

A CROSS SECTIONAL SURVEY TO ASSESS THE LEVEL OF SKILL ON ECG AND ITS INTERPRETATION AMONG NURSING STUDENTS

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ABSTRACT

Nurses are usually the first responders to in-hospital cardiac arrests. Therefore, they must be master in basic resuscitation skills. They should also be able to recognize basic ECG rhythms since they are responsible for monitoring and clinical decision-making based on the information obtained from the monitor. Assessing the level of skill on ECG and its interpretations among nursing students and to associate the clinical variables with the level of skill. This was a cross-sectional study of nursing students studying at a selected nursing institute in Uttar Pradesh. Nursing students who were studying GNM II year, GNM III year, BSc II year, BSc III year, BSc IV year, P. BSc I year, and P. BSc II year who met the inclusion criteria were included in the study. Using a computer-generated Haahr's random number table, a total of 200 samples were chosen. The data was gathered using the case vignette tool. The majority of nursing students (82%) of nursing students had very poor skill, 13.50 % had poor skill, 4.50 % had Average skill on ECG and interpretation. There was significant association between level of skill and clinical characteristics such as handling of cardiac monitors ($\chi^2=27.029$, $p=0.000$), interpretation of ECG ($\chi^2=14.549$, $p=0.000$), source of information of ECG ($\chi^2=16.437$, $p=0.011$). The authors conclude to teach complicated ECG rhythms, innovative teaching approaches such as simulation can be incorporated that can help the nursing students to gain more skill and be competent enough to detect or diagnose early ECG changes.

Key Words: cardiac arrests, ECG rhythms, survey.

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INTRODUCTION

According to American College of Cardiology (2007) The ECG remains the most widely used initial screening test for evaluating patients with chest pain. It is the most important initial diagnostic tool for patients with suspected ACS because it is inexpensive, available, and non-invasive. The ECG is the first diagnostic test that should be performed on patients who present to the emergency department with chest pain or angina equivalent symptoms. ECG changes of ischemia occur before infarction, providing the ability to intervene to restore blood flow before myocardial cell death ensues.^[1]

According to Enlund M. (2010) nurses play vital role in linking the rhythm strip with the clinical Status of the patient and the nurse's identification and recognition of arrhythmias in the initiation of appropriate nursing and medical response. Knowledge about the categorization of arrhythmias and subsequent validation of nurse's competency are critical knowledge safe effective practice.^[2]

The ability to evaluate various ECG waveforms is an important skill for many health care professionals including nurses, doctors and medical assistants. If nurses are able to interpret electrocardiogram (ECG) not only their knowledge base increases but the detection and treatment of chronic or acute cardiac problems will also improve. Considering the severity of the life-threatening condition the authors felt need to assess the level of skill on ECG and its interpretation among nursing students to become competent to obtain and interpret ECG.

OBJECTIVES

1. To assess the level of skill on ECG and its interpretations among nursing students
2. Find the association between demographic and clinical variables and level of skill on ECG and its interpretation among nursing students.

HYPOTHESIS

1. There will be a significant association between level of skill and demographic and clinical variables among nursing students.

METHODOLOGY

This study was a cross sectional descriptive study design conducted among nursing students studying in selected in nursing institute, Uttar Pradesh. Nursing students who were studying GNM II year, GNM III year, BSc II year, BSc III year, BSc IV year, P. BSc I year, and P. BSc II year who met the inclusion criteria were included in the study. A total of 200 samples were selected by using simple random technique with help of computer generated Haahr's random number table. The data was gathered using the case vignette tool.

DESCRIPTION OF THE TOOL

Section A: Demographic and Clinical Variables

This was developed by the authors in accordance with the needs of the present study. This tool was self-administered, and it elicited information of the nursing students on clinical variables information such as, type of affiliated hospital & source of information, recording of ECG manually, handling of cardiac monitors, interpretation of ECG.

Section B: Case Vignette Tool on ECG and its Interpretation

This case vignette has two components i.e., normal and abnormal ECG interpretation. The normal ECG components includes heart rate calculation, rhythm identification, axis determination, measuring of intervals and segments, morphology of ECG waves was included. The abnormal ECG components include myocardial ischemia and infarction, Bradyarrhythmia, Tachyarrhythmia, Bundle branch block and fascicular block, enlargement and hypertrophy.

The fiction case scenario was given with ECG strip. Based on the scenario, questions were asked to the participants to interpret the ECG strip. The question items were given in declarative form, which is stated in brief, concise, clearly and avoided double-barreled items. The instrument has 16 fiction case scenarios with 50 fill in the blanks type questions were asked. A score of 1 for the correct answer, a score of 0 for wrong response was given.

