | 3.8 | 76.0 | 4 | 1.13 |
| 4. | Airway | 2 | 2 | 1.47 | 73.50 | 2 | 0.57 |
| 5. | Breathing | 2 | 2 | 1.67 | 83.50 | 2 | 0.61 |
| 6. | Circulation | 11 | 11 | 8.03 | 73.0 | 8 | 1.54 |
| | Overall knowledge | 30 | 30 | 20.37 | 78.0 | 24 | 4.28 |

Section III: Comparison of Pretest and Posttest Knowledge Scores of Control Group and Experimental Group of Students Regarding CPR

From Table 16, it is evident that in the control group of students, the obtained “t” value 1.07 is less than the table value at the 0.05 level of significance. Therefore, the “t” value is found to be non-significant. This means that there was no gain in the knowledge level of the control group of students regarding CPR (Figure 17).

From Table 17, it is evident that in the experimental group of students, the obtained “t” value of 12.80 is greater than the table value at the 0.05 level of significance. Therefore, the “t” value is found to be significant. This means that there was a significant gain in the knowledge level of students regarding CPR. This supports the notion that an STP regarding CPR is effective in increasing students’ knowledge level (Figure 18).

Table 16. Comparison of pretest and posttest knowledge scores of the control group of students regarding CPR, N=30.

| S.N.. | Knowledge aspects | Pretest | | Posttest | | Mean difference | T value | Df | Inference |
|-------------------|---|---------|------|----------|------|-----------------|---------|----|-----------|
| | | Mean | SD | Mean | SD | | | | |
| 1. | Meaning, causes, signs, and symptoms of cardiac arrest. | 4.17 | 1.37 | 4.3 | 1.39 | 0.13 | 0.4286 | 59 | Ns |
| 2. | Meaning and indication for CPR | 2.87 | 0.82 | 2.9 | 0.84 | 0.03 | 0.12758 | 59 | Ns |
| 3. | Precautions to be taken during CPR | 3.3 | 1.26 | 3.43 | 1.22 | 0.13 | 0.45206 | 59 | Ns |
| 4. | Airway | 1.13 | 0.78 | 1.13 | 0.78 | 0 | 0 | 59 | S |
| 5. | Breathing | 1.33 | 0.66 | 1.33 | 0.66 | 0 | 0 | 59 | Ns |
| 6. | Circulation | 7 | 1.62 | 7.27 | 1.72 | 0.27 | 0.80933 | 59 | Ns |
| Overall knowledge | | 19.8 | 4.25 | 20.37 | 4.28 | 0.57 | 1.06904 | 59 | Ns |

NS, not significant; S, significant

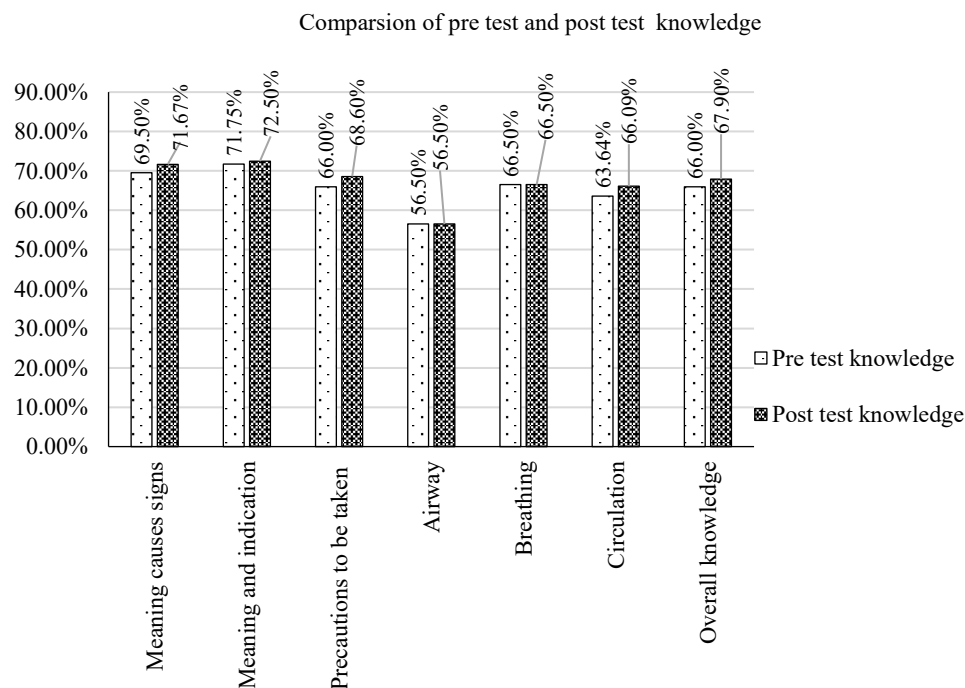


Figure 17. The bar diagram shows the comparison of pretest and posttest knowledge scores of students.

Table 17. Comparison of pretest and posttest knowledge scores of experimental groups of students regarding CPR, N=30.

| S.N. | Knowledge aspects | Pretest | | Posttest | | Mean difference | T value | Df | Inference |
|-------------------|---|---------|------|----------|------|-----------------|----------|----|-----------|
| | | Mean | SD | Mean | SD | | | | |
| 1. | Meaning, causes, signs, and symptoms of cardiac arrest. | 3.63 | 1.59 | 5.13 | 1 | 1.5 | 5.106209 | 59 | S |
| 2. | Meaning and indication for CPR | 2.87 | 1.08 | 3.3 | 0.84 | 0.43 | 1.699739 | 59 | S |
| 3. | Precautions to be taken during CPR | 2.9 | 1.42 | 3.8 | 1.13 | 0.9 | 3.087055 | 59 | S |
| 4. | Airway | 0.97 | 0.72 | 1.47 | 0.57 | 0.5 | 2.411265 | 59 | S |
| 5. | Breathing | 0.87 | 0.82 | 1.67 | 0.61 | 0.8 | 3.663004 | 59 | S |
| 6. | Circulation | 5.33 | 1.79 | 8.03 | 1.54 | 2.7 | 8.104214 | 59 | S |
| Overall Knowledge | | 16.57 | 4.96 | 23.40 | 3.58 | 6.83 | 12.80 | 59 | S |

