



Nurses' Knowledge of Electrocardiogram Interpretation at Al-Hussein Teaching Hospital in Al-Samawa City



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ABSTRACT

Aims Electrocardiography is a common non-invasive diagnostic tool used to evaluate the heart's electrical and muscular processes. Every nurse must understand the fundamental electrocardiogram rhythms. This study aimed to assess nurses' knowledge of electrocardiogram interpretation at Al-Hussein Teaching Hospital in Al-Samawa City.

Instruments & Methods This descriptive study was carried out on nurses at Al-Hussein Teaching Hospital in Al-Samawa City, Iraq, from 1st December 2022 to 30th February 2023. Fifty nurses were selected by a purposive sampling (non-probability) method. A researcher-made questionnaire was designed to collect data. This questionnaire consisted of two sections. The first section was related to demographic information, and the second section had 15 self-report questions to measure the knowledge level of nurses. Data were analyzed using SPSS 24.0 software.

Findings Most of the nurses were women (64.0%) and in the age group of 25-29 years (36.0%), and more than half of them were married (74.0%). Most nurses graduated from the institute (42.0%), and the total years of service of 40% were 1-10 years. The nurses' knowledge regarding electrocardiogram Interpretation was at a poor level.

Conclusion The knowledge of electrocardiogram interpretation in Al-Hossein Teaching Hospital in Al-Samawa City is at a poor level.

Keywords Nurses; Electrocardiogram; Knowledge

CITATION LINKS

[1] Implementation and outcomes of cardiac rehabilitation educational package: a tertiary center study [2] A brief review: History to understand fundamentals of electrocardiography [3] Knowledge of student nurses regarding interpretation of electrocardiogram: a pre-experimental study [4] 43 oral deficiencies in nurses' knowledge and substandard practice related to ECG monitoring: baseline results of the PULSE trial [5] Practice standards for electrocardiographic monitoring in hospital settings: an American Heart Association scientific statement from the Councils on Cardiovascular Nursing, Clinical Cardiology, and Cardiovascular Disease in the Young: endorsed by the International Society of Computerized Electrocardiology and the American Association of Critical-Care Nurses [6] Introduction to medical-surgical nursing [7] Implications of nurse's moral distress experience in clinical practice and their health status in obstetrics and critical care settings [8] Essential clinical procedures [9] Nurses' knowledge and practices of electrocardiogram interpretation [10] Deficiencies in nurses' knowledge and substandard practice related to ECG monitoring: multisite randomized clinical trial [11] Nurses competencies of electrocardiogram interpretation in emergency settings: a literature review [12] Electrocardiogram interpretation competency among paramedic students [13] A survey of clinical competence of new nurses working in emergency department in Iran: A descriptive, cross-sectional study [14] Nurses' performance regarding life threatening ventricular dysrhythmias among critically ill patients [15] Guidelines and scientific documents [16] Determination of the abilities of nurses in diagnosing the ECG findings about emergency heart diseases and deciding the appropriate treatment approaches [17] Electrocardiograms: a guide to rhythm recognition for emergency nurses [18] The effectiveness of an education program on nurses' knowledge of electrocardiogram interpretation [19] The effect of peer-nurses' lecturing on critical units nurses' retaining knowledge of electrocardiogram interpretation [20] The top 10 causes of death [21] Validation and clinical interpretation of the St George's respiratory questionnaire for COPD (SGRQ-C) after adaptation to Malaysian language and culture, in patients with COPD [22] Nurses knowledge about care of patient with acute coronary syndrome [23] Nurses knowledge regarding care of patients with acute coronary syndrome in El obied Teaching Hospital (El obied Locality July-September 2017) [24] Nurses' performance regarding electrocardiography application and its interpretation: suggested nursing guideline [25] Evaluation of knowledge of medical department nurses regarding standard procedure toward electrocardiogram in Al-Amara City Hospitals, Iraq