SCORING FOR CASE VIGNETTE:

The score was interpreted as follows for the level of skill

Level of Skill	Score	Percentage
Very Poor	0-10	0-20
Poor	11-20	21-40
Average	21-30	41-60
Good	31-40	61-80
Excellent	41-50	81-100

CONTENT VALIDITY OF CASE VIGNETTE & RELIABILITY

The experts were asked to review the case vignette tool and rate the items in terms of relevance, clarity, simplicity, and ambiguity in the content evaluation form. After obtaining feedback from all experts, the tool was gathered and analysed and necessary modifications tool were done before collecting the data. The internal consistency of case vignette tool was found to be 0.853 and it indicates that the tool was reliable.

RESULTS

Descriptive statistics and inferential statistics have computed the results by using SPSS software, version 23. The analyses of the data from the study are presented under the following headings:

Section A: Distribution of nursing students based on clinical variables.

Section B: Description of level of skill on ECG and its interpretation among nursing students

Section C: Association of level of skill on ECG and its interpretation among nursing students with selected clinical variables.

Section A: Distribution of nursing students based on demographic and clinical variables.

Table 1: Distribution of Demographic and Clinical variables among nursing students n=200

Demographic and clinical Variables	f	%
Age in years		
Below 20 years	73	36.5
21-22 years	65	32.5
23-24 years	54	27.0
Above 24 years	8	4.0
Gender		
Male	47	23.5
Female	153	76.5
Residence		
Rural	102	51.0
Semi Urban	46	23.0
Urban	52	26.0
Nursing Programme		
GNM	87	43.5
B. Sc	63	31.5
P.B.B.Sc	50	25.0
Type of affiliated Hospital		
Private Hospital	133	66.5
Government Hospital	67	33.5
Both	0	0
Recording of ECG manually		
Yes	124	62.0
No	76	38.0
Have you ever handled cardiac monitor in the intensive care unit?		
Yes	42	21.0
No	158	79.0
Interpretation of ECG in cardiac monitor/ ECG strip		
Yes	98	49.0
No	102	51.0
Source of Information for ECG and its interpretation		
Clinical Experience	82	41.0
Internet	40	20.0
Seminar/Workshop/Conference	20	10.0
Classroom teaching	58	29.0
Family History of Heart Disease		
Yes	74	37.0
No	126	63.0

Table 1 depicts that the highest percentage of nursing students 36.5 % were in the age group of below 20 years, most of the nursing students 76.5% were female, 51 % of them were from rural, 43.5 % of them were pursuing GNM, the majority of nursing students 66.5 % nursing students of were undergoing training in Government hospital, 62 % of them were recorded ECG manually, majority 79 % of them were not handled cardiac monitors, 51 % had not done ECG interpretation, 41 % of nursing students got information from clinical experience.

Section B: Description of level of skill on ECG and its interpretation among nursing students

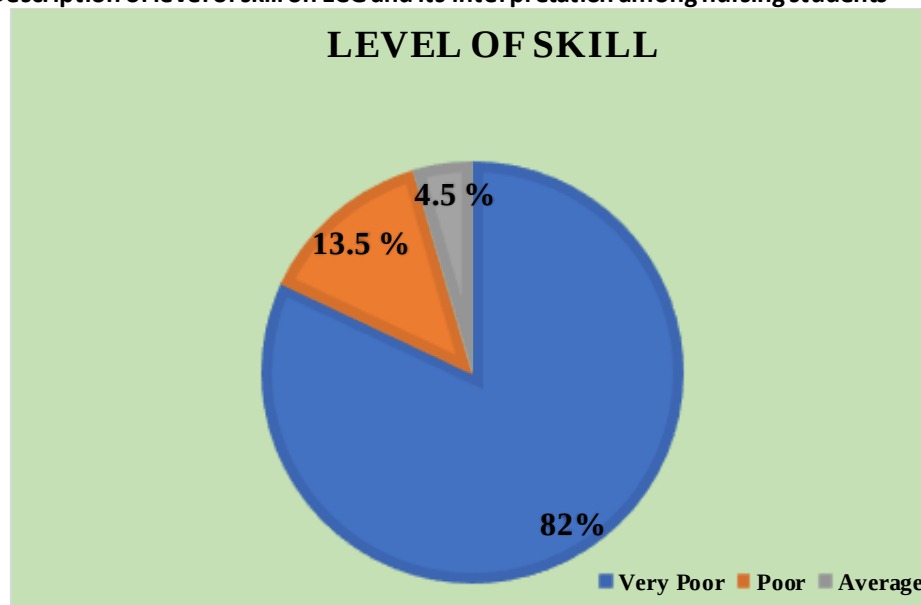


Figure 1: Description of level of skill on ECG and its interpretation

Figure 1 shows that the majority of nursing students (82%) of nursing students had very poor skill, 13.50% had poor skill, 4.50 % had Average skill on ECG and interpretation.

