University of Basrah

College of Nursing

Nurses' Knowledge toward Electrocardiogram Interpretation at Al-Basrah Teaching Hospitals.

A Research Project

By students

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In the Partial Fulfillment of the Requirements for the

Degree of Bachelor in Nursing Science

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March , 2022 AD   Shaban, 1443 H

بسم الله الرحمن الرحيم

(وَلَوْلَا فَضْلُ ٱللَّهِ عَلَيْكَ وَرَحْمَتُهُ لَهَمَّت طَّائِفَةٌ مِّنْهُمْ أَن يُضِلُّوكَ وَمَا يُضِلُّونَ إِلَّا أَنفُسَهُمْ ۖ وَمَا يَضُرُّونَكَ مِن شَىْءٍ ۚ وَأَنزَلَ ٱللَّهُ عَلَيْكَ ٱلْكِتَابَ وَٱلْحِكْمَةَ وَعَلَّمَكَ مَا لَمْ تَكُن تَعْلَمُ ۚ وَكَانَ فَضْلُ ٱللَّهِ عَلَيْكَ عَظِيمًا)

صدق الله العلي العظيم

سورة النساء (١١٣)

Dedication

هاقد وصلنا الى نهاية المشوار في هذا الحلم لنبدأ من جديد حلما آخر ، انتهت حياتنا الجامعيه التي عشنا بين جنباتها الكثير من المواقف الجميلة والسيئه عشناها بحلوها ومرها ، اهدي انجازي الى من كانت دعواتهم ومساندتهم ترافقني وتحاوطني دائما وابدا ((والدي الحبيبين)) ، الى من قدموا لي دعما كبيرا لانهاء هذا المشوار الصعب ((اخواتي واخوتي)) الى من عشت معهم سنين دراستي نآزر ونشجع بعضنا ((صديقاتي وزميلاتي)) ، الى الارواح الراحله الباقيه في قلبي (جدي، خالتي) لمن كان لهم الفضل الاكبر في وصولي الئ هذا اليوم و الى كل من ساندني بكلمه تشجيع او دعوة خالصة ، أهديكم تخرجي

Nada Kareem

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2022

Acknowledgments

Firstly, I wish to express my gratitude to **Allah** (**the Great and Almighty**) for giving me the ability to do and complete this project.

I would like to express my sincere appreciation to The University of Basrah and College of Nursing for giving me the chance for perusing my study and Sincere thanks and deepest respects are given to the Dean of College of Nursing /University of Basrah, Prof. Dr. **Abdulameer A.Al-Mussawi**

Special thanks go to my supervisor Assist. Lecture. **Khadija Mohammed Jassim** for her support and encouragement thanks a lot for her.

Abstract

Background: Electrocardiogram (ECG) is a diagnostic tool that is routinely used noninvasively to assess the electrical and muscular functions of the heart. All nurses should be able to recognize basic ECG rhythms.

Objectives: To assess the knowledge of electrocardiogram among nurses, to find out the association between knowledge of nurses toward Electrocardiogram and soci-demographic characteristics

Methodology: Descriptive cross- sectional design study was carried out, the period of the study extended from 21st November, 2021 to the 30th March, 2022. A probability random study sample of nurses in Basrah teaching hospital and Al-Fayah hospital. The researcher take (100) nurses from both hospitals. Structured Questionnaire was used as instrument for data collection to assessed nurses' knowledge. Data were analyzed through the use of statistical package of Social Sciences (SPSS) version 22 in which descriptive and inferential statistical measures were employed.

Results: The results of the study showed that nurse's knowledge regarding Electrocardiogram, Were good level of knowledge.

Conclusions: The vast majority are young age nurses, male, graduated from Bachelor degree, most of them working in emergency unit, have (1-5) years of experience, most of the nurses have training previous ECG and ECG information resource from the university. There is significance relationship between (age, gender, Years of working experience and working unit) regarding knowledge of electrocardiogram interpretation and no significance relationship between (Educational level, Previous ECG training course and ECG information resource) .

Recommendations: Refreshing intensive training courses must be run under the supervision of qualified staff in electrocardiography at least every

two years, Further courses regarding ECG knowledge and practice should be incorporated into the nursing education curriculum, Handbooks should be prepared to improve nurses' ECG knowledge.

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List of Abbreviations

Symbols	Meaning
%	Percentage
α	Cronbach Alpha
+	Plus
>	More than
$\leq$	Less than or equal
AV	Atrioventricular
CCU	Coronary care unit
d.f	degree of freedom
Dr	Doctor
ECG	Electrocardiogram
ED	Emergency Department
EKG	Elektrokardiogramm
F	Frequency

ICU	Intensive Care Unit
M	Mean
M.S	Mean of Score
MOH	Ministry of Health
N	Number
N.S	Not significant
p	Probability
r	Pearson Correlation Coefficient
S	Significant
SD	Standard Deviation
Sig	Significance
SPSS	Statistical Package of Social Sciences
WHO	World Health Organization
X2	Chi-square

Chapter One

Introduction

Chapter One

Introduction

1.1. Introduction

Electrocardiogram (ECG) is a diagnostic tool that is routinely used non-invasively to assess the electrical and muscular functions of the heart. ECG has been considered to be the first diagnostic tool in chest pain and enables specialists to assess the risks and symptoms. ECG has also made a focal point of modern medicine because it provides information about diagnosing acute coronary syndromes and cardiac arrhythmias(Tahboub and Dal Yılmaz, 2019).

Electrocardiography is the measurement of electrical activity in the heart (using an electrocardiograph, e.g. cardiac monitor, ECG machine) and recording it as a visual trace, either on paper or on an oscilloscope screen, by placing electrodes on the skin (Al-Husaunawy,2015).