Introduction

Diabetes patients have a 2 to 4 times increased risk of developing coronary artery disease. Coronary vascular disorders account for about 25% of all fatalities. According to the World Health Organization (WHO), deaths from coronary artery disease are three times more common than deaths from coronary vascular disorders. The prevalence of heart illnesses is rapidly rising around the world. In 2030, 23.4 million people are expected to die from cardiac conditions ^[1, 2]. Cardiovascular Diseases (CVDs) are currently the leading cause of death in India. India has a CVD death rate of 272 per 100,000 people, greater than the global average of 235 per 100,000 people, according to the Global Burden of Disease study ^[3]. The prevalence of heart disease in India right now is concerning. An Indian die from heart issues every 29 seconds. In India, there could be 20,000 new cardiac patients diagnosed each day. According to estimates, in India, cardiovascular illnesses claim the lives of 17.5 million people annually, accounting for a startling 31% of all fatalities worldwide, making it the country with the highest burden of coronary heart disease by the year 2020 ^[4]. The nurses must attentively watch the continuous Electrocardiogram (ECG) monitoring and be capable of performing a preliminary interpretation. Their ability to correctly set ECG leads, analyze data, and treat critically ill patients has a major impact on lowering morbidity and fatality rates ^[5].

The sub-specialty of nursing sciences known as critical-care nursing focuses, in particular, on how people react to situations where they face imminent death. ECGs are watched and interpreted by nurses who work in critical care units, where patients are often observed intermittently or constantly at the bedside using a 12-lead ECG ^[6-8]. An important instrument that is frequently employed unobtrusively to evaluate the heart's electrical and muscular activity is the electrocardiogram. Additionally, it provides details on how to diagnose cardiac arrhythmias and acute coronary syndrome. ECG can be used in a variety of clinical situations, such as those involving patients who have syncope, dyspnea, and chest discomfort, and persons who have consumed harmful substances, abnormal electrolytes, and pacemakers ^[9]. An electrocardiogram, which tracks the electrical activity of the heart, can be used to identify a number of different cardiac conditions. An ECG is obtained by placing a number of electrodes on the patient's chest and limbs, and then printing a recording on the ECG machine for analysis. Additionally, it is utilized to track myocardial infarction healing ^[10, 11].

Given that nurses care for the majority of patients in hospitals and have the greatest contact with them, it is critical that they have the skills necessary to administer and interpret electrocardiograms in their

capacity as members of the emergency services team. Additionally, improving the ECG interpretation skills of healthcare workers who operate in emergency rooms might improve patient safety by reducing the likelihood of interpretation mistakes in life-threatening circumstances. To guarantee fast treatments and life-saving procedures when dysrhythmias do occur, nurses in critical care settings must do a more precise evaluation ^[12, 13].

Since the 1990s, cardiovascular disease (CVD) has been the main reason for early mortality in Egypt. 2020 saw 173,871 fatalities from coronary heart disease, or 32.40% of all deaths. Meanwhile, cardiac rhythm problems affect more than 70% of patients in intensive care units, and their death rates reflect this ^[11, 14]. The nurse should be knowledgeable and skilled enough to use ECG equipment, record an ECG, recognize serious and life-threatening arrhythmias, and respond to them properly. Once the procedure has been explained to the patient, the nurse must ensure that the ECG machine is secure and ready to use, check that the date and time are accurate on the device, wash hands, obtain verbal or written consent, maintain patient privacy, position the patient supinely, and properly prepare the patient's skin ^[15]. Nurses are frequently the first to arrive at a hospital when a cardiac arrest happens. They must consequently be skilled in the fundamentals of resuscitation. Considering that they are in charge of overseeing and basing clinical choices on the information gathered from the monitor, they should also be able to recognize fundamental ECG rhythms ^[5-7]. In the study by Doğan and Melek, 60.5% of the nurses reported that they were unable to identify the different types of arrhythmias and were unaware of the proper electrocardiography monitoring ^[16].