NS, not significant; S, significant

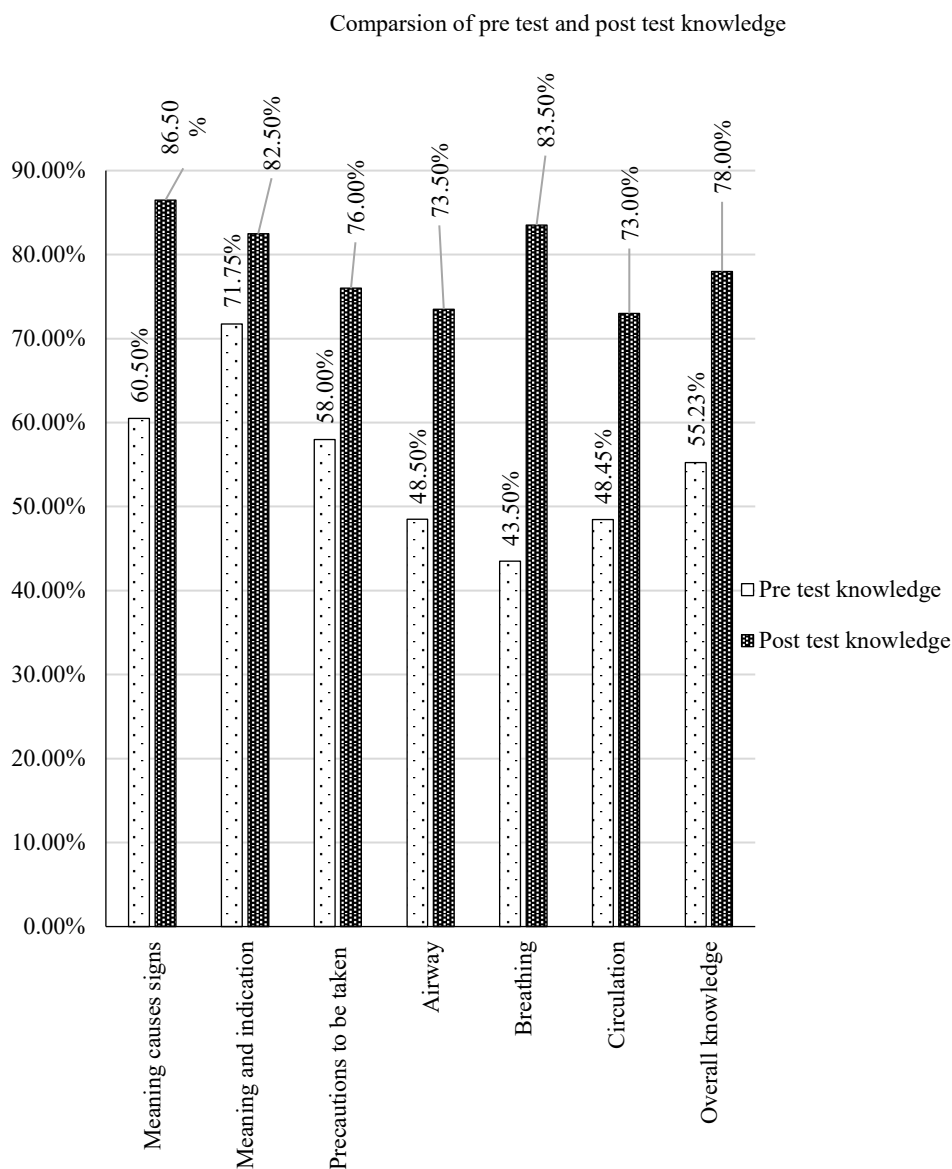


Figure 18. Bar diagram showing comparison of pretest and posttest knowledge scores of experimental groups of students.

Section IV: Skills of the Control Group and Experimental Group of Students Regarding CPR

Table 18 reveals that in the control group majority, 46.67% of the students had average skills, followed by 40% of them had poor skills, and 14.33% of the students had good skills regarding CPR in the pretest. In the posttest without administration of an STP regarding CPR, 53.33% of the students had average skills, followed by 26.67% of them having poor skills, and 20% of the students had good skills regarding CPR (Figure 19).

Table 19 reveals that in the experimental group majority, 60% of the students had poor skills, followed by 23.33% of them had average skills, and 16.67% of the students had good skills regarding CPR in the pretest. After administration of an STP regarding CPR, 60% of the students had good skills, followed by 26.67% of them had average skills, and 13.33% of the students had poor skills regarding CPR in the posttest (Figure 20).

Table 18. Frequency and percentage of knowledge of the control group of students regarding CPR, N=30.

| Skill level | Pretest | | Posttest | |
|------------------|-----------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Poor Skill | 12 | 40.0 | 8 | 26.67 |
| b. Average Skill | 14 | 46.67 | 16 | 53.33 |
| c. Good Skill | 4 | 14.33 | 6 | 20.0 |
| Total | 30 | 100.0 | 30 | 100.0 |

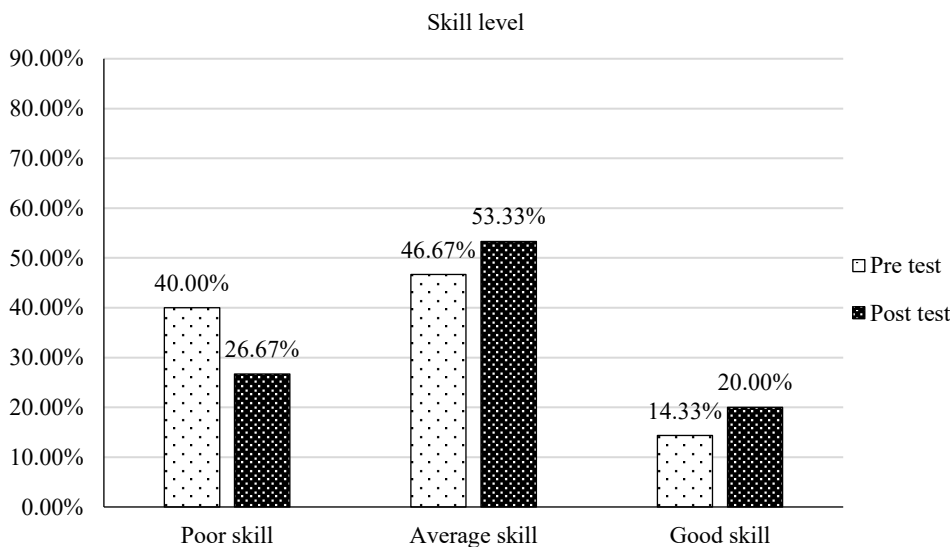


Figure 19. The bar diagram shows the percentage distribution of the knowledge level of students.

Table 19. Frequency and percentage of knowledge of experimental groups of students regarding CPR, N=30

| Skill level | Pretest | | Posttest | |
|------------------|-----------|------------|-----------|------------|
| | Frequency | Percentage | Frequency | Percentage |
| a. Poor Skill | 18 | 60.0 | 4 | 13.33 |
| b. Average Skill | 7 | 23.33 | 8 | 26.67 |
| c. Good Skill | 5 | 16.67 | 18 | 60.0 |
| Total | 30 | 100.0 | 30 | 100.0 |

Section V: Correlation Of Knowledge and Skill Scores of Control Group and Experimental Group of Students

Table 20 shows that in the control group of students, the overall pretest mean±SD of knowledge score of students was 19.80±4.25 with a mean percentage of 66%, and the overall pretest mean±SD of skill score of students was 10.67±3.23 with a mean percentage of 59.27%. The computed value of Karl Pearson’s correlation coefficient was +0.324. This shows that there is a positive relationship between the overall knowledge score and the overall skill score of students in the pretest.

