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A STUDY TO EVALUATE THE EFFECTIVENESS OF PLANNED TEACHING PROGRAM ON KNOWLEDGE REGARDING ECG INTERPRETATION IN EARLY DETECTION OF CARDIAC ARRHYTHMIAS AMONG THE STUDENT NURSES AT SELECTED NURSING COLLEGES, BATHINDA

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ABSTRACT

Nursing students have difficulty in interpreting the ECG rhythms. The current classroom environment often lacks application and practice opportunities, and as a result, students struggle with identification of ECG rhythms at the patient's bedside. The purpose of this study was to evaluate the effectiveness of planned teaching program on knowledge regarding ECG interpretation in early detection of cardiac arrhythmias among the student nurses at selected nursing colleges, Bathinda. The objective of the study was to assess the pre and post interventional knowledge scores and to evaluate the effectiveness of the planned teaching program. And also to determine the association between the socio-demographic variables and knowledge level of the student nurses regarding ECG interpretation in early detection of cardiac arrhythmias. One group pre test post test experimental design was selected for the study. The participants were 50 student nurses from selected nursing institutions, Bathinda. A non probability convenient sampling technique was used to select the sample for the study. A structured interview schedule is used to collect data from the subjects. The obtained data was analyzed using descriptive and inferential statistics and interpreted in terms of objectives and hypothesis of the study. The results of the study concluded that planned teaching program had a great impact in enhancing the knowledge of the student nurses regarding ECG interpretation in early detection of cardiac arrhythmias.

Key words: Electrocardiogram, Rhythm, Arrhythmia, Interpretation, Cardiac Care Unit.

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INTRODUCTION

The present scenario reveals that nursing students must correctly interpret ECG rhythms in order to provide safe and competent care, but they often have difficulty in proper electrocardiogram (ECG) analysis and have minimal clinical practice opportunity for applying this knowledge [1].

Other than coronary artery diseases and myocardial infarction, arrhythmias are also the leading cause of a cardiac event. Arrhythmias are a disturbance in regular heart rate and rhythm due to an alteration in electrical conduction or automaticity. Some arrhythmias can be described as minor arrhythmias which usually don't need treatment, while major arrhythmias have to be treated as early as possible and life threatening arrhythmias which need immediate and emergency treatment. In the United States, more than 650,000 patients die annually from heart attack and, approximately two million patients have atrial fibrillation. Lethal ventricular arrhythmias account for the majority of sudden cardiac death, 30 to 60% of death from coronary artery disease result from ventricular fibrillation, and approximately 90% of patients who have acute MI experience arrhythmias [2].

A recent study report in 2010 reveals that 60% of the global heart patients are in India. Approximately 60% of all cardiac deaths occur due to arrhythmias leading to sudden cardiac arrest (SCA) in India.[3] Sudden cardiac death accounts for approximately 300,000 deaths per year in the country, of which 75-80% is due to ventricular fibrillation (VF). This represents an incidence of 0.08-0.16% deaths per year in the adult population. VF is commonly the first expression of CAD and is responsible for approximately 50% of deaths from CAD, often within the first hour after the onset of an acute MI or coronary syndrome.

Arrhythmias are the main cause of preventable death in the developing countries. The majority of these arrhythmias arise secondary to underlying coronary artery disease. Sudden death due to malignant ventricular arrhythmias can be the initial manifestation of coronary artery disease in many patients. Inadequate recognition and management of coronary artery disease and its risk factors in developing countries adversely impacts on their prevalence [4].

Nursing student's knowledge retention of ECG identification from classroom lecture gradually decreases when students leave the classroom. Although nursing students may be comfortable in learning theoretical knowledge from classroom lectures, they can become apprehensive when applying this knowledge during the clinical experience. Nursing students typically have not seen this procedure performed on a patient, and therefore, lack clinical experience. This lack of clinical experience may result in difficulty in identifying ECG rhythms, which directly affects patient care [5]. The gap between nursing knowledge and applying knowledge at the bedside is the reflection between the skills and knowledge learned under supervision in an academic environment and those skills needed for safe, independent function at the patient's bedside [6].

According to the Center for Disease Control, heart disease is the number one cause of death in the United States. Heart disease can result in arrhythmias which are visible on an ECG, and an ECG is the current daily diagnostic tool for detecting various cardiovascular diseases. Perfect interpreting of the information on an ECG takes significant amounts of training and practice, and nurses must act under pressure to detect life-threatening dysrhythmias [7].