Electrocardiography is the most widely used diagnostic technique in cardiology. If properly understood, it significantly aids in the identification and care of people with heart problems. Additionally, it is essential for the diagnosis of cardiac arrhythmias and acute myocardial ischemia syndromes. Most cardiac catastrophes are caused by these two diseases. In many situations, it is reasonable to utilize it as a screening test ^[17]. The National Service Framework for Coronary Heart Disease offers recommendations on crucial elements of treatment that might significantly improve patient care ^[18]. Learning fundamental nursing concepts calls for fresh approaches that can help nurses retain their new knowledge ^[19, 20]. This study aimed to assess nurses' knowledge of electrocardiogram interpretation at Al-Hussein Teaching Hospital in Al-Samawa City.

Instruments and Methods

This descriptive study was carried out to assess the knowledge of nurses at Al-Hussein Teaching Hospital in Al-Samawa City, Iraq, from 1st December 2022 to

30th February 2023. Fifty nurses were selected by a purposive sampling (non-probability) method. Nurses who had less than one year of service were excluded from the study.

A researcher-made questionnaire was designed to collect data by reviewing the literature, other studies, and prior knowledge. This questionnaire consisted of two sections. The first section was related to demographic information, including age, gender, educational level, marital status, and years of service. The second section had 15 self-report questions to measure the knowledge level of nurses. A pilot study was carried out to test the reliability of the questionnaire. The internal consistency of the questions was determined with Cronbach alpha coefficient of 0.787, and the instrument's dependability was confirmed.

The study was conducted in the morning shift in the maternity and pediatric wards, and the questionnaires were distributed among the nurses of the intensive care unit, the coronary care unit, the emergency room, and the rehabilitation unit (both public and private wards).

Correct answers less than 50% were considered as poor knowledge level, and correct answers above 50% were considered as good knowledge level.

The collected data were presented as frequency and percentage, and IBM Statistical Package for Social Science (SPSS software) version 24.0 was used [21].

Findings

The mean age of nurses was 27.23 ± 4.46 years old, and the mean years of service was 6.23 ± 5.72 . Most of

the nurses were young women in the age group of 25-29 years. The frequency distribution of the demographic characteristics of the studied nurses is presented in Table 1.

Table 1) Frequency distribution of the demographic characteristics of the studied nurses (n=50)

Demographic characteristics	Frequency	Percentage
Age group (years)		
20-24	10	20.0
25-29	17	34.0
30-34	11	22.0
35-39	3	6.0
40-44	4	8.0
45-50	5	10.0
Gender		
Male	18	36.0
Female	32	64.0
Educational level		
Secondary	16	32.0
Institute	21	42.0
College	13	26.0
Marital status		
Single	13	26.0
Married	37	74.0
Divorced	0	0.0
Widow/Widower	0	0.0
Total years of service		
1-10	20	40.0
11-20	15	30.0
21-30	10	20.0
>31	5	10.0

In total, the knowledge of ECG interpretation was good in 10 nurses (20%) and poor in 40 nurses (80%). The frequency distribution of true and false answers of the studied nurses to the questions and the determination of their knowledge level of ECG interpretation is provided in Table 2.

Table 2) Frequency distribution of true and false answers of the studied nurses to the questions and determination of their knowledge level of ECG interpretation (n=50)