Table 20. Correlation between overall knowledge score and overall skill score of the control group of students in pretest, N=30.

| S.N. | Knowledge aspects | No. of items | Max score | Mean | Mean% | SD | Correlation coefficient (r) |
|------|-------------------|--------------|-----------|-------|-------|------|-----------------------------|
| 1. | Overall Knowledge | 30 | 30 | 19.80 | 66.0 | 4.25 | 0.324 |
| 2. | Overall Skill | 18 | 18 | 10.67 | 59.27 | 3.23 | |

NS, not significant; S, significant

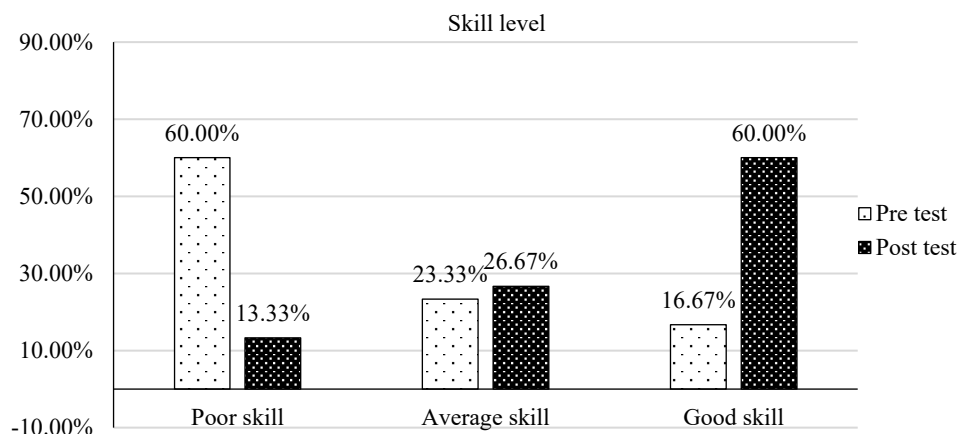


Figure 20. The bar diagram shows the percentage distribution of the knowledge level of students.

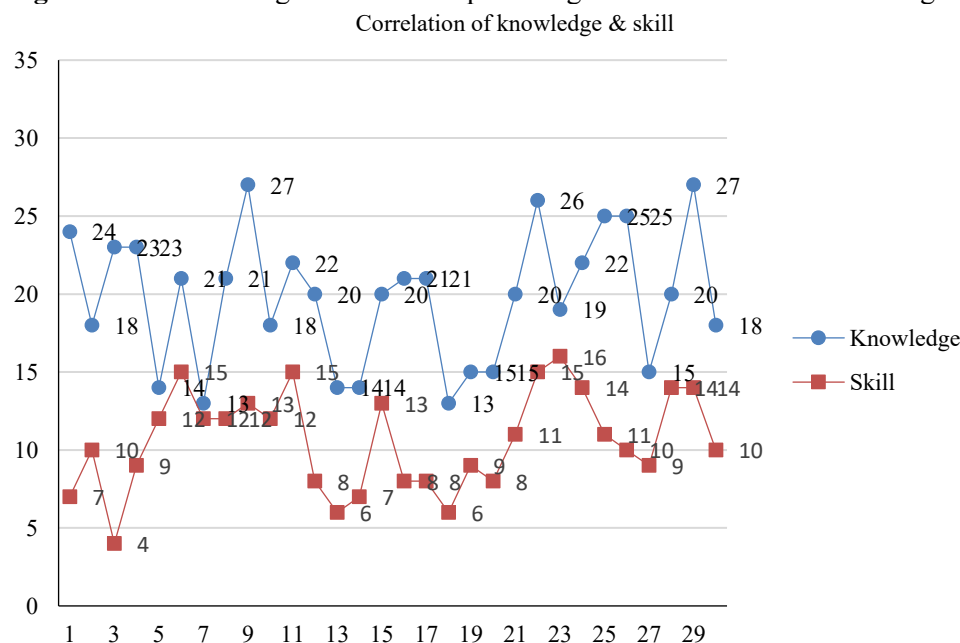


Figure 21. Line diagram showing the correlation of knowledge scores and skill scores of students regarding CPR in the pretest.

In the control group, the obtained r value of 0.324 was greater than the table value of 0.250, at a significance level of 0.05. Therefore, the “ r ” value is found to be significant. Hence, the hypothesis states that there will be a significant positive relationship between the overall knowledge and skill scores of students (Figure 21).

Table 21 shows that in the control group of students, the overall posttest mean \pm SD of knowledge score of students was 20.37 \pm 4.28 with a mean percentage of 67.90%, and the overall posttest mean \pm SD of skill score of students was 11.43 \pm 2.73, with a mean percentage of 63.50%. The computed value of Karl Pearson’s correlation coefficient was +0.267, which shows that there is a positive relationship between the overall knowledge score and the overall skill score of students in the posttest.

In the control group, the obtained r value of 0.267 was greater than the table value of 0.250 at a significance level of 0.05. Therefore, the “ r ” value is found to be significant. Hence, the hypothesis states that there will be a significant positive relationship between the overall knowledge and skill scores of students (Figure 22).

Table 22 shows that in the experimental group of students, the overall pretest mean \pm SD of the knowledge score of students was 16.57 \pm 4.96 with a mean percentage of 55.23%. The overall mean \pm SD of skill score of students was 9.87 \pm 3.47 with a mean percentage of 54.83%. The computed value of Karl Pearson’s correlation coefficient was +0.261, which shows that there is a positive relationship between the overall knowledge score and the overall skill score of students in the pretest.

Table 21. Correlation between overall knowledge score and overall skill score of the control group of students in posttest, N=30.

| S.N. | Knowledge aspects | No. of items | Max score | Mean | Mean% | SD | Correlation coefficient (r) |
|------|-------------------|--------------|-----------|-------|-------|------|-----------------------------|
| 1. | Overall knowledge | 30 | 30 | 20.37 | 67.90 | 4.28 | 0.267 |
| 2. | Overall skill | 18 | 18 | 11.43 | 63.50 | 2.73 | |