Electrocardiography (ECG) is the simplest noninvasive procedure which has no side effects. It records even slightest variations in the conduction mechanism of the heart that helps the care givers to identify the abnormalities. Various conditions which can be identified through ECG are heart wall hypertrophy, valvular diseases and arrhythmias. Electrocardiography is the most commonly performed cardiac test and as an ongoing procedure. ECG is a very useful screening tool for a variety of cardiac abnormalities.ECG machines are readily available in most medical facilities and the test is simple to perform risk free and inexpensive [8].

NEED FOR THE STUDY

Even though ICUs and CCUs are well equipped with modern infrastructure, number of deaths reported in the previous years all around the world was significantly high. Cardiac monitors provide basic information about the cardiac activity regularly but it is unworthy when the health care professionals are not trained enough to have proper skills to interpret the ECG and to take appropriate actions. Activation of the emergency system in a cardiac care unit depends up on how fast and easily the care providers identify the cardiac emergency from the patient side monitor. Statistics shows that vast majority of deaths happening in critical care area are cardiac in origin, SCD (sudden cardiac death) has become almost synonymous with sudden death.

The ability to differentiate normal and abnormal cardiac rhythms, called arrhythmias, is an essential skill for the nurse. Cardiac monitoring is now used in a wide range of hospitals, clinics, and home settings. Prompt assessment of arrhythmias and the patient response to the rhythm is critical. Every ICU or CCU has cardiac monitors which provide an accurate record of electrical activity of the heart. Observation and early identification of arrhythmias and other lethal cardiac activity variations has become a vital role of a nurse. In critical care areas nurses are at the bed side for continued assessment and monitoring for caring the patients. It helps to rule out the cardiac emergencies by identifying the variations in the ECG monitor. Early identification of abnormalities in cardiac activity, aids in taking prompt preventive actions in a hospital set up .So it is very imperative for the nurses to know how to read ECG waves and interpret it.[9] Interpretation of ECG is the determination of normal and abnormal findings among cardiovascular diseases with the help of measurements, rhythm analysis, conduction analysis and wave form description. This ability of nurse will enable her to compare the ECG strip with the previous one and identify the deviations [9].

A study was conducted to assess the effectiveness of a special teaching program on emergency ECG monitoring and management in US among staff nurses who are working in cardiac care units in several government hospitals. And it has found after the implementation of structured teaching program the number of deaths due to arrhythmias and cardiac arrest was reduced by 12% in the next two consecutive years.

Therefore the researcher was interested in assessing the effectiveness of a planned teaching program on knowledge regarding ECG interpretation in early detection of cardiac arrhythmias, which would enhance the knowledge among the student nurses. In various aspect of nursing as well as in other disciplines, the planned teaching method is found to be more effective than the traditional methods. The reports of such studies shows that

there is a significant improvement in students learning by using planned learning module. Therefore the investigator felt the need to develop a planned training program on ECG interpretation in early detection of cardiac arrhythmias and to enable the nursing students to learn and develop this skill which in turn will enable them to practice and utilize it in the clinical area while caring for these patients. Effective learning about ECG and its interpretation during their student period will form a strong base or foundation in developing this skill which will also enable him/her to develop the critical thinking skills essential in nursing [8-10].

PROBLEM STATEMENT

A Study To Evaluate The Effectiveness Of Planned Teaching Program On Knowledge Regarding ECG Interpretation In Early Detection Of Cardiac Arrhythmias Among The Student Nurses At Selected Nursing Colleges, Bathinda.

OBJECTIVES

1. To assess the knowledge of student nurses regarding ECG interpretation in early detection of cardiac arrhythmias by assessing the pre interventional test knowledge scores.
2. To assess the knowledge of student nurses regarding ECG interpretation in early detection of cardiac arrhythmias by assessing the post interventional test knowledge scores.
3. To determine the effectiveness of planned teaching program by comparing the pre and post test knowledge scores of student nurses.
4. To determine the association between the socio-demographic variables and knowledge level of student nurses regarding ECG interpretation in early detection of cardiac arrhythmias.

RESEARCH METHODOLOGY

Research Approach: An evaluative research approach was chosen to assess the knowledge of student nurses regarding ECG interpretation in early detection of cardiac arrhythmias.