In addition, the knowledge process and education are important aspects of the correct interpretation of the ECG - definition of normal/abnormal rhythm, understanding of electrophysiological concepts and characteristics of the monitoring technique.

The nurse, in care and management activities, is responsible for maintaining comprehensive patient care in a safe and effective way. In this sense, it is essential that nursing training focus on the analysis, interpretation and mastery of clinical signs and diagnostic methods in the context of cardiovascular illness (Saffi MAL, 2018).

Nurses are usually the first responders to in-hospital cardiac arrests. Therefore, they must be master in basic resuscitation skills. It has been reported that work unit in the hospital affected the knowledge and practice of ECG. Showed higher test scores among the nurses working in the cardiology department in comparison to those working in the Emergency Department (ED) and Intensive Care Unit (ICU) (Tahboub and Dal Yılmaz,2019).

1.2. Importance of the Study

Heart disease is a third disease that causes death worldwide. Early detection of heart disease is a right step to decrease that mortality. Electrocardiogram (ECG) is an essential strategy in the management to determine the next treatment in a patient handling with cardiology diagnosis. It was estimated as the best sign compared to the increase in serum levels. It is a diagnostic device that is still affordable for society compared to the other high technology device to detect the abnormalities of the heart. The ability of the nurse in the ECG interpretation was still low. Their ability was only limited to the measurement and quite low in the interpretation (Nissa and M, 2018).

World Health Organization (WHO, 2017) reported that ischemic heart disease and stroke takes the first place in the top 10 causes of death worldwide which it accounting for a combined 15 million deaths in 2015.

While, in Iraq study that was carried out to identify nurses' knowledge concerning early intervention for patients with ventricular tachycardia at Baghdad teaching hospitals which show result of overall assessment of the studied sample's knowledge was low (Mousa *et al.*, 2016).

As well, every nurse should be able to recognize basic ECG rhythms, such as normal sinus rhythm, sinus tachycardia, sinus bradycardia, atrial fibrillation, atrial flutter, heart blocks, ventricular fibrillation and a systole (Atwood *et al.*, 2015). This is required that the nurse must be responsible for monitoring and clinical decision-making based on information obtained from the monitor (Funk *et al.*, 2017).

1.3. Problem of the study.

Nurses' Knowledge toward Electrocardiogram Interpretation at Al-Basrah Teaching Hospitals.

1.4. Objectives of the study.

1. To assess the knowledge of electrocardiogram among nurses.

2. To find out the association between knowledge of nurses toward Electrocardiogram and soci-demographic characteristics.

1.5. Hypothesis of the Study

1.5.1. The Study Hypothesis

There is a significant association between Nurses' Knowledge and Electrocardiogram Interpretation.

1.5.2. The Null Hypothesis

There is no significant association between Nurses' Knowledge and Electrocardiogram Interpretation.

1.6. Definitions of Terms

1.6.1. Nurses

1.6.1. a. Theoretical Definition

Health care professionals have been educated and trained to promote and maintain health through the diagnosis and treatment of acute and chronic conditions (AL-Khaykanee and Khaleel , 2018).

1.6.1. b. Operational Definition

A person formally educated and certificate to give care that need with a minimum of Preparatory Nursing, Diploma in Nursing, Bachelor of Nursing who gives medication and provides nursing care according to systematic nursing process in Al-Basrah teaching hospitals.

1.6.2. Knowledge

1.6.2. a. Theoretical Definition

Awareness and concepts gained during experience or study (American Heritage, 2016).

1.6.2. b. Operational Definition

It is the ability of nurses to acquire facts and information concerning Electrocardiogram Interpretation.

1.6.3. Electrocardiogram

1.6.3. a. Theoretical Definition

An electrocardiogram (ECG) is a measure of how the electrical activity of the heart changes over time as action potentials propagate throughout the heart during each cardiac cycle (Dupre *et al*., 2015).

1.6.3. b. Operational Definition

Electrocardiographs detect the electrical signals associated with cardiac activity and produce an ECG, a graphic record of the voltage versus time.

Chapter Two

Review of Literature

Chapter Two
Literature Review

2.1. Historical overview about Electrocardiography.

Dr. Willem Einthoven, a Dutch physiologist inspired by the work of Waller, refined the capillary electrometer even further and was able to demonstrate five deflections which named ABCDE Figure (2-1).
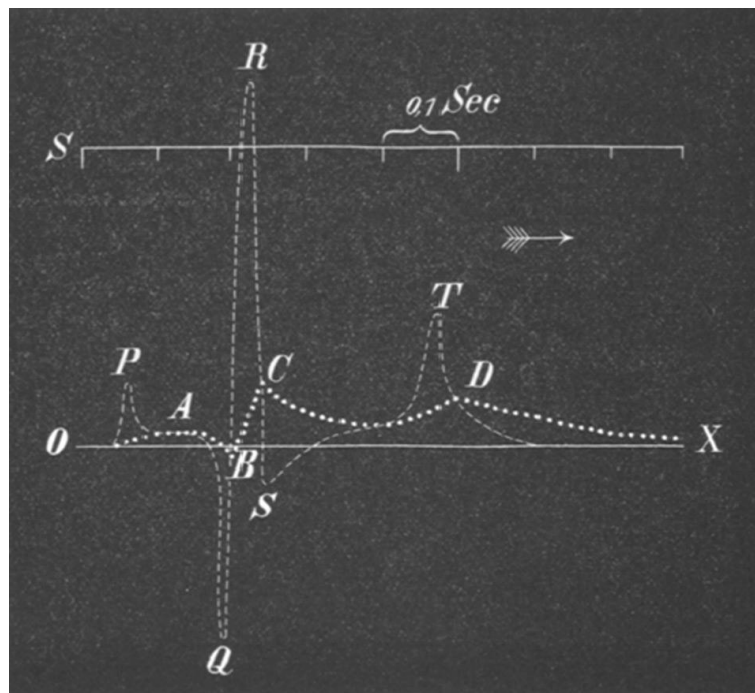
Figure (2-1): Two superimposed ECGs are shown. Uncorrected curve is labeled ABCD. This tracing was made with refined Lippmann capillary electrometer. The other curve was mathematically corrected by Einthoven to allow for inertia and friction in the capillary tube. He chose the letters PQRST for the corrected curve based on mathematical tradition of labeling successive point on a curve. From Ref (AlGhatrif & Lindsay, 2012).