NS, not significant; S, significant

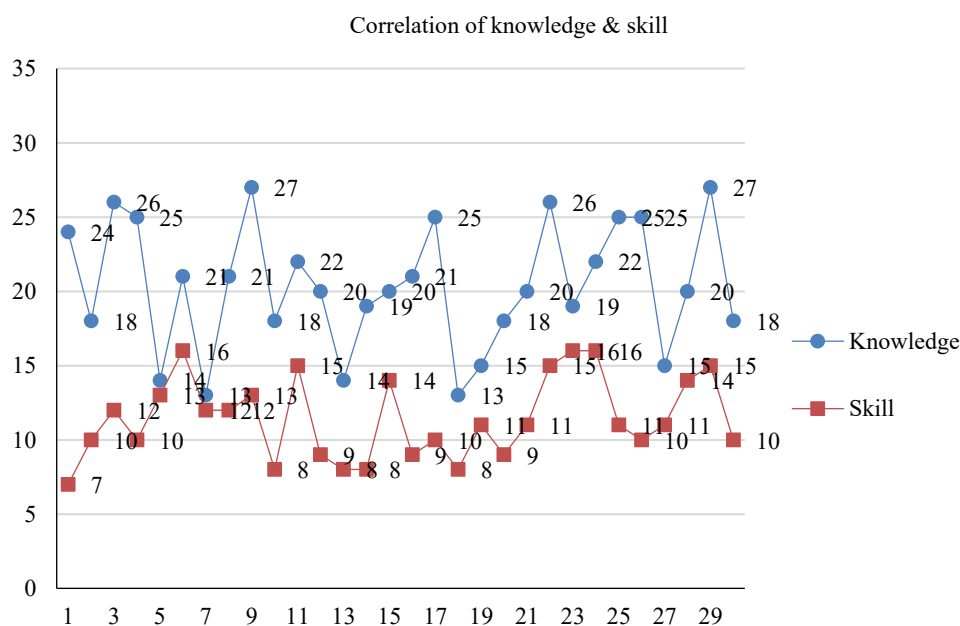


Figure 22. Line diagram showing the correlation of knowledge scores and skill scores of the control group of students regarding CPR in the posttest.

Table 22. Correlation between overall knowledge score and overall skill score of experimental groups of students in pretest (N=30).

| S.N. | Knowledge aspects | No. of items | Max score | Mean | Mean% | SD | Correlation coefficient (r) |
|------|-------------------|--------------|-----------|-------|-------|------|-----------------------------|
| 1. | Overall Knowledge | 30 | 30 | 16.57 | 55.23 | 4.96 | 0.261 |
| 2. | Overall Skill | 18 | 18 | 9.87 | 54.83 | 3.47 | |

NS, not significant; S, significant

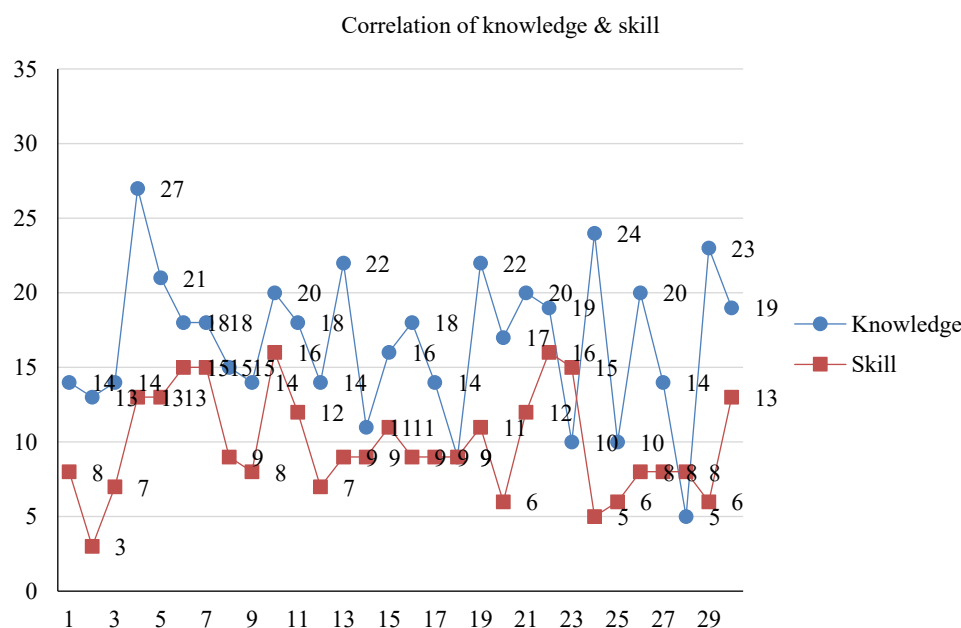


Figure 23. Line diagram showing the correlation of knowledge scores and skill scores of experimental groups of students regarding CPR in the pretest.

Table 23. Correlation between overall knowledge score and overall skill score of experimental groups of students in posttest, N=30.

| S.N. | Knowledge aspects | No. of items | Max. score | Mean | Mean% | SD | Correlation coefficient (r) |
|------|-------------------|--------------|------------|-------|-------|------|-----------------------------|
| 1. | Overall Knowledge | 30 | 30 | 23.4 | 78.0 | 3.58 | 0.265 |
| 2. | Overall Skill | 18 | 18 | 13.27 | 73.71 | 3.29 | |

NS, not significant; S, significant

In the experimental group, the obtained r value of 0.261 was greater than the table value of 0.250, at a significance level of 0.05. Therefore, the “r” value is found to be significant. Hence, the hypothesis states that there will be a significant positive relationship between the overall knowledge and skill scores of students (Figure 23).

Table 23 shows that in the experimental group of students, the overall posttest mean±SD of the knowledge score of students was 23.40±3.58 with a mean percentage of 78%. The overall mean±SD of skill score of students was 13.27±3.29 with a mean percentage of 73.71%. The computed value of Karl Pearson’s correlation coefficient was +0.265, which shows that there is a positive relationship between the overall knowledge score and the overall skill score of students.

In the experimental group of students, the obtained r value of 0.265 was greater than the Table value of 0.250 at a significance level of 0.05. Therefore, the “r” value is found to be significant. Hence, the hypothesis states that there will be a significant positive relationship between the overall knowledge and skill scores of students (Figure 24).

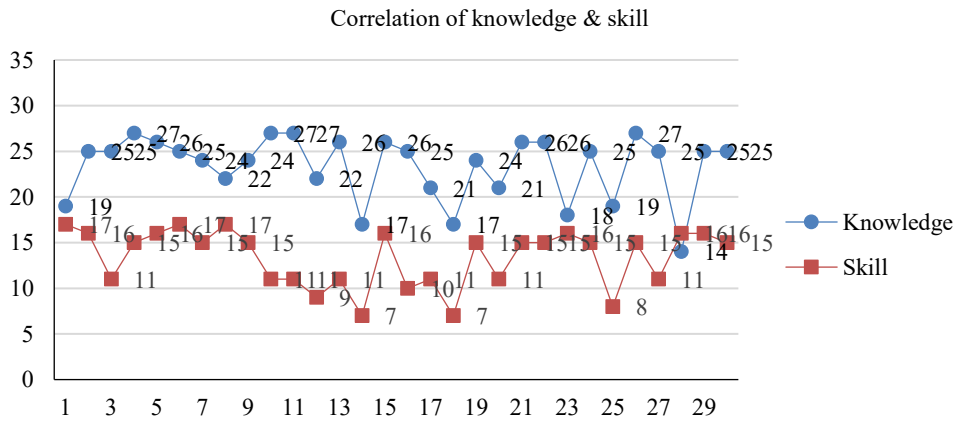


Figure 24. Line diagram showing the correlation of knowledge scores and skill scores of experimental groups of students regarding CPR in the posttest.