Research Design: One group pre test post test experimental design was chosen for this study.

Setting of the Study: The study was conducted at selected nursing colleges of Bathinda district, Punjab.

Population: For the present study, the target population is the student nurses studying at selected nursing colleges of Bathinda district.

SAMPLE AND SAMPLING TECHNIQUE

Sample: The sample for the present study consisted of student nurses studying at the selected nursing colleges of Bathinda district.

Sampling Technique: Convenient sampling technique was used for choosing of samples.

Sample Size: A total of 50 student nurses were selected to be the part of the study.

Data collection procedures: Investigator personally visited each respondent and explained the purpose of the study. The respondents were assured anonymity and confidentiality of the information provided by them and an informed consent was obtained. Interviews were conducted during their leisure time. Data was collected with the help of the socio-demographic profile and knowledge questionnaire regarding ECG interpretation in early detection of cardiac arrhythmias. The data collection process was terminated after thanking participant for their participation and co-operation.

Description of the data collection tool: In this study the data collection tools were consisted of 2 parts covering the following areas.

I. Socio-demographic data: It contains Five (5) questions selected on background factors such as age, gender, year of studying, previous knowledge of ECG and its interpretation and clinical experience in cardiac departments as student nurse.

II. Preparation of knowledge questionnaire: Knowledge questionnaire consisted of 42 items regarding ECG interpretation in early detection of cardiac arrhythmias was used based on the objective of the study.

III. Scoring:

Scoring for the present study was, each question has multiple choices of four different answers with one correct option and each correct answer considered one mark and the wrong answer carries zero mark. The maximum score was 42 and minimum score was (0) zero.

Method of data analysis

- Description of sample characteristics, baseline data containing sample characteristics (socio-demographic data) was analyzed using frequency and percentage.
- The knowledge of the student nurses was analyzed using frequency, percentage, mean percentage and standard deviation.
- Association between knowledge scores and selected demographic data was found out by using Chi-Square test.

RESULTS

Frequency and percentage distribution of the demographics variables

The table 1 depicts that, the majority 38% of the nursing students were of 21-23 years in age, minority 26% were in the group 24-26 years and 36% in the age group 18-20 years of age. With regard to their gender, majority 90% of the samples were females and the rest 10% were males. Considering their year of studying 36%, 38%, 14% and 12% were studying in BSc Nursing 3rd year, BSc Nursing 4th year, Post BSc Nursing 1st year and Post BSc Nursing 2nd year respectively. Out of 50 student nurses, 16% of them had previous knowledge of ECG and its

interpretation while 84% had no previous knowledge. Also 100% of them had clinical experience in cardiac department as student nurse.

Table 1: Distribution of student nurses of the selected nursing colleges according to socio-demographic variables (n=50)

Variables	No of respondents	Percentage
Age in years		
a. 18-20 years	18	36.0
b. 21-23 years	19	38.0
c. 24-26 years	13	26.0
d. 26 years & above	00	00.0
Gender		
a. Male	05	10.0
b. Female	45	90.0
Year of Studying		
a. BSc Nursing 3rd Year	18	36.0
b. BSc Nursing 4th Year	19	38.0
c. Post BSc Nursing 1st Year	07	14.0
d. Post BSc Nursing 2nd Year	06	12.0
Previous knowledge of ECG and its interpretation		
a. Yes	08	16.0
b. No	42	84.0
Clinical experience in cardiac department as student nurses		
a. Yes	50	100.0
b. No	00	00.0
Total	**50**	**100**

Table 2: Percentage distribution of pre test knowledge scores regarding ECG interpretation in early detection of cardiac arrhythmias

Sl.no	Level of knowledge	No. of Student Nurses	Percentage
1	Poor knowledge	10	20
2	Average knowledge	30	60
3	Good knowledge	10	20
4	Very good knowledge	0	0
	Total	**50**	**100**

Table 3: Percentage distribution of post test knowledge scores regarding ECG interpretation in early detection of cardiac arrhythmias among the nursing students

Sl.no	Level of knowledge	No. of Student Nurses	Percentage
1	Poor knowledge	00	00
2	Average knowledge	00	00
3	Good knowledge	14	28
4	Very good knowledge	36	72
	Total	**50**	**100**

Table 4: Comparison of overall knowledge scores regarding ECG interpretation in early detection of cardiac arrhythmias between pre test and post test