No.	Questions	False		True		Assessment
		No.	%	No.	%	
1	The P wave denotes the repolarization of the right and left atriums.	41	82	9	18	Poor
2	Both the right and left ventricles depolarize, as shown by the QRS complex.	40	80	10	20	Poor
3	The ventricular repolarization waveform is the T wave.	35	70	15	30	Poor
4	One of the ECG's negative waves is the T wave.	33	66	17	34	Poor
5	The typical PR interval ranges from 0.12 to 0.20 seconds.	37	74	23	26	Poor
6	V1 and aVR leads are negative waves in a typical ECG.	44	88	6	12	Poor
7	The presence of pathologic Q waves indicates a prior myocardial infarction.	38	76	12	24	Poor
8	The rhythm of atrial fibrillation may be regular.	35	70	15	30	Poor
9	Left Ventricular Hypertrophy (LVH) is detectable by ECG.	43	86	7	14	Poor
10	Leads V1 to V6 show ST elevation in inferior myocardial infarction.	6	12	44	88	Good
11	In lateral myocardial infarction, leads I, aVL, V5, and V6 all exhibit ST elevation.	26	52	24	48	Poor
12	The leads II, III, and aVF show ST elevation in anterior myocardial infarction.	26	52	34	68	Good
13	Myocardial ischemia is indicated by ST depression in the ECG.	31	62	19	38	Poor
14	RSR pattern is seen in the right bundle branch block rhythms in V1, V2, and V3.	36	72	14	28	Poor
15	In cases of hypokalemia, the T long wave and QRS wide wave are observed.	40	80	10	20	Poor

Discussion

This study was conducted to assess nurses' knowledge of electrocardiogram interpretation at Al-Hussein Teaching Hospital in Al-Samawa City, Iraq. The present study showed that the majority of nurses were in the age group of 25 to 29 years, which confirms that the majority of nurses were under 30 years of age (36.0%). This finding supports the

results of Mustafa *et al.*, which show that the highest percentage of nurses (37%) are in the age group of 25-29 years [22].

The majority of nurses in the current study (64.0%) were women. This finding is also supported by Mohammad's study, which shows that most of the nurses (83.3%) were women [23]. The researchers' opinion is that the percentage of women is the

highest because the acceptance rate for women is higher than that of men.

The present study revealed the majority of nurses (42.0%) in the study groups were institute graduates. This result agrees with the finding in a study held in Egypt by Mohammed Ali *et al.*, which reported that the highest percentage of nurses (67.5%) were graduated from technical institute graduates^[24]. This is due to the fact that nurses who study in an institution spend fewer years to graduate, while nurses who graduate from nursing colleges spend more years. In other words, the duration of college education is longer.

In terms of the marital status, the present study revealed that 74.0% of samples was married, and 26.0% was single. This result is also consistent with the finding of Mohammed *et al.*'s study, which showed that the most of nurses (77.5%) are married^[24].

This study showed that the majority (40.0%) of nurses had 1-10 years of service experience. This result is consistent with the findings of a study conducted by Tahboub and Dal Yilmaz in Turkey that 53.8% of nurses had less than five years of experience as licensed nurses^[9]. This result is reasonable considering that most nurses are in the age group of 25-29 years.

According to the results of the present study, nurses' knowledge of electrocardiogram interpretation was at a poor level. This result is contrary to the findings of Tahboub and Dal Yilmaz, who reported that nurses have a high level of ECG knowledge^[9].

Also, this result is contrary to the findings of a study conducted in Iraq by Alridh *et al.*, where nurses had a moderate understanding of routine electrocardiography methods^[25].

According to the results of the current research, which shows the poor level of knowledge of nurses in ECG interpretation, it is suggested to improve the knowledge and performance of nurses in this field through continuous training programs for at least three months. A manual should also be prepared and distributed to all nurses. Providing continuous training classes, including updated information for nursing staff, can also improve the knowledge level of nurses.

The limitation of the study is that this study was conducted in Al-Samawa City, and caution should be taken in generalizing the results to other cities. It is suggested that similar studies be conducted in the Al-Muthanna government and other cities.

Conclusion

The knowledge of electrocardiogram interpretation in Al-Hossein Teaching Hospital in Al-Samawa City is at a poor level.

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Ethical Permission: The information of the nurses was used for research purposes and was confidential.

Conflict of Interests: There is no conflict of interests.

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