Table 24. Association of posttest knowledge of scores of the control group of students with selected demographic variables, N=30.

| Variables | Inadequate knowledge | Moderate knowledge | Adequate knowledge | Chi-square χ^2 | Df | P-value (0.05) | Inference |
|---|----------------------|--------------------|--------------------|---------------------|----|----------------|-----------|
| 1. Age in years | | | | | | | |
| a. 17–19 | 1 | 6 | 3 | 5.23 | 6 | 12.59 | NS |
| b. 20–22 | 3 | 5 | 1 | | | | |
| c. 23–25 | 2 | 3 | 3 | | | | |
| d. Above 25 | 0 | 1 | 2 | | | | |
| 2. Gender | | | | | | | |
| a. Male | 5 | 8 | 2 | 5.51 | 2 | 5.99 | NS |
| b. Female | 1 | 7 | 7 | | | | |
| 3. Religion | | | | | | | |
| a. Hindu | 4 | 14 | 6 | 3.92 | 6 | 12.59 | NS |
| b. Muslim | 1 | 1 | 2 | | | | |
| c. Christian | 1 | 0 | 1 | | | | |
| d. Others | 0 | 0 | 0 | | | | |
| 4. Area of residence | | | | | | | |
| a. Urban area | 1 | 10 | 2 | 6.70 | 2 | 5.99 | S |
| b. Rural area | 5 | 5 | 7 | | | | |
| 5. Level of education | | | | | | | |
| a. First year | 3 | 9 | 3 | 4.50 | 4 | 9.49 | NS |
| b. Second year | 2 | 3 | 1 | | | | |
| c. Third year | 1 | 3 | 5 | | | | |
| 6. Family history of cardiac diseases | | | | | | | |
| a. Yes | 2 | 3 | 1 | 1.11 | 2 | 5.99 | NS |
| b. No | 4 | 12 | 8 | | | | |
| 7. Previous knowledge regarding cardiovascular resuscitation | | | | | | | |
| a. Yes | 5 | 10 | 6 | 7.83 | 2 | 5.99 | S |
| b. No | 1 | 5 | 3 | | | | |
| 8. Source of health information | | | | | | | |
| a. Media | 2 | 1 | 3 | 4.12 | 6 | 12.59 | NS |
| b. Health professionals | 4 | 13 | 5 | | | | |
| c. Family members and relatives | 0 | 0 | 0 | | | | |
| d. Friends and neighbors | 0 | 1 | 1 | | | | |

NS, not significant; S, significant

Section VI: Association of Knowledge of Scores of Control Group and Experimental Group of Students with Selected Demographic Variables

Table 24 shows the χ^2 value computed between the knowledge of the control group of students regarding CPR and selected demographic variables. Variables such as area of residence and previous knowledge regarding CPR were significant at the level of 0.05. Variables such as age in years, sex, religion, level of education, family history of cardiac diseases, and source of health information were not significant at the level of 0.05; therefore, the hypothesis stated that there would be a significant association between knowledge of students regarding CPR and selected demographic variables.

Table 25. Association of posttest knowledge of scores of experimental groups of students with selected demographic variables, N=30.

| Variables | Inadequate knowledge | Moderate knowledge | Adequate knowledge | Chi-square χ^2 | D f | P-value (0.05) | Inference |
|---|----------------------|--------------------|--------------------|---------------------|-----|----------------|-----------|
| 1. Age in years | | | | | | | |
| a. 17–19 | 0 | 1 | 10 | 13.64 | 6 | 12.59 | S |
| b. 20–22 | 0 | 1 | 4 | | | | |
| c. 23–25 | 0 | 6 | 4 | | | | |
| d. Above 25 | 1 | 1 | 2 | | | | |
| 2. Gender | | | | | | | |
| a. Male | 1 | 6 | 12 | 0.72 | 2 | 5.99 | NS |
| b. Female | | 3 | 8 | | | | |
| 3. Religion | | | | | | | |
| a. Hindu | 1 | 5 | 15 | 1.60 | 6 | 12.59 | NS |
| b. Muslim | | 3 | 4 | | | | |
| c. Christian | | 1 | 1 | | | | |
| d. Others | 0 | 0 | 0 | | | | |
| 4. Area of residence | | | | | | | |
| a. Urban area | | 3 | 6 | 0.476 | 2 | 5.99 | NS |
| b. Rural area | 1 | 6 | 14 | | | | |
| 5. Level of education | | | | | | | |
| a. First year | 1 | 1 | 12 | 12.30 | 4 | 9.49 | S |
| b. Second year | 0 | 1 | 5 | | | | |
| c. Third year | 0 | 7 | 3 | | | | |
| 6. Family history of cardiac diseases | | | | | | | |
| a. Yes | | | 1 | 0.517 | 2 | 5.99 | NS |
| b. No | 1 | 9 | 19 | | | | |
| 7. Previous knowledge regarding cardiovascular resuscitation | | | | | | | |
| a. Yes | 1 | 3 | 17 | 8.33 | 2 | 5.99 | S |
| b. No | | 6 | 3 | | | | |
| 8. Source of health information | | | | | | | |
| a. Media | 0 | 2 | 4 | 14.74 | 6 | 12.59 | S |
| b. Health professionals | 0 | 6 | 13 | | | | |
| c. Family members and relatives | 1 | 0 | 1 | | | | |
| d. Friends and neighbors | 0 | 1 | 2 | | | | |

NS, not significant; S, significant

Table 25 shows the χ^2 value computed between the knowledge of the experimental group of students regarding CPR and selected demographic variables. Variables such as age in years, level of education, previous knowledge regarding CPR, and source of health information were significant at the 0.05 level. Variables such as gender, religion, area of residence, and family history of cardiac diseases were not significant at the level of 0.05; therefore, the hypothesis stated that there would be a significant association between knowledge of students regarding CPR and selected demographic variables.