To adjust for Inertia in the capillary system, was implemented a mathematical correction, which resulted in the curves that we see today. Following the mathematical tradition established by Descartes, was used the terminal part of alphabet series (PQRST) to name these deflections. The term 'electrocardiogram' used to describe these wave forms was first coined by

Einthoven at the Dutch Medical Meeting of 1893. In 1901, was successfully developed a new string galvanometer with very high sensitivity, which used in his electrocardiograph. His device weighed 600 pounds Figure (2-2). (AlGhatrif & Lindsay, 2012).
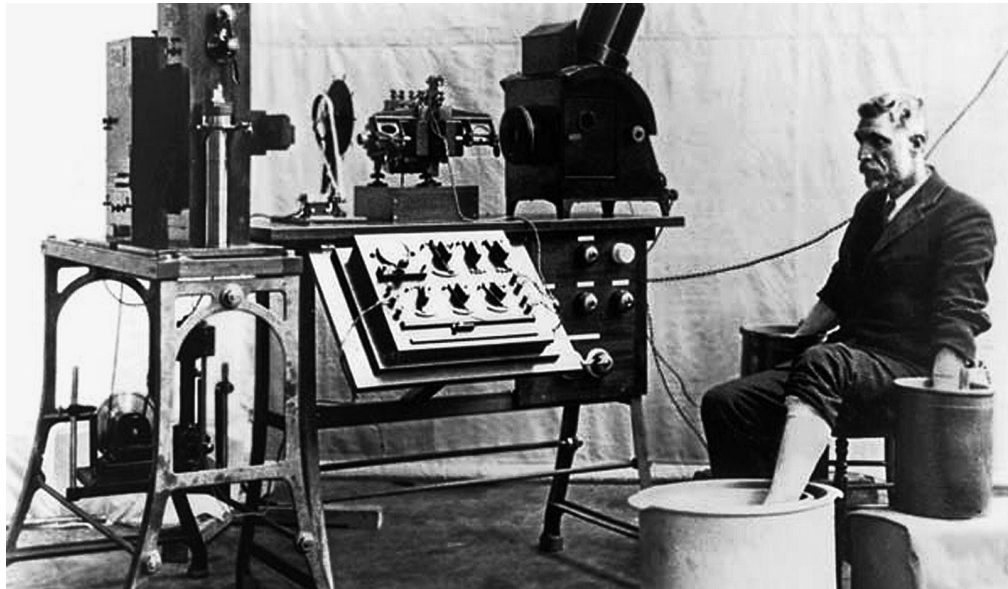
Figure (2-2): Old string galvanometer electrocardiograph showing the big machine with the patient rinsing his extremities in the cylindrical electrodes filled with electrolyte solution (AlGhatrif & Lindsay, 2012).

ECGs are important biomedical signals, which are reflective of an electric activity of the heart. They form a subject of intensive research for over 100 years. ECG signals are one of the best-understood signals being at the same time an important source of diagnostic information. Because of this, in the recent years there has been a steady and intensive research with intent of developing efficient and effective methods of processing and analysis of ECG signals with emphasis on the discovery of essential and novel diagnostic information. (Gacek, 2012).

2.2. General overview upon Electrocardiography.

Electrocardiography (ECG or EKG abbreviated from the German Elektrokardiogramm) is the recording of the electrical activity of the heart. Traditionally this is in the form of a transthoracic (across the thorax or chest)

interpretation of the electrical activity of the heart over a period of time, as detected by electrodes attached to the surface of the skin and recorded or displayed by a device external to the body. The recording produced by this noninvasive procedure is termed an electrocardiogram (also ECG or EKG). It is possible to record ECGs invasively using an implantable loop recorder (Kagalkar & Jambotkar, 2019)**.**

2.3. Types of ECG

The two types of ECG recordings are the 12-lead ECG and a rhythm strip. Both types give valuable information about heart function. A 12-lead ECG records information from 12 different views of the heart and provides a complete picture of electrical activity. Figure (2-3) show ECG leads placement (Eckman and Labus, 2010).

2.3.1. Einthoven's triangle

The axes of the three bipolar limb leads (I, II, and III) form a shape known as Einthoven's triangle. Because the electrodes for these leads are about equidistant from the heart, the triangle is equilateral. The axis of lead I extends from shoulder to shoulder, with the right-arm lead being the negative electrode and the left-arm lead being the positive electrode. The axis of lead II runs from the negative right-arm lead electrode to the positive left-leg lead electrode. The axis of lead III extends from the negative left-arm lead electrode to the positive left-leg lead electrode (Hampton and Hampton, 2019).

