COMPARING THE EFFECTIVENESS OF COMPUTER SIMULATED LEARNING OVER TRADITIONAL LECTURE METHOD ON KNOWLEDGE REGARDING ECG AND ITS INTERPRETATION AMONG GNM 2ND YEAR STUDENTS.

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ABSTRACT

Background The use of internet facilities and computer stimulated learning is becoming a popular trend among the institutions with higher education. Computer stimulated learning has improved the teaching and learning environment and has been becoming a common learning environment among the students and teachers. Computer stimulated learning is now available to everyone, anywhere, anytime irrespective of distance and time. Digital technologies are integrated more and more in our day-to-day life, so it is also included in classroom practice. Thus, the researcher felt need to prepare and administer a computer stimulated learning over traditional lecture method among the GNM Nursing 2nd year students on ECG and its interpretation. Electrocardiography is the process of producing an electrocardiogram (ECG or EKG), a recording - a graph of voltage versus time - of the electrical activity of the heart using electrodes placed on the skin. Statement: - A Study to Compare the effectiveness of Computer Simulated learning over traditional lecture method on knowledge regarding ECG and its interpretation among GNM 2ND YEAR students at selected nursing colleges of District Pulwama. Aim: -The aim of the study was to assess the knowledge through computer simulated learning and traditional lecture method regarding ECG and its interpretation. Methodology: - The Quantitative research approach was adopted and Quasi experimental research design. The settings of the study were Dolphin Institute of Nursing and paramedical science Pulwama. The sample consists of 100 students of GNM 2nd year students and samples were selected by Random sampling technique. The Knowledge was assessed by using Structured questionnaire. Result: In

overall view of the present study findings, out of 50 subjects in experimental group, 40 % were in the age group of 18-20years, 6% in between 20-22yrs, 1% in above 23yrs. In control group out of 50 subjects, 46% in the age group of 18-20years, 4% in 20-22yrs. Among all in experimental group 40 % were females and 10% were males. In control group out of 50 subjects, 45% were females and 5% were males. The study finding revealed that in experimental group 12% during pretest had inadequate knowledge and 38% had adequate knowledge regarding ECG and its interpretation. While in the control no student had inadequate knowledge and 50% had adequate knowledge. During the post-test 31% students in the experimental group had inadequate and 19% had adequate knowledge regarding ECG and its interpretation. While in the control group no student had inadequate knowledge and 50% had adequate knowledge regarding ECG and its interpretation. Conclusion: The present study results revealed that the mean pretest knowledge of the control group score was 7.82 and the mean pretest score knowledge of the experimental group was 12.96. The mean post-test knowledge of the control group was 18.8 and the mean post-test knowledge of the experimental group was 20.26.

Keywords: Traditional lecture method, Simulation method, Interpretation, Assess, Questionnaire.

INTRODUCTION

"When you no longer know what headache, heartache, or stomach-ache means without cistern punctures, electrocardiograms and six x-ray plates, you are slipping"

The use of internet facilities and computer stimulated learning is becoming a popular trend among the institutions with higher education. Computer stimulated learning has improved the teaching and learning environment and has been becoming a common learning environment among the students and teachers. Computer stimulated learning is now available to everyone, anywhere, anytime irrespective of distance and time. Digital technologies are integrated more and more in our day-to-day life, so it is also included in classroom practice. Thus, the researcher felt need to prepare and administer a computer stimulated learning over traditional lecture method among the GNM Nursing 2nd year students on ECG and its interpretation.

The areas which need critical care and monitoring of critically ill patients or unstable patients are done by using cardiac monitor. Nurses working in hospitals must be knowledgeable and must know how to provide goal-oriented care all time. The goal of high-quality care is to save clients life from life threatening conditions.