Table 26. Association of posttest skill scores of the control group of students with selected demographic variables, N=30.

| Variables | Poor skill | Average skill | Good skill | Chi-square χ^2 | Df | P-value (0.05) | Inference |
|---|------------|---------------|------------|---------------------|----|----------------|-----------|
| 1. Age in years | | | | | | | |
| a. 17–19 | 3 | 5 | 3 | 3.40 | 6 | 12.59 | NS |
| b. 20–22 | 2 | 4 | 2 | | | | |
| c. 23–25 | 2 | 6 | | | | | |
| d. Above 25 | 1 | 1 | 1 | | | | |
| 2. Gender | | | | | | | |
| a. Male | 3 | 10 | 3 | 1.37 | 2 | 5.99 | NS |
| b. Female | 5 | 6 | 3 | | | | |
| 3. Religion | | | | | | | |
| a. Hindu | 5 | 11 | 5 | 1.12 | 6 | 12.59 | NS |
| b. Muslim | 2 | 3 | 1 | | | | |
| c. Christian | 1 | 2 | | | | | |
| d. Others | 0 | 0 | 0 | | | | |
| 4. Area of residence | | | | | | | |
| a. Urban area | 5 | 6 | 2 | 1.66 | 2 | 5.99 | NS |
| b. Rural area | 3 | 10 | 4 | | | | |
| 5. Level of education | | | | | | | |
| a. First year | 3 | 12 | 1 | 10.19 | 4 | 9.49 | S |
| b. Second year | 1 | 1 | 3 | | | | |
| c. Third year | 4 | 3 | 2 | | | | |
| 6. Family history of cardiac diseases | | | | | | | |
| a. Yes | 4 | 1 | | 8.85 | 2 | 5.99 | S |
| b. No | 4 | 15 | 6 | | | | |
| 7. Previous knowledge regarding cardiovascular resuscitation | | | | | | | |
| a. Yes | 4 | 13 | 4 | 2.52 | 2 | 5.99 | NS |
| b. No | 4 | 3 | 2 | | | | |
| 8. Source of health information | | | | | | | |
| a. Media | 1 | 3 | 2 | 2.82 | 6 | 12.59 | NS |
| b. Health professionals | 7 | 11 | 4 | | | | |
| c. Family members and relatives | 0 | 0 | 0 | | | | |
| d. Friends and neighbors | 0 | 2 | 0 | | | | |

NS, not significant; S, significant

Section VII: Association of Skill Scores of Control Group and Experimental Group of Students with Selected Demographic Variables

Table 26 shows the χ^2 value computed between the skills of the control group of students regarding CPR and selected demographic variables. Variables such as level of education and family history of cardiac diseases were significant at the level of 0.05. Variables such as age in years, gender, religion, area of residence, previous knowledge regarding CPR, and source of health information were not significant at 0.05; therefore, the hypothesis that there will be a significant association between the skill of students regarding CPR and selected demographic variables is accepted.

Table 27. Association of posttest skill scores of experimental groups of students with selected demographic variables, N=30.

| Variables | Poor skill | Average skill | Good skill | Chi-square χ^2 | Df | P-value (0.05) | Inference |
|---|------------|---------------|------------|---------------------|----|----------------|-----------|
| 1. Age in years | | | | | | | |
| a. 17–19 | | 3 | 8 | 13.36 | 6 | 12.59 | S |
| b. 20–22 | 3 | 1 | 1 | | | | |
| c. 23–25 | 0 | 3 | 7 | | | | |
| d. Above 25 | 1 | 1 | 2 | | | | |
| 2. Gender | | | | | | | |
| a. Male | 1 | 3 | 15 | 7.93 | 2 | 5.99 | S |
| b. Female | 3 | 5 | 3 | | | | |
| 3. Religion | | | | | | | |
| a. Hindu | 3 | 6 | 12 | 5.80 | 6 | 12.59 | NS |
| b. Muslim | | 1 | 6 | | | | |
| c. Christian | 1 | 1 | | | | | |
| d. Others | 0 | 0 | 0 | | | | |
| 4. Area of residence | | | | | | | |
| a. Urban area | 2 | 2 | 5 | 0.90 | 2 | 5.99 | NS |
| b. Rural area | 2 | 6 | 13 | | | | |
| 5. Level of education | | | | | | | |
| a. First year | 0 | 3 | 11 | 11.62 | 4 | 9.49 | S |
| b. Second year | 1 | 4 | 1 | | | | |
| c. Third year | 3 | 1 | 5 | | | | |
| 6. Family history of cardiac diseases | | | | | | | |
| a. Yes | 0 | 0 | 1 | 0.689 | 2 | 5.99 | S |
| b. No | 4 | 8 | 17 | | | | |
| 7. Previous knowledge regarding cardiovascular resuscitation | | | | | | | |
| a. Yes | 2 | 3 | 16 | 7.84 | 2 | 5.99 | NS |
| b. No | 2 | 5 | 2 | | | | |
| 8. Source of health information | | | | | | | |
| a. Media | 0 | 1 | 5 | 13.39 | 6 | 12.59 | S |
| b. Health professionals | 1 | 7 | 11 | | | | |
| c. Family members and relatives | 1 | 0 | 1 | | | | |
| d. Friends and neighbors | 2 | 0 | 1 | | | | |

NS, not significant; S, significant

Table 27 shows the χ^2 value computed between the skills of the experimental group of students regarding CPR and selected demographic variables. Variables such as age in years, sex, level of education, family history of cardiac diseases, and source of health information were significant at the level of 0.05. Variables such as religion, area of residence, and previous knowledge regarding CPR were not significant at the level; therefore, the hypothesis that there will be a significant association between the skill of students regarding CPR and selected demographic variables is accepted.

DISCUSSION

In the discussion, the major findings of the study are discussed along with the objective and hypothesis of the study.

Section I: Demographic Profile of Control Group and Experimental Group of Students

Age, in the control group, 36.67% of the students were aged between 17 and 19 years, followed by 26.67% of them were aged between 20 and 22 years, and 23 and 25 years, and the remaining 10% of them were aged above 25 years. In the experimental group, 36.67% of the students were aged between 17 and 19 years, followed by 33.33% of them aged between 23 and 25 years, 16.67% of them were aged between 20 and 22 years, and the remaining 13.33% of them were aged >25 years. Gender, in the control group, the majority, 53.33% of the students, were male, and the remaining 46.67% of the students were female, and in the experimental group majority, 63.33% of the students were male, and the remaining 36.67% of the students were female.

Religion, In the control group, the majority, 70% of students, belonged to the Hindu religion, followed by 20% of them belonging to the Muslim religion, the remaining 10% of the students belonged to the Christian religion, and none of them belonged to other religions. In the experimental group majority, 70% of students belonged to the Hindu religion, followed by 23.33% of them belonging to the Muslim religion, the remaining 6.67% of the students belonged to the Christian religion, and none of them belonged to other religions. Area of residence, in the control group, the majority, 56.67% of the students were from rural areas, and the remaining 43.33% of the students were from urban areas, while in the experimental group majority, 70% of the students were from rural areas, and the remaining 30% of the students were from urban areas.

Level of education, In control group, 53.33% of the students were studying in first year, followed by 30% of them were studying in third year, and remaining 16.67% of the students were studying in second year; in experimental group, 46.67% of the students were studying in first year, followed by 33.33% of them were studying in third year, and remaining 20% of the students were studying in second year. Family history of cardiac arrest, in the control group, 83.33% of the students did not have any family history of cardiac diseases and remaining 16.67% of the students had family history of cardiac diseases and in experimental group 96.67% of the students did not have any family history of cardiac diseases and remaining 11.67% of the students had family history of cardiac diseases.