2.3.2. Augmented leads

Leads aVR, aVL, and aVF are called augmented leads. They measure electrical activity between one limb and a single electrode. Lead aVR provides no specific view of the heart. Lead aVL shows electrical activity coming from the heart's lateral wall. Lead aVF shows electrical activity coming from the heart's inferior wall. Figure (2-3) show: Lead vectors for the three standard limb leads, the three augmented limb leads (left), and the six unipolar precordial leads (right) (Hampton and Hampton, 2019).
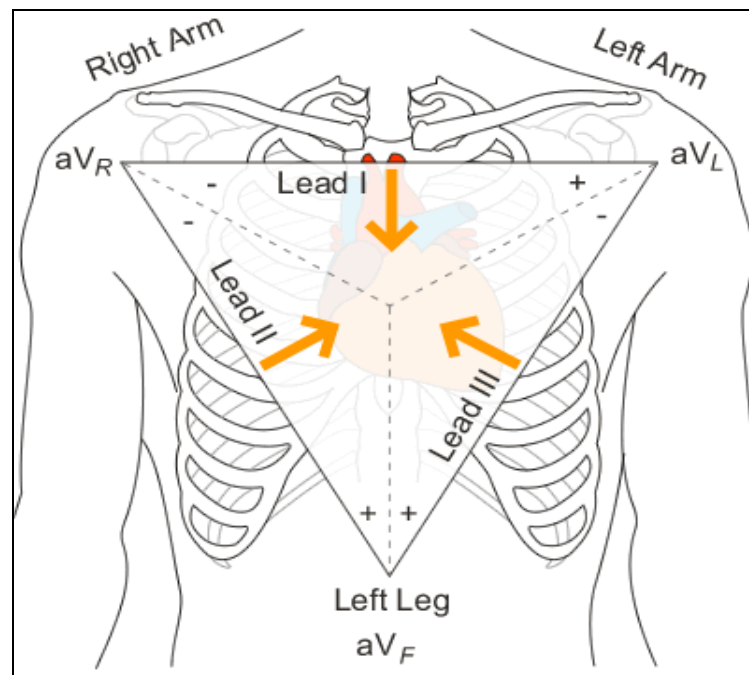
Figure (2-3): Lead vectors for the three standard limb leads, the three augmented limb leads (left), and the six unipolar precordial leads (right). (Mirvis and Goldberger,2010)

2.4. The ECG as A Combination of Atrial and Ventricular Waveforms

The ECG really consists of two separate but normally related parts: an atrial ECG, represented by the P wave, and a ventricular ECG, represented by the QRS-T sequence. With completely normal rhythm, when the sinus node is pacing the heart, the P wave (atrial stimulation or depolarization) always precedes the QRS complex (ventricular stimulation or depolarization) because the atria are electrically stimulated first. Therefore, the P-QRS-T cycle is usually considered as a unit. Figure (2-4) show normal ECG (Goldberger, 2018).
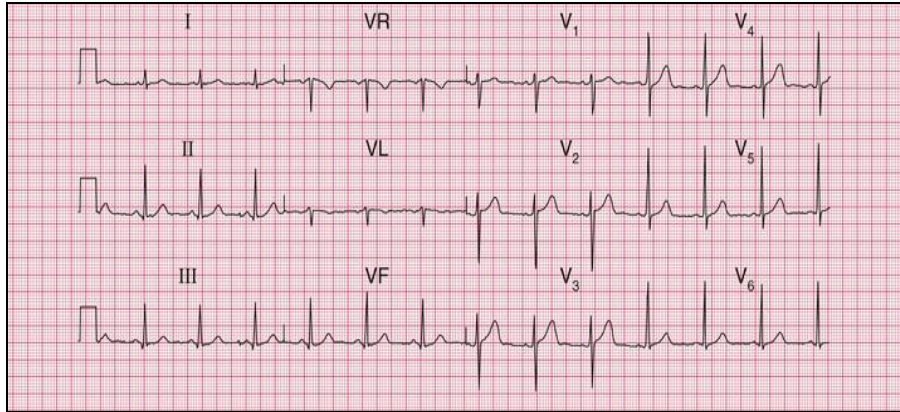
Figure (2-4) normal ECG (Hampton and Adlam, 2019)

2.5. Understanding the Normal ECG

2.5.1. Normal Sinus P Wave

The P wave, which represents atrial depolarization, is the first waveform seen in any cycle. Atrial depolarization is initiated by spontaneous depolarization of pacemaker cells in the sinus node in the right atrium. The atrial depolarization path therefore spreads from right to left and downward toward the atrioventricular (AV) junction (Goldberger, 2013).

2.5.2. Normal QRS Complex: General Principles

The principles used to predict P waves can also be applied in deducing the shape of the QRS waveform in the various leads. The QRS, which represents ventricular depolarization, is somewhat more complex than the P wave, but the same basic ECG rules apply to both, the spread of ventricular depolarization consists of two major sequential phases: (Goldberger, 2013).

2.5.2.a. The first phase of ventricular depolarization is of relatively brief duration (shorter than 0.04 sec) and small amplitude. It results from spread of the stimulus through the interventricular septum. The septum is the first part of the ventricles to be stimulated. Furthermore, the left side of the septum is stimulated first (by a branch of the left bundle of His) (Goldberger, 2013).

2.5.2.b. The second phase of ventricular depolarization involves simultaneous stimulation of the main mass of both the left and right ventricles from the inside (endocardium) to the outside (epicardium) of the heart muscle. In the normal

heart the left ventricle is electrically predominant. In other words, it electrically overbalances the right ventricle (Goldberger, 2013).