Sl.no	Test	No. of mess workers	Mean	SD	Paired t-test
1	**Pre test**	**50**	**17.22**	**6.74**	**t=21.61 P=0.001*** significant**
2	**Post test**	**50**	**33.78**	**3.49**	

* Significant at P≤0.05 ** highly significant at P≤0.01 *** very high significant at P≤0.001

Table 5: Comparison of level of knowledge regarding food ECG interpretation in early detection of cardiac arrhythmias among the student nurses with respect to pre and post test scores

Sl. no	Level of knowledge	Pre test		Post test		Pearson Chi-square test
		No. of student nurses	%	No. of student nurses	%	
1	Poor knowledge	10	20	0	0	$\chi 2=66.37$ P=0.001*** Significant
2	Average knowledge	30	60	0	0	
3	Good knowledge	10	20	14	28	
4	Very good knowledge	0	0	36	72	

* Significant at P≤0.05, ** highly significant at P≤0.01, *** very high significant at P≤0.001

Table 6: Effectiveness of structured teaching programme regarding ECG interpretation in early detection of cardiac arrhythmias among the student nurses

	Percentage		
	Pre test knowledge	Post test knowledge	knowledge gain
Knowledge	41.0%	80.4%	39.4%

Fig: 1 Bar diagram depicting the assessment of pre test knowledge level percentage distribution of the student nurses

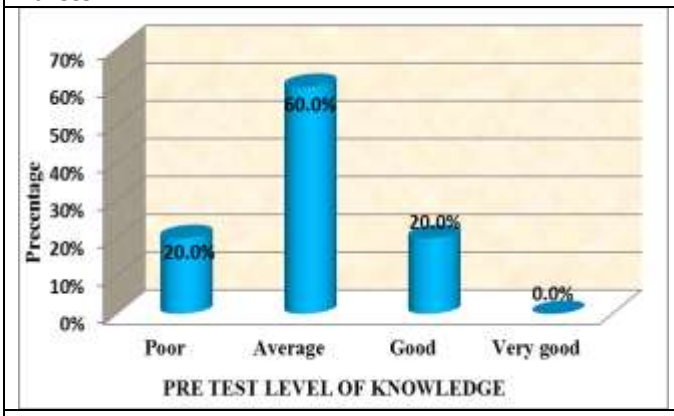


Fig 2: Bar diagram depicting the assessment of post test knowledge level distribution of student nurses

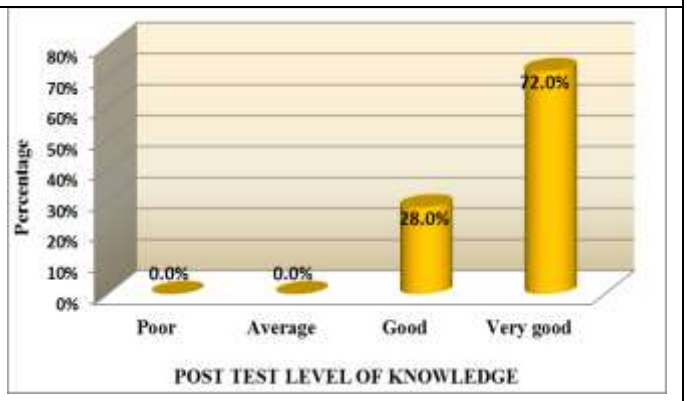


Fig 3: Comparison of student nurse's pre test and post test mean knowledge score regarding ECG interpretation in early detection of cardiac arrhythmias