Previous knowledge regarding cardio pulmonary resuscitation, In control group, 70% of the students were had previous knowledge regarding cardio pulmonary resuscitation and remaining 30% of the students were not had previous knowledge regarding cardio pulmonary resuscitation and in experimental group majority 70% of the students were had previous knowledge regarding cardio pulmonary resuscitation, and remaining 30% of the students were not had previous knowledge regarding cardio pulmonary resuscitation.

Source of health information, in control group majority of 73.33% of the students were acquired information from health professional, followed by 20% of them were acquired information from media, remaining 6.67% of them were acquired information from friends and neighbors and none of them

acquired information from family members and relatives and in control group majority of 63.33% of the students were acquired information from health professional, followed by 20% of them were acquired information from media, 10% of them were acquired information from friends and neighbors and remaining 6.67% of them were acquired information from family members and relatives.

Section II: Knowledge of the Control Group and the Experimental Group of Students Regarding CPR

Knowledge of the Control Group of Students Regarding CPR

The findings of this study depict the interpretation of students' knowledge levels regarding CPR. In the pretest, 53.33% of the students had moderate knowledge, followed by 26.67% of them having inadequate knowledge, and 20% of the students had adequate knowledge regarding CPR in the pretest. In the posttest without administration of an STP, 50% of the students had moderate knowledge, followed by 30% of them had adequate knowledge, and 20% of the students had inadequate knowledge regarding CPR.

Maximum pretest mean percentage obtained by the students was found in the aspect of meaning and indication for CPR (71.75%), followed by 69.50% in the aspect of meaning, causes, signs, and symptoms of cardiac arrest, 66.50% in the aspect of breathing, 66% in the aspect of precautions to be taken during CPR, 63.64% in the aspect of circulation, and least mean percentage obtained in the aspect of airway (56.60%). The overall mean \pm SD of pretest knowledge score of students was 19.80 \pm 4.25, a mean percentage of 66%.

Maximum posttest mean percentage obtained by the students was found in the aspect of meaning and indication for CPR (72.50%), followed by 71.67% in the aspect of meaning, causes, signs, and symptoms of cardiac arrest, 68.60% in the aspect of precautions to be taken during CPR, 66.50% in the aspect of breathing, 66.09% in the aspect of circulation, and least mean percentage obtained in the aspect of airway (56.50%) The overall mean \pm SD of posttest knowledge score of students was 20.37 \pm 4.28 and a mean percentage of 67.90%.

Knowledge of the Experimental Group of Students Regarding CPR

The findings of this study depict the interpretation of students' knowledge levels regarding CPR. In the pretest majority 50% of students had moderate knowledge, followed by 43.33% of them having inadequate knowledge, and 6.67% of the students having adequate knowledge regarding CPR in the pretest. After administration of the STP, 66.67% of the students had adequate knowledge, followed by 30% of them having moderate knowledge, and 3.33% of the students had inadequate knowledge regarding CPR in the posttest.

Maximum pretest mean percentage obtained by the students was found in the aspect of meaning and indication for CPR (71.75%), followed by 60.50% in the aspect of meaning, causes, signs, and symptoms of cardiac arrest, 58% in the aspect of precautions to be taken during CPR, 48.50% in the aspect of airway, 48.50% in the aspect of circulation, and least mean percentage obtained in the aspect of breathing (43.50%). The overall mean \pm SD of pretest knowledge score of experimental groups of students was 16.57 \pm 4.96, and the mean percentage was 55.23%.

Maximum posttest mean percentage obtained by the students was found in the aspect of meaning, causes, signs, and symptoms of cardiac arrest (85.50%), followed by 83.50% in the aspect of breathing, 82.50% in the aspect of meaning and indication for CPR, 76% in the aspect of precautions to be taken during CPR, 73.50% in the aspect of airway, and least mean percentage obtained in the aspect of circulation (73%). The overall mean \pm SD of posttest knowledge score of experimental groups of students was 20.37 \pm 4.28, and the mean percentage was 78%.

Section III: Comparison of the Pretest and Posttest Knowledge Scores of the Control Group and Experimental Group of Students Regarding CPR

Comparison of the Pretest and Posttest Knowledge Scores of the Control Group of Students Regarding CPR

The overall mean \pm SD of pretest knowledge score of students was 19.80 \pm 4.25, a mean percentage of 66%. The overall mean \pm SD of posttest knowledge score of students was 20.37 \pm 4.28, a mean percentage of 67.90%.

The obtained “t” value of 1.07 is less than the table value at a significance level of 0.05. Therefore, the “t” value is found to be non-significant. This means that there was no gain in the knowledge level of the control group of students regarding CPR.

Comparison of the Pretest and Posttest Knowledge Scores of the Experimental Group of Students Regarding CPR

The overall mean \pm SD of pretest knowledge score of experimental groups of students was 16.57 \pm 4.96, and the mean percentage was 55.23%. The overall mean \pm SD of posttest knowledge score of experimental groups of students was 20.37 \pm 4.28, and the mean percentage was 78%.

The obtained “t” value, 12.80, is greater than the table value at a significance level of 0.05. Therefore, the “t” value is found to be significant. This means that there was a significant gain in the knowledge level of students regarding CPR. This finding supports the notion that an STP regarding CPR is effective in increasing the knowledge level of students.

Section IV: Skills of Control Group and Experimental Group of Students Regarding CPR

Skill of the Control Group of Students Regarding CPR

The findings of this study show the level of skills regarding CPR among students. In the pretest, 46.67% of the students had average skills, followed by 40% of them having poor skills, and 14.33% of the students had good skills regarding CPR in the pretest. In the posttest without administration of an STP regarding CPR, 53.33% of the students had average skills, followed by 26.67% of them had poor skills, and 20% of the students had good skills regarding CPR.

Skills of the Experimental Group of Students Regarding CPR

The findings of this study show the level of skills regarding CPR among students. In the pretest, the majority, 60% of the students, had poor skills, followed by 23.33% of them had average skills, and 16.67% of the students had good skills regarding CPR in the pretest. After administration of an STP regarding CPR, 60% of the students had good skills, followed by 26.67% of them had average skills, and 13.33% of the students had poor skills regarding CPR in the posttest.

Section V: Correlation Between Knowledge and Skill of Control Group and Experimental Group of Students Regarding CPR

Correlation Between Knowledge and Skill of the Control Group of Students Regarding CPR

In the pretest, the finding shows that the computed value of Karl Pearson’s correlation coefficient was +0.324, which was greater than the table value of 0.250, at a significance level of 0.05. Therefore, the “r” value is found to be significant, which shows that there is a positive relationship between overall pretest knowledge and overall pretest skill regarding CPR among students.

In the posttest, the finding shows that the computed value of Karl Pearson’s correlation coefficient was +0.267, which was greater than the table value of 0.250, at a significance level of 0.05. Therefore, the “r” value is found to be significant, which shows that there is a positive relationship between overall posttest knowledge and overall posttest skill regarding CPR among students.