2.5.3. Normal T Wave

The T wave represents the mid-latter part of ventricular repolarization. A normal T wave has an asymmetrical shape; that is, its peak is closer to the end of the wave than to the beginning. When the T wave is positive, it normally rises slowly and then abruptly returns to the baseline. When it is negative, it descends slowly and abruptly rises to the baseline. The *asymmetry* of the normal T wave contrasts with the symmetry of abnormal T waves in certain conditions, such as MI and a high serum potassium level. Figure (2-5) show ECG component (Goldberger, 2018).
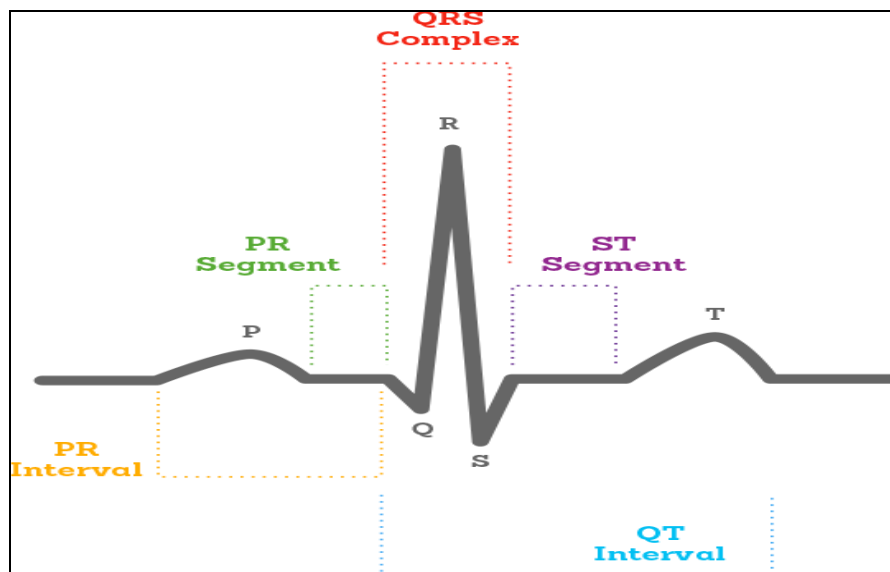
Figure (2-5) ECG component

2.6. Uses of Electrocardiogram

The ECG is one of the most versatile and inexpensive clinical tests. Its utility derives from careful clinical and experimental studies over more than a century showing its essential role in:

- ♣ Diagnosing dangerous cardiac electrical disturbances causing brady- and tachyarrhythmias.

♣ Providing immediate information about clinically important problems, including myocardial ischemia/infarction, electrolyte disorders, and drug toxicity, as well as hypertrophy and other types of chamber overload.

♣ Providing clues that allow you to forecast preventable catastrophes. A major example is a very long QT(U) pattern, usually caused by a drug effect or by hypokalemia, which may herald sudden cardiac arrest due to *torsades de pointes* (Goldberger, 2018).

2.7. Nursing considerations and responsibility about ECG

Nurses play important role in obtaining, interpreting and communicating ECG findings which knowledge and skills in detecting any arrhythmia are key factors in determining the quality of nursing care (Tahboub and Dal Yılmaz, 2019). Nurses must have sufficient knowledge to perform these responsibilities in ways that increase care and patient outcomes (Pettersen *et al* 2014).

When applying continuous monitoring ECG to detect deterioration produces a situation that may in fact subvert the nurse's ability to provide proper clinical surveillance of patients conditions. So the nurse's knowledge and skills in detecting any arrhythmia on the ECG monitors are important key factors in determining the quality of nursing care. Nurses in acute clinical areas are able to record and interpret 12-lead electrocardiograms so the treatment can be initiated as soon as possible which leading to better clinical outcomes for this patient group (Tahboub and Dal Yılmaz, 2019).

Chapter Three

Methodology

Chapter Three

Methodology

This chapter explains research design that is used in the study. It also includes the administrative arrangements, setting of the study, sample of the study, criteria of the sample, instruments of the study, validity of the questionnaire, data collection, data analysis.

3.1. Design of the Study

Descriptive cross- sectional design study was carried out, the period of the study extended from 21st November, 2021 to the 30th March, 2022.

3.2. Administrative Arrangement and Ethical Consideration

3.2.a. Administrative Arrangement

Before the collection of the data, formal administrative permissions were obtained to conduct the study. The researcher obtains an ethical approval from the Ethical Researcher Committee, University of Basrah /Faculty of Nursing. The researcher provided a detailed description of the study, including a statement of the problem, goals and questionnaire to Basrah Directorate of Health (Center for Human Development and Training) (Appendix A) in order to obtain formal permission to conduct the study. Later, permission was granted to Al-Fayah and Al-Basrah teaching hospitals in order to ensure agreement and cooperation to complete the study.

3.2.b. Ethical Consideration

The researcher explained the purpose of the study for each nurse staff before participation. It was confirmed that the study maneuver would not cause any actual or potential damage to the study sample. Oral consent was obtained from each nurse before data collection.

3.3. Setting of the Study and Sample Selection

Table (3.1): Setting of the Study and Sample Selection

Setting of the Study	Hospitals	N.	%
Hospitals	Al-Fayah hospital	50 %	50%
	Basrah teaching hospital	50 %	50%
Total		100%	100%

N. = Number   % Percentage

3.4. The Sample of the Study

A probability random study sample of nurses in Basrah teaching hospital and Al-Fayah hospital. The researcher take (100) nurses from both hospitals.

3.4.1. Inclusion Criteria:

❖ Female and male nurses.

❖ Nurses aged 20 years and above.

❖ Nurses who agreed to participate in the study.

3.4.2. Exclusion Criteria:

♣ Nurses who refused to participate in the study.

♣ Seriously ill nurses at the time of data collection were excluded.

3.5. Study Instruments

A structured questionnaire is constructed through extensive review of relevant literature, with some modifications (Tahboub and Dal Yılmaz, 2019). The questionnaire mainly it was consisted of two parts:

Part 1: Demographic Characteristics of sample

This part is concerned with the collection of demographic data obtained from the nurses through face to face interview. It includes (7) items relative to age, gender, years of working experience, educational level, working unit, Previous ECG training course and ECG information resource .

Part 2: Knowledge of nurses on electrocardiogram

This part was designed to include (18 items) that represented the information of nurses related to electrocardiogram.