In hospitals critical care units are well equipped by cardiac monitors but the deaths reported were not satisfactory. Cardiac monitors provide baseline information about the heart's activity but because of lack of knowledge and skilfulness nurses are not fully aware about the interpretation of ECG. Statistics show that major cause of death in critical care units are of SCD (sudden cardiac death)

The ability to detect the cardiac dysrhythmias is an important skill for every nurse. Cardiac monitoring is used in every hospital in the world. Identification of cardiac dysrhythmias is now an important or vital role for nurses. By doing cardiac monitoring nurses will come to know about various cardiac emergencies. Early detection of cardiac abnormalities will help the hospital to take preventive measures about the cardiac emergencies. So, it is very important for the nurses to interpret the ECG. Interpretation of ECG is the determination of normal and abnormal heart beats

Electrocardiography is the process of producing an electrocardiogram (ECG or EKG), a recording - a graph of voltage versus time - of the electrical activity of the heart using electrodes placed on the skin. These electrodes detect the small electrical changes that are a consequence of cardiac muscle depolarization followed by repolarization during each cardiac cycle (heartbeat). Changes in the normal ECG pattern occur in numerous cardiac abnormalities, including cardiac rhythm disturbances (such as atrial fibrillation and ventricular tachycardia),

inadequate coronary artery blood flow (such as myocardial ischemia and myocardial infarction) In a conventional 12-lead ECG, ten electrodes are placed on the patient's limbs and on the surface of the chest. The overall magnitude of the heart's electrical potential is then measured from twelve different angles ("leads") and is recorded over a period (usually ten seconds). In this way, the overall magnitude and direction of the heart's electrical depolarization is captured at each moment throughout the cardiac cycle. There are three main components to an ECG: The P wave, which represents the depolarization of the atria; the QRS complex, which represents the depolarization of the ventricles; and the T wave, which represents the repolarization of the ventricles.

According to the WHO, coronary heart diseases are the leading cause of death worldwide, becoming a truly global pandemic. An ECG is pivotal for the diagnosis of coronary heart disease. Therefore, physicians in all specialties increasingly use ECG, especially in the emergency departments (EDs), as circulatory disorders are one of the most frequent reasons for admission. However, previous data have reported deficiencies in ECG interpretation, even if the patient outcome resulting from ECG misinterpretation seems not to have been impacted. Thus, it is crucial to optimize competent ECG interpretation skills. However, the optimal educational strategies for teaching ECG remain unclear. Previous studies evaluated workshops, traditional lecture-based methods, and self-directed learning for teaching ECG interpretation and tested the value of a single seminar given by a consultant cardiologist to emergency physicians. They reported that 21.3% of ECGs had serious misinterpretations in pre seminar tests compared with 10.7% of ECGs in post seminar tests N ($P < 0.005$), reducing ED patient mismanagement from 3.2 to 1.7% ($P < 0.0001$).In a prospective randomized study including fourth-year medical students, noted that participants in the self-directed learning group had lower test scores compared with workshops or traditional lecture-based methods. Alternative teaching strategies were also tested, including dance and puzzles, which failed to achieve statistical significance when compared with the classical lecture-based course.

OBJECTIVES OF STATEMENT

❖ To assess the knowledge regarding ECG and its interpretation among GNM 2nd year students.

❖ To compare the effectiveness between computer simulated learning and traditional lecture method on ECG and its interpretation among GNM 2nd year students.

❖ To find the association between the level of knowledge on ECG and its interpretation with selected demographic variables.

PURPOSE OF THE STUDY

The purpose of the study is to enhance knowledge among GNM 2nd year students through computer simulated learning and traditional lecture method on ECG and its interpretation.

REVIEW OF LITERATURE

(Deepak Kumar Swami 2017)

A study was conducted to assess the effectiveness of structured teaching programme on knowledge of 'electrocardiogram' among nursing students. The study was conducted in Nursing College at Indore. Total samples were 30. Non probability purposive sampling technique was used. The research tool was developed in English after an extensive of literature and expert's opinion. The structured questionnaire was used as an instrument to measure the level of knowledge of nursing students about ECG at Indore. This study revealed that samples had poor knowledge (63%) and very few of them had good knowledge (7%) whereas the level of knowledge in very poor range is (30%). Moreover, there were no any single respondent set in excellent and very good category of knowledge. Chi square test was calculated to find out the association between the demographic variables and the level of knowledge regarding ECG among nursing students and it resulted there is association between the demographic variable e.g. age and exposure in assisting the investigative procedure and the level of knowledge.

(Woods LS 2006)

The ECG is a graphic display of the electrical forces generated by the heart. The ECG is the gold standard for non-invasive diagnosis of cardiac arrhythmias and conduction abnormalities and useful tool in evaluating the function of implanted devices such as pacemaker and implanted defibrillators. In 1902, a Dutch Physiologist, Willem Einthoven recorded the first ECG with his 270 kg machine, to string galvanometer for which he was awarded a Nobel Prize.

(Carey MG, Palter MM 2007)

A study was done on ECG to figure out nurses' abilities to differ between ischemic and non-ischemic ECG patterns.75 nurses were given a set of 6 patient's problems each with a 12-lead ECG and ask to nurses to identify the presence and absence of ischemia. 14 (19%) of the 75 nurses correctly identified the presence and absence of ischemia. Of the 3 ECGs with MI pattern, 59(79%) of the nurses identified all 3 as ischemia. For the 3 non ischemic ECGs 37(49%) of the

nurses identified a normal ECG as ischemia, 47(63%) determined that an early repolarization pattern was ischemia, and 34(54%) indicated that a left bundle block pattern was ischemic. The study concludes that, no one was determined the correct leads, location, or amplitude of ST – segment elevation.

METHODOLOGY

Quantitative quasi-experimental research approach and non-equivalent control group pre-test post-test control group design was used in the study.

☐ Population: GNM students

☐ Sample: GNM 2ND year students.

☐ 100 nursing students will be selected for this study i.e. 50 sample for experimental group and 50 sample for control group

☐ Research Setting - Dolphin institute of nursing and paramedical science Pulwama.

☐ Sampling Technique- probability sampling will be used i.e. simple random sampling

DEMOGRAPHIC VARIABLES: Age, Gender, Exposure in assisting the investigate procedure, Previous knowledge on ECG and interpretation, Source of information

HYPOTHESIS

H01- There will be no significant difference in knowledge regarding ECG and its interpretation between computer simulated learning and traditional lecture method among GNM 2nd year students.

H02- There will be no significant association between the level of knowledge on ECG and its interpretation between computer simulated learning and traditional lecture method with selected demographic variables.

DATA COLLECTION TECHNIQUE AND TOOLS

Data collection tool and techniques based on objectives of the study, following tools were prepared:

Tool I: Demographic variables which included age, gender, religion, Exposure in assisting the investigative procedure, Previous knowledge on ECG and its interpretation, source of information etc.

Tool II: Self-structured questionnaires (Karl Pearson‟s correlation method, r=0.8) to the assess the level of knowledge regarding ECG and its interpretation. Self-structured questionnaires had

the knowledge questionnaire on ECG and its interpretation. Total of 28 items were prepared and each carried one mark.

Validity

The content validity of tools was done by a panel of five experts from medical and nursing field, who had expertise in developing such instruments and the necessary modification was done accordingly.

Scoring and Interpretation

ANALYSIS OF SAMPLE CHARACTERISTICS BASELINE VARIABLES

Characteristics	Category	Experimental group		Control group	
		F	%	F	%
Age	18 – 20	40	40%	46	46%
	20-22yrs	6	6%	4	4%
	Above 23yrs	4	4%	0	0%
Gender	Male	10	10%	5	5%
	Female	40	40%	45	45%
Exposure in assisting the investigative procedure	Yes	46	46%	45	45%
	No	4	4%	5	5%
Previous knowledge of ECG and its interpretation	Yes	40	40%	35	35%
	No	10	10%	15	15%
Source of information	Clinical experience	40	40%	35	35%
	Books	8	8%	15	!5%
	Mass media	2	2%	0	0%

Frequency and percentage distribution of Sample according to their age group- Data analysis revealed that that out of 50 subjects in experimental group, 40 % were in the age group of 18-20years, 6% in between 20-22yrs, 1% in above 23yrs. In control group out of 50 subjects, 46% in the age group of 18-20years, 4% in 20-22yrs and 0% above the age group of 23years.

Frequency and percentage distribution of Sample according to their Gender -Data analysis

revealed that out of 50 subjects in experimental group, 40 % were females and 10% were males. In control group out of 50 subjects, 45% were females and 5% were males.

EXPOSURE IN ASSISTING THE INVESTIGATIVE PROCEDURE Data analysis revealed that out of 50 subjects in experimental group, 46% has exposure from investigative procedure and 4 has not been exposure from investigative procedure. In control group 45% has exposure from investigative procedure and 5%has not been exposure from investigative procedure.

PREVIOUS KNOWLEDGE OF ECG AND ITS INTERPRETATION: - Data analysis revealed that out of 50 subjects in experimental group, 40% has previous knowledge of ECG and its interpretation and 10% has not previous knowledge of ECG and its interpretation. In control group 35% has previous knowledge of ECG and its interpretation and 15% has not previous knowledge of ECG and its interpretation.

SOURCE OF INFORMATION: - Data analysis revealed that out of 50 subjects in experimental group, 40% has information from clinical experience 8% has information from books 2% has information from mass media. In control group, 35% has information from clinical experience 15% has information from books.

ASSESSMENT OF KNOWLEDGE REGARDING E.C.G AND ITS INTERPRETATION.

Maximum Score [28]	Pre test				Post test			
	Experimental group		Control group		Experimental group		Control group	
	No. of Students	%	No. of Students	%	No. of Students	%	No. of Students	%
Inadequate knowledge (≤10)	12	12%	0	0%	31	31%	0	0%
Adequate knowledge (≥15)	38	38%	50	0%	19	19%	50	50%

The above table depicts that in experimental group 12% during pretest had inadequate

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knowledge and 38% had adequate knowledge regarding ECG and its interpretation. While in the control no student had inadequate knowledge and 50% had adequate knowledge. During the posttest 31% students in the experimental group had inadequate and 19% had adequate knowledge regarding ECG and its interpretation. While in the control group no student had inadequate knowledge and 50% had adequate knowledge regarding ECG and its interpretation.

OVERALL PRE-TEST AREA WISE KNOWLEDGE IN EXPERIMENTAL GROUP

Sl. No	Area wise content	Maximum possible score (28)	Mean	Standard Deviation	Mean Percentage
		Knowledge score			
1	Basic knowledge of ECG	12	12.96	2.7	25.92%
2	ECG interpretation	38	7.8	4.1	15.6%

The above Table depicts that the pretests knowledge of the experimental group regarding ECG and its interpretation. Students had a mean percent score of 25.92 in the basic knowledge about ECG and had mean percent of 15.6 on the aspect regarding interpretation of ECG.

AREA WISE PRETEST KNOWLEDGE SCORE IN CONTROL GROUP

Sl. No	AREA WISE CONTENT	MAXIMUM POSSIBLE SCORE (28)	Mean	Standard Deviation	Mean Percentage
		KNOWLEDGE SCORES BY NO. OF STUDENTS			
1	Basic knowledge of ECG	0	20.26	3.3	40.52%
2	ECG interpretation	50	18.8	4.3	37.6%

The above table depicts that the pre interventional knowledge of the control group regarding ECG and its interpretation. Students got a mean percent score of 40.52 with a mean in the basic

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knowledge about ECG whereas they had mean percent of 37.6% on the aspect of ECG and its interpretation.

ASSESSMENT OF EFFECTIVENESS OF COMPUTER SIMULATION ON KNOWLEDGE LEVEL AMONG EXPERIMENTAL GROUP.

PRETEST AND POST-TEST KNOWLEDGE SCORE ON ECG AND ITS INTERPRETATION AMONG EXPERIMENTAL GROUP

Knowledge score	Mean	Mean difference	Paired _t 'test value	SD	df	P value
Pretest	12.96					
Posttest	20.26	7.3	12.58	2.7±4.I	49	0.001 Sig

The above table depicts that pretest mean score was 12.96, post-test mean score was 20.26 with a mean difference of 7.3. The paired t'test value is 12.58 at SD 2.7±4.1, significant at 0.001 levels.

PRETEST AND POSTTEST KNOWLEDGE SCORE ON ECG AND ITS INTERPRETATION AMONG CONTROL GROUP.

Knowledge score	Mean	Mean difference	Paired _t' test value	SD	df	Significance
Pretest	7.82					Not sig.
Posttest	18.8	10.98	17.13	3.3±4.3	49	

The table depicts that the pretest mean score was 7.82, posttest mean score was 18.8 with a mean difference of 10.98. The paired_t' test value is 17.13 at SD 3.3±4.3, found not significant.

COMPARISON BETWEEN THE EFFECTIVENESS OF COMPUTER SIMULATED LEARNING AND LECTURE METHOD.

OVERALL POST TEST KNOWLEDGE SCORE ON ECG AND ITS INTERPRETATION AMONG CONTROL AND EXPERIMENTAL GROUP

Group	Sample (n)	Max.score	Knowledge scores				t -test	P value
			Mean	Standard error	Mean percentage	df	0.07	0.001 sig:
Experimental	50	28	20.26	0.58	7.3 %			
Control	50	28	18.8	0.6	10.98%	98		

The above table Shows the mean post-test knowledge score of 20.26 among the experimental group (SE of 0.58) with that of mean post-test knowledge score 18.8 among the control group with an SE of 0.6. The computed _p value is significant at 0.001 level.

ASSOCIATION BETWEEN THE LEVEL OF PRE- INTERVENTION KNOWLEDGE SCORE WITH THEIR SELECTED DEMOGRAPHIC VARIABLES

Demographic variables		Pretest Knowledge score		EXPERIMENTAL group		
		≤10 marks Inadequate knowledge	>15marks Adequate Knowledge	df	Chi square value	p value
Age	18-20 years	25	1			
	20-22yrs	10	5			
	Above 23 yrs	5	4	2	2.927	NS
Gender	Male	5	5			
	Female	30	10	1	-	NS
Exposure in assisting the investigative procedure	Yes	30	5			
	No	10	5	2	1.200	NS
Previous knowledge of ECG and its interpretation	Yes	10	10			
	No	20	10	2	.288	NS
Source of information	Clinical experince	20	10	2	1.0	NS

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	Books	5	5			
	Mass media	5	5			

Demographic variables		Pretest Knowledge score		Control group		
		≤10 marks Inadequate knowledge	>15marks Adequate Knowledge	df	Chi square value	p value
Age	18-20 years	20	5			
	20-22yrs	10	5			
	Above 23 yrs	5	5	2	3.927	NS
Gender	Male	5	10	1	-	NS
	Female	25	10			
Exposure in assisting the investigative procedure	Yes	30	10	2	1.12	NS
	No	20	0			
Previous knowledge of ECG and its interpretation	Yes	20	10			
	No	10	10	2	1.288	NS
Source of information	Clinical experince	25	10	2	12.0	NS
	Books	5	5			
	Mass media	5	0			

The above Table depicts that there is no association between the demographic variables and the pretest knowledge score of the experimental and control group.

CONCLUSION

- In experimental group 12% during pretest had inadequate knowledge and 38% had adequate knowledge regarding ECG and its interpretation. While in the control no student had inadequate knowledge and 50% had adequate knowledge. During the post-test 31% students in the experimental group had inadequate and 19% had adequate knowledge regarding ECG and its interpretation. While in the control group no student had inadequate knowledge and 50% had adequate knowledge regarding ECG and its interpretation. A structured teaching program was prepared for the students which included a 50-minute lecture cum discussion session regarding ECG and its interpretation and a computer simulation was prepared for same time duration with the same aspects of learning that covered in the structured teaching program.

  Based on knowledge aspects the pretest knowledge scores were classified. Knowledge assessment questions were classified under two aspects, they were: -

- Basic knowledge on ECG
- Interpretation of ECG

- The mean post-test knowledge score of 20.26 among the experimental group (SE of 0.58) with that of mean post-test knowledge score 18.8 among the control group with an SE of 0.6. The computed p value is significant at 0.001 level.

- There is no association between the demographic variables and the pre-test knowledge score of the experimental and control group. There was no association shown between the baseline variables and knowledge scores of the participants in the study, hence it is concluded that there is no association between the knowledge level of the students, irrespective of all the baseline characteristics students can be trained adequately to gain knowledge and skill in ECG and its interpretation.

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