Correlation Between Knowledge and Skill of the Experimental Group of Students Regarding CPR

In the pretest, the finding shows that the computed value of Karl Pearson's correlation coefficient was +0.261, which was greater than the table value of 0.250, at a significance level of 0.05. Therefore, the "r" value is found to be significant, which shows that there is a positive relationship between overall pretest knowledge and overall pretest skill regarding CPR among students.

In the posttest, the finding shows that the computed value of Karl Pearson's correlation coefficient was +0.265, which was greater than the table value of 0.250, at a significance level of 0.05. Therefore, the "r" value is found to be significant, which shows that there is a positive relationship between overall posttest knowledge and overall posttest skill regarding CPR among students.

Section VI: Association of Posttest Knowledge Score of Control Group and Experimental Group of Students with Selected Demographic Variables

It was evident that the χ^2 value was computed between the students' knowledge regarding CPR and selected demographic variables. In the control group of students, variables such as area of residence and previous knowledge regarding CPR were significant at the level of 0.05. Variables such as age in years, gender, religion, level of education, family history of cardiac diseases, and source of health information were not significant at the 0.05 level, and in the experimental group, variables such as age in years, level of education, previous knowledge regarding CPR, and source of health information were significant at the 0.05 level. Variables such as gender, religion, area of residence, and family history of cardiac diseases were not significant at the level of 0.05; therefore, the hypothesis stated that there would be a significant association between the knowledge of students regarding CPR and selected demographic variables.

Section VII: Association of Posttest Skill Score of Control Group and Experimental Group of Students with Selected Demographic Variables

It was evident that the χ^2 value was computed between the skills of students regarding CPR and selected demographic variables. In the control group, variables such as the level of education and family history of cardiac diseases were significant at the level of 0.05. Variables such as age in years, sex, religion, area of residence, previous knowledge regarding CPR, and source of health information were not significant at the level; 0.05 and in the experimental group, variables such as age in years, sex, level of education, family history of cardiac diseases, and source of health information were significant at the 0.05 level. Variables such as religion, area of residence, and previous knowledge regarding CPR were not significant at 0.05; therefore, the hypothesis that there will be a significant association between the skill of students regarding CPR and selected demographic variables is accepted.

CONCLUSION

The conclusions are derived from the findings and are a synthesis of the findings. Forming these conclusions requires a combination of logical reasoning, creative formation of a meaningful whole from pieces of information obtained through data analysis and findings from previous studies, receptivity to subtle clues in the data, and the use of an open context in considering alternative explanations of the data.

In the control group, 53.33% of the students had moderate knowledge, followed by 26.67% of them had inadequate knowledge, and 20% of the students had adequate knowledge regarding CPR in the pretest. In the posttest without administration of an STP, 50% of the students had moderate knowledge, followed by 30% of them had adequate knowledge, and 20% of the students had inadequate knowledge regarding CPR.

In the experimental groups, 50% of the students had moderate knowledge, followed by 43.33% of them had inadequate knowledge, and 6.67% of the students had adequate knowledge regarding CPR in the pretest. After administration of the STP, 66.67% of the students had adequate knowledge, followed by 30% of them having moderate knowledge, and 3.33% of the students had inadequate knowledge regarding CPR in the posttest.

However, in the control group, the majority of the demographic variables of the students indicated a non-significant association with knowledge, except area of residence and previous knowledge regarding CPR, and in the experimental group, age in years, level of education, previous knowledge regarding CPR, and source of health information.

In the control group, 46.67% of the students had average skills, followed by 40% of them having poor skills, and 14.33% of the students had good skills regarding CPR in the pretest. In the posttest conducted without the administration of a structured teaching programme (STP) on CPR, 53.33% of the students demonstrated average skills, followed by 26.67% who demonstrated poor skills, and 20% who demonstrated good skills in performing CPR.

In experimental groups, 60% of the students had poor skills, followed by 23.33% of them had average skills, and 16.67% of the students had good skills regarding CPR in the pretest. After administration of an STP regarding CPR, 60% of the students had good skills, followed by 26.67% of them had average skills, and 13.33% of the students had poor skills regarding CPR in the posttest.

In control group the majority of the demographic variable of the students indicates non-significance association with skill except level of education and family history of cardiac diseases and in experimental group age in years, age in years, gender, level of education, family history of cardiac diseases and source of health information In control group, the obtained “r” value of Karl Pearson’s correlation coefficient was +0.324 in pretest and +0.267 in posttest between overall knowledge score and overall skill score, this shows that there is a positive relationship between overall knowledge score and overall skill score of students regarding cardio pulmonary resuscitation.

In the experimental group, the obtained “r” value of Karl Pearson’s correlation coefficient was +0.261 in the pretest and +0.265 in the posttest between the overall knowledge score and the overall skill score, which shows that there is a positive relationship between the overall knowledge score and the overall skill score of students regarding CPR.

IMPLICATIONS OF THE STUDY

The findings of this study can be used in the following areas of the nursing profession:

Nursing Practice

Nurses play a vital role in educating the caregivers of patients with cardiac diseases regarding CPR. Educating and creating awareness are an integral part of nursing services. Nurses should be equipped with up-to-date knowledge of CPR so that they can impart appropriate knowledge to students. Based on the findings of this study, a training program should be planned for nurses to increase their knowledge and efficiency in performing CPR.

Nursing Education

Nurses play a major role in educating students about BLS. Therefore, nursing students can conduct awareness programs on CPR in the community during their community health nursing postings, as well as in outpatient departments (OPDs) and primary health centers. Student nurses and teaching faculty should be provided with in-service education to update their knowledge regarding CPR, and nursing personnel should also be given in-service education to update their knowledge.

Nursing Administration

Nursing administration should take the initiative to conduct the periodical health education program to improve awareness of CPR. Advanced technology and ever-growing challenges in healthcare needs. The college and hospital administrations are responsible for providing nurses, nurse educators, and nurse students with continuing education on recent advancements in BLS strategies. This enables them to update their knowledge and skills.

Nursing Research

This study will help nurse researchers to develop insight into the developing module and set information towards creating awareness among the public regarding BLS strategies. The study findings will reveal the current knowledge status of individuals about BLS strategies and the extent to which this knowledge should be improved. The findings of the study will help expand the scientific body of professional knowledge upon which further research can be conducted; this will motivate other investigators to conduct future studies regarding BLS.

RECOMMENDATION

- A study can be conducted with a larger sample size to confirm the results of the study and generalize the findings.
- The comparative study can be conducted with nursing college students.
- A similar study can be conducted by using experimental and control groups.
- A study can be conducted among other college students.
- A study can be conducted among the arts college students.
- A study can be conducted using random sampling techniques.
- A study can be conducted with different educational levels of nursing students.

LIMITATIONS

- Generalization of the findings of the study was limited to only the degree students at the selected college in Jodhpur.
- Structured knowledge and skill questions used for data collection restricted the amount of information that could be obtained from the respondents.
- The study had only one group to prove the effectiveness of the STP, and the study was limited to six weeks.

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