3.6. Validity of the Instrument

Content validity has been determined for evaluation of the tool through a panel of eight experts, (Appendix B). To investigate the content of the questionnaire, those experts were provided with a copy of the study instrument asked to review and evaluate the instrument for its content clarity and adequacy. The researcher applied all recommendation of experts. Some items were excluded and others were added after taking all the comments and recommendations into consideration. The questionnaire was considered valid after performing the modifications that were based on their responses.

3.7. Pilot Study

In order to determine the reliability of the study instrument, a pilot study was carried out on (10) patients at Basrah teaching hospital and Al-Fayah hospital from 5th to 9th December, 2021. The patients in the pilot study had the same criteria of the original study sample. The sample of the pilot study was excluded from the original study sample.

3.8.1. The Purposes of Pilot Study

✓ To find out whether the content of the questionnaire is understood by the study participants.

✓ To estimate the time needed to answer questions.

✓ To identify the barriers that may be encountered during the study process.

✓ To determine the reliability of questionnaire.

3.8.2. The Result of Pilot Study

The results of the pilot study indicated that the questionnaire was clear to the participants. The time required for answering the questionnaire was 5-15 minutes.

3.8. Reliability of the Questionnaire

The reliability of the questionnaire was estimated by determining the internal consistency of the instrument through the computation of Alpha Correlation Coefficient (Split half method). The Coefficient Alpha was applied to determine the reliability of the present study instrument by application of Statistical Package for Social Science Program (IBM SPSS) version 22.0.

The result of the reliability for the questionnaire (Table 3.2) was statistically adequate; it means that the questionnaires had an adequate level of internal consistency and equivalence measurability.

Table (3.2) Reliability Analysis of the Scale (N= 10)

Reliability	N	Cronbach's Alpha *(r)*	Estimation
Scale	10	0.84	Accepted

3.9. Data Collection

Data collection was performed through the use of the study instrument. The Implementation was carried out at Al-Fayah and Al-Basrah teaching hospitals from 12th December 2021, to 25th January , 2022. The data were collected by all participants by interviewed and informed of the study's goals and objectives.

3.10. Statistical Analysis

3.10.1. Descriptive Statistical Tests

3.10.1.a. Frequency (F): In statistics the frequency of an event is the number of times the event occurred in an experiment or study (Kenny & Keeping, 2016). It was used for describing the distribution of sample demographic variables.

3.10.1.b. Percentage (%): a number or rate that is expressed as a certain number of parts of something divided into 100 parts (Merriam-Webster, 2016). It was used for describing the distribution of sample demographic variables, and calculated according to this formula:

$$\% = \frac{\sum F}{N} \ x100$$

3.10.1.c. Mean of Score (M.S): The arithmetic mean is the sum of the individual values in a data set divided by the number of values in the data set (Chernick & Friis, 2003). It was used for calculating and determining the level of knowledge and calculated according to the following formula:

$$M.S = \frac{\sum ri=1 Fi \ x \ Si}{\sum ri= 1 Fi} \ x100$$

3.10.1.d. Standard Deviation: is a measure that is used to quantify the amount of variation or dispersion of a set of data values (Bland & Altman, 1996). It was used to determine the variation of data related to level of knowledge and calculated as follows:

$$S = \sqrt{\frac{\Sigma(X - \overline{X})^2}{N}}$$

where S = the standard deviation of a sample,
Σ means "sum of,"
X = each value in the data set,
X = mean of all values in the data set,
N = number of values in the data set.

3.10.2. Inferential Statistical Tests

3.10.2.a. Chi-square test: is one of the important nonparametric tests that are used to compare more than two variables for a randomly selected data. The expected frequencies are calculated based on the conditions of null hypothesis. The rejection of null hypothesis is based on the differences of actual value and expected value (Chegg Study, 2019). It is calculated as:

$$\chi^2 = \Sigma \frac{(O - E)^2}{E}$$

O = the frequencies observed
E = the frequencies expected
Σ *= the 'sum of'*

Chapter Four

Results

Chapter Four

Results of the Study

This chapter presents the descriptive analysis of the sample related to socio-demographic characteristics of nurses; and describes their level of knowledge concerning electrocardiogram. This chapter also describes the relationship between levels of knowledge among nurses with some of their characteristics.

Table (4.1): Distribution of the Sample According to their Socio-demographic Characteristics.

Characteristic	Groups	Frequency	Percent
Age	20-25	65	65.0%
	26-30	26	26.0%
	31- 35	4	4.0%
	> 35	5	5.0%
	Total	100	100
Mean ± SD 1.49 ± 0.798			
Gender	Male	55	55.0%
	Female	45	45.0%
	Total	100	100%
Years of working experience	1- 5	90	90.0%
	6-10	5	5.0%
	> 10	5	5.0%
	Total	100	100
Educational level	Preparatory	20	20.0%
	Diploma	17	17.0%
	Bachelor degree	63	63.0%
	Master degree	0	0
	Total	100	100
working unit	Emergency	37	37.0%
	Intensive care unit	25	25.0%
	Coronary care unit	18	18.0%
	Medical unit	20	20.0%
	Total	100	100

Previous ECG training course	Yes	83	83.0%
	No	17	17.0%
	Total	100	100
ECG information resource	University	53	53.0%
	Courses	11	11.0%
	Internet	24	24.0%
	Self-learning books	12	12.0%
	Total	100	100

F=Frequency, %= Percent

The findings of this table reveal that average age of nurses among sample (1.49 ± 0.798) years old with highest percentage (65.0%) of age (20– 25), Concerning the gender of nurses the largest number of study sample are male (55.0 %), Regarding the Years of working experience of nurses , the finding refers that the (90.0 %) of nurses have (1-5 years) experience, Regarding the educational level of nurses, the finding refers that the highest percentage of nurses are graduated from Bachelor degree (63.0%), concerning the working unit indicates that (37.0%) of nurses are working in emergency unit, regarding Previous ECG training course reveal that most of the nurses have training (83.0%), and ECG information resource most of them have information from the university (53.0%).

Table (4.2): Overall assessment of nurse's knowledge regarding Electrocardiogram.

Classification	Frequency	Percent	M.S	S.D	Ass
Poor	24	24.0			
Fair	44	44.0			
Good	32	32.0	0.82	0.748	Good
Total	100	100			

Ass: Assessment, F: Frequency, %: Percentage, M.S: Mean of Score, S.D: standard deviation

Poor = 0– 0.33, Fair = 0.34 – 0.67. Good 0.68-1

This table presents the level of nurse's knowledge regarding electrocardiogram; the finding among the study sample reveals that nurses are showing good level of knowledge according to the mean of score.

Table (4.3): Association between Socio-Demographic characteristic of nurses and Overall knowledge regarding electrocardiogram.

Socio-demographic Characteristics	Rating	Knowledge			Sig.
		Poor	Moderate	Good	
Age	20-25	18	26	21	p- value(0.076)
	26-30	4	17	5	d.f = 6
	31- 35	1	0	3	NS
	> 35	1	1	3	
Gender	Male	12	19	24	p-value (0.019)
	Female	12	25	8	d.f = 2
					S
Years of working experience	1- 5	8	23	7	p-value (0.040)
	6-10	12	11	18	d.f = 4
	> 10	4	10	7	S.
Educational level	Preparatory	7	7	6	p-value (0.390)
	Diploma	2	7	8	d.f = 4
	Bachelor degree	15	30	18	N.S.
	Master degree	0	0	0	
working unit	Emergency department	9	9	12	p-value (0.051)
	Intensive care unit	11	32	13	d.f = 6
	Coronary care unit	4	2	4	NS.
	Medical unit	0	1	3	

Previous ECG training course	Yes	21	38	24	p-value (0.342
	No	3	6	8	d.f = 2
					N.S.
ECG information resource	University	13	20	20	p-value (0.287)
	Courses	0	6	5	d.f = 6
	Internet	7	12	5	N.S.
	Self-learning books	4	6	2	

df: Degree of freedom, P: Probability value, Sig: Significant, N.S: Not Significant

This table depicts that there is no significant relationship between nurses' knowledge with their (age , Educational level, working unit , Previous ECG training course and ECG information resource) among study sample evidenced by insignificant differences at p-value ≤ 0.05.

However, there is significant relationship between nurse's knowledge with their (gender and Years of working experience) at p-value ≤ 0.05.

Chapter Five

Discussion

Chapter Five

Discussion of the Results

5.1. Discuss the Socio- demographic characteristics of the study sample

5.1.1. Age

The finding of current study reveals that the average age of nurses among study sample is (1.49 ± 0.798) years old with highest percentage (65.0%) of age groups $(20 - 25 \text{ years})$.

This result incompatible with descriptive study that conducted by ((Nissa and M, 2018) done on regular nurses, their studied results revealed that (62.3 %) of sample their age between (26-30 years).

5.1.2 Gender

The findings of the study underhand depict that (55.0 %) of nurses are males among study sample.

These results are incompatible with cross-sectional comparative descriptive study was conducted in northwest of Iran. The findings referred that (64.8%) of nurses were females (Rahimpour *et al*., 2021).

5.1.3. Years of working experience

Regarding the year of working experience of nurses; the results of the present study reveals that the highest percentage of nurses are (90.0%). These results are congruent with cross-sectional study entitled (Evaluation of Nurses Knowledge and Practical of Electrocardiogram Toward Adolescent Patient) that carried out by (Al-Husaunawy, 2015) who stated that (44.1 %) of the sample were have experience between (1-4 years).

5.1.4. Educational level

Regarding the educational level of nurses; the results of the present study reveals that the highest percentage of nurses are graduated from Bachelor degree (63.0%). These results are harmonizing with crossover design that carried out by (Funk *et al*., 2017) who stated that (65.0%) of the sample were Bachelor degree.

5.1.5. Working unit

The results of the study underhand indicate that (37.0 %) of nurses are working in emergency unit. These findings disagree with crossover design carried out on (3013) nurses, in which (46.0 %) of nurses were working in intensive care unit (Funk et al., 2017).

5.1.6. Previous ECG training course

The findings of the current study reveal that more of the nurses are taking course of ECG training (83.0%).These results are inconsistent with (Ho *et al* ., 2021) study entitled (Capability of emergency nurses for electrocardiogram interpretation) on (96) nurses; their results stated that (61.5%) of participants are no taking a course of ECG training.

5.1.7. ECG information resource

Concerning the ECG information resource. The results of the present study depict that the nurses have information from the university (53.0 %). These findings are identical with (Neha and Pareek, 2019) study entitled (Knowledge of Student Nurses Regarding Interpretation of Electrocardiogram: A Pre-Experimental Study) who have been found that (42.0%) of the nurses have information from classroom teaching.

5.2. Assessment of nurse's knowledge regarding Electrocardiogram.

The findings of the present study reveal the overall assessment of nurse's knowledge regarding Electrocardiogram; the finding indicates that nurses show good level of knowledge.

These results are compatible with (Tahboub and Dal Yılmaz, 2019) who stated that the study results showed a high level of ECG knowledge and practice among the nurses.

5.3. Knowledge of nurses regarding electrocardiogram with their age.

The results of current study indicate that no significant difference between the mean of knowledge score and age of samples.

These findings harmonizing with a descriptive study cross-sectional design that carried out by (Al-Husaunawy, 2015) who have studied (102) nurses was worked in CCU,ICU, Emergency Unit; the results of the study showed non-Significant difference on knowledge scores and the age .

5.4. Knowledge of nurses regarding electrocardiogram with their gender.

The results of current study depict that there is significant relationship between nurses' knowledge with their gender among the study sample.

These results correspond with a descriptive study design (quasi-experimental study) (Khudur, 2019).The researcher found that there is no significant association between n Nurses knowledge concerning in Nursing Management for patients with Third degree and bundle branch block and gender.

5.5. Nurses' Knowledge regarding electrocardiogram with their years of experiences.

The findings of recent study show that there is significant relationship between nurses' knowledge with their years of experiences.

This finding inconsistent with study that carried out by (Basanshrieh *et al.*, 2019) who their results indicated that non- significant relationship between knowledge and practice regarding interpretation of electrocardiogram (ECG) among nurses with their years of work experience.

5.6. Nurses' Knowledge regarding electrocardiogram with their Educational level.

The finding of current study depict that there is no significant relationship between nurses' knowledge with their educational level.

This finding in the same line with (Philip and Chauhan, 2020) who reported that no association with the knowledge level of the nurses and professional qualification.

5.7. Nurses' Knowledge regarding electrocardiogram with their previous ECG training courses.

The finding of current study depict that there is no significant relationship between nurses' knowledge with their previous ECG training courses.

This finding not consistent with (Al-Husaunawy, 2015) who found that relationship between nurses knowledge and their training session.

5.8. Nurses' Knowledge regarding electrocardiogram with their ECG information resource.

The finding of current study depict that there is no significant relationship between nurses' knowledge with their ECG information resource.

This finding The finding of this study incongruent with non-experimental descriptive study design that conducted by (Dandagi and Dandagi, 2015) in India who were found that there was no statistically significant association

found between knowledge of III-year GNM students regarding management of pregnancy induced hypertension and source of information of students.

5.9. Nurses' Knowledge regarding electrocardiogram with their working unit.

The finding of current study depict that there is no significant relationship between nurses' knowledge with their working unit.

The finding of this study incongruent with non-experimental descriptive study design that conducted by (Tahboub, and Dal Yılmaz,, 2019) in India who were found that there was statistically significant association between knowledge of nurses and working unit.

Chapter six

Conclusions and Recommendations

Chapter Six

Conclusions and Recommendations

6.1. Conclusions

This chapter enlightens the importance of this research, revealed that:

6.1.1. The vast majority are young age nurses, male, graduated from Bachelor degree, most of them working in emergency unit, have (1-5) years of experience, most of the nurses have training previous ECG and ECG information resource from the university .

6.1.2. There is significance relationship between (gender and Years of working experience) regarding knowledge of electrocardiogram interpretation.

6.1.3. There is no significance relationship between (age, working unit Educational level, Previous ECG training course and ECG information resource) regarding knowledge of electrocardiogram interpretation.

6.2. Recommendations

The following recommendations were made since the study was carried out on a small sample.

6.2.1. Refreshing intensive training courses must be run under the supervision of qualified staff in electrocardiography at least every two years.

6.2.2. Further courses regarding ECG knowledge and practice should be incorporated into the nursing education curriculum.

6.2.3. Handbooks should be prepared to improve nurses' ECG knowledge.

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Appendix

Appendix A

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العدد : ١٨

التاريخ : ١٠ / ١ / ٢٠٢٢

جمهورية العراق
وزارة الصحة
دائرة صحة البصرة
مكتب المدير العام
مركز التدريب والتنمية البشرية
شعبة ادارة المعرفة/م/البحوث

الى/م. الفيحاء التعليمي

م/ تسهيل مهمة

عقدت لجنة البحوث في دائرة صحة البصرة اجتماعها في يوم ٩/١/ ٢٠٢٢ وتم دراسة مشروع البحث ذي الرقم (١٥٦/٢٠٢٢) المعنون:

معارف الممرضين تجاه تفسير مخطط كهربائية القلب في مستشفيات البصرة العليمي) والمقدم من الباحثة(ندى كريم ابراهيم) والباحثة (زهراء عبد العباس سوادي) طالبات دراسات اولية - كلية التمريض

بتاريخ ٢٠٢١/١/٩ وقررت:

"الموافقة على تنفيذ مشروع البحث بصيغته المقدمة ولامانع من تنفيذه في مؤسسات الدائرة."

المرفقات:
قرار لجنة البحوث المرقم١٥٦/٢٠٢٢

لتفضلكم بالاطلاع....

الطبيبة الاختصاص
د. رجاء احمد محمود
مديرة مركز التدريب والتنمية البشرية
/ ١ / ٢٠٢٢

نسخة منه الى:
مركز التدريب والتنمية البشرية/مع الاوليات

</div>

Appendix B

Panel of Experts

ت	اسم الخبير	اللقب العلمي/الوظيفي	الاختصاص	سنوات الخبرة	مكان العمل
١	د. سجاد سالم عيسى	استاذ	دكتوراه طب اسرة	٢٦ سنة	جامعة البصرة/كلية التمريض
٢	د. وصفي ظاهر عبد علي	استاذ مساعد	دكتوراه فسلجة	٣٠ سنة	جامعة البصرة/كلية التمريض
٣	أ.م.د. سندس باقر داود	استاذ مساعد	دكتوراه تمريض الام و الوليد	٣٠ سنة	جامعة البصرة/كلية التمريض
٤	أ.م.د. عبد الكريم سلمان خضير	استاذ مساعد	دكتوراه تمريض بالغين	١٢سنة	جامعة البصرة/كلية التمريض
٥	م.د. هشام حسين عبد الرؤوف	مدرس	دكتوراه في الاشعة التشخيصية	٢٢ سنة	جامعة البصرة/ كلية التمريض
٦