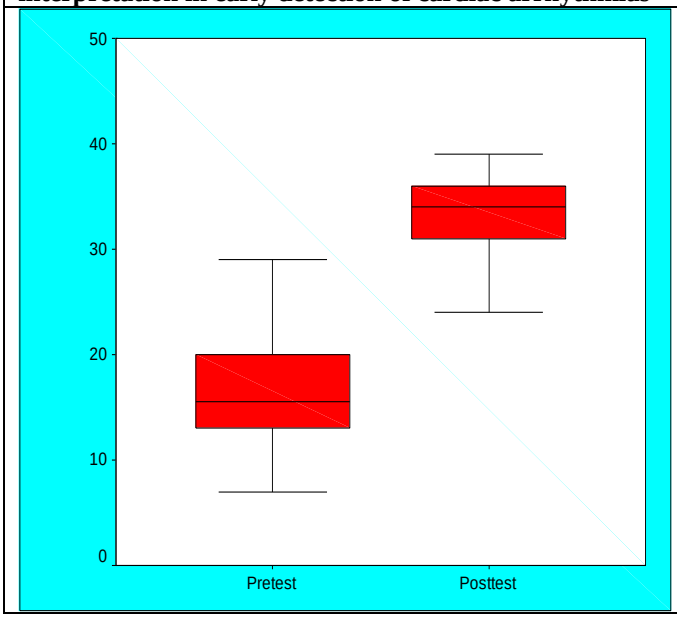
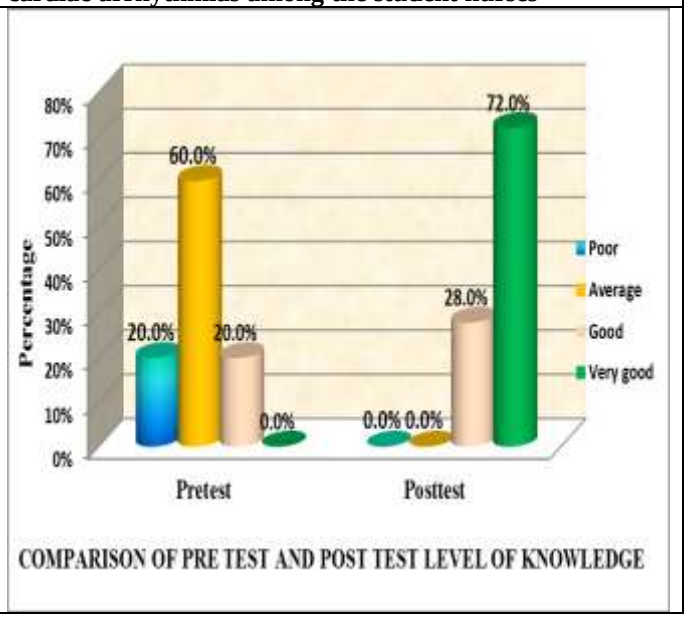


Fig 4: Comparison of pre and post test knowledge level regarding ECG interpretation in early detection of cardiac arrhythmias among the student nurses



The table 2 reveals the overall pre test knowledge level on ECG interpretation in early detection of cardiac arrhythmias among the student nurses. In general 20.0% of the student nurses are having poor knowledge, 60% of them having average knowledge and 20% of them having good knowledge and none of them having very good knowledge. In 50 samples majority of them had an average knowledge.

The table 3 reveals the overall post test level of knowledge on ECG interpretation in early detection of cardiac arrhythmias among the nursing students. In general 28% of the student nurses are having good knowledge, 72% of them are having very good knowledge and none of them are having poor/average knowledge.

The table 4 reveals the comparison of overall knowledge score between pre test and post test. On an average the student nurses had a pre test mean score of 17.22 and SD of 6.74 and a post test mean score of 33.78 and SD of 3.49. The difference between the pre test and post test mean score is 16.56. Pared t test value 21.61.The difference between pre test and post test knowledge score is large and is statistically significant. Differences between pre test and post test score was analyzed using paired t-test.

The table 5 shows that, before the PTP, 20% of the student nurses had poor knowledge, 60% of them had an average knowledge and 20% of them had good knowledge and none of them had very good knowledge. In overall 60% of student nurses had average knowledge based on pre test score. After the administration of PTP, 28% of student nurses had good knowledge, 72% of them had very good knowledge and none of them had poor and average knowledge.

Table 6 shows the effectiveness of the planned teaching program. Considering the overall aspects, the student nurses have gained 39.4 percent more knowledge after the administration of planned teaching program which indicates the effectiveness of the program.

Association between the levels of knowledge of the student nurse's with the selected demographic variables.

The study shows that there is a significant association between the knowledge level with the selected demographic variable such as previous knowledge of ECG and its interpretation. The rest demographic variables had no association with the knowledge level of the student nurses.

CONCLUSION

The study concluded that, before the administration of PTP, 20% of the student nurses had poor knowledge, 60% of them had average knowledge and 20% of them had good knowledge and none of them had very good knowledge. After the administration of PTP, 28% of student nurses had good knowledge, 72% of them had very good knowledge and none of them had poor and average knowledge. Considering the overall aspects, the student nurses have gained 39.4 percent more knowledge after the administration of planned teaching program which indicates the effectiveness of the program.

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