Table 3: Description of Mean, SD and Mean percentage of area wise distribution of skill score among nursing students. n=200

Area	Max Score	Mean	SD	Mean %
Normal ECG	5	1.52	0.68	3.1
Myocardial Ischemia and Infarction	9	3.3	1.61	6.6
Bradyarrhythmias	9	1.02	0.63	2.0
Tachyarrhythmias	21	2.71	0.74	5.4
Bundle Branch Block and Hypertrophy	6	1.51	0.41	3.0
Overall	50	10.06	4.07	20.1

Table 3 portrays that out of the maximum attainable score (50) the overall mean $\pm$ SD among nursing students was 10.06 ± 4.07 , which was 20.1% of total score. The nursing students got highest mean in Myocardial Ischemia and Infarction i.e., 3.3 with standard deviation of 1.61.

Table 4: Association between level of skill and demographic and clinical variables among nursing students.
n=200

Demographic and clinical Variables	Average (9)	Poor (27)	Very poor (164)	Total	Chi Square value & P value
	f	F	f		
Age in years					
Below 20 years	4	15	54	73	$\chi^2 = 9.599$ Df=6 p= 0.142 NS
21-22 years	2	7	56	65	
23-24 years	2	3	49	54	
Above 24 years	1	2	5	8	
Gender					
Male	2	9	36	47	$\chi^2 = 1.679$ Df=2 p= 0.431 NS
Female	7	18	128	153	
Residence					
Rural	3	16	83	102	$\chi^2 = 5.728$ Df=4 p= 0.220 NS
Semi Urban	1	4	41	46	
Urban	5	7	40	52	
Nursing Programme					
GNM	4	18	65	87	$\chi^2 = 7.649$ Df=4 p= 0.105 NS
B. Sc	2	6	55	63	
P.B.B.Sc	3	3	44	50	
Type of affiliated Hospital					
Private Hospital	6	20	107	133	$\chi^2 = 0.811$ Df=2 p= 0.666 NS
Government Hospital	3	7	57	67	
Recording of ECG manually					
Yes	5	15	104	124	$\chi^2 = 0.773$ Df=2 p= 0.679 NS
No	4	12	60	76	
Have you ever handled cardiac monitor in the intensive care unit?					
Yes	8	3	31	42	$\chi^2 = 27.029$ Df=2 p= 0.000 NS
No	1	24	133	158	
Interpretation of ECG in cardiac monitor/ ECG strip					
Yes	7	21	70	98	$\chi^2 = 14.549$ Df=2 p= 0.000 NS
No	2	6	94	102	
Source of Information for ECG and its interpretation					
Clinical Experience	3	5	74	82	$\chi^2 = 16.437$ Df=6 p= 0.011 NS
Internet	1	11	28	40	
Seminar/Workshop/Conference	3	3	14	20	
Classroom teaching	2	8	48	58	
Family History of Heart Disease					
Yes	4	5	65	74	$\chi^2 = 4.658$ Df=2 p= 0.0973 NS
No	5	22	99	126	

The data presented in table 4 portrays that the association between level of skill among nursing students and the clinical variables. There was significant association between level of skill and clinical characteristics such as handling of cardiac monitors ($\chi^2 = 27.029$, $p=0.000$), interpretation of ECG ($\chi^2 = 14.549$, $p=0.000$), source of information of ECG ($\chi^2 = 16.437$, $p=0.011$). Hence null hypothesis (H_{01}) was rejected for handling of cardiac monitors, interpretation of ECG, source of information and null hypothesis is accepted for other characteristics.

DISCUSSION

The present study findings were supported by Sheilini M (2015) showed that the mean score of skill was 1.50.^[3] The present study findings were supported by Varvaroussis D.P. (2014) showed that graduating medical students the ability to detect from common emergency ECG abnormalities of anterioseptal ST segment elevation myocardial infraction, atrial fibrillation, and first-degree atrioventricular block was 42.6%, 39.1%, and 32.1%, respectively.^[4] This shows that graduating medical students had low competency in ECG interpretations. The present study findings were consistent with Jablonover RS (2014) showed that the mean ECG competency score among graduating medical students was 8.2 ± 0.529 .^[5]

CONCLUSION

This study was undertaken to assess the level of skill ECG and its interpretation among nursing students. The study showed that most nursing students had poor ECG skills and interpretation. Thus, based on data the authors conclude to teach complicated ECG rhythms, innovative teaching approaches such as simulation can be incorporated that can help the nursing students to gain more skill and be competent enough to detect or diagnose early ECG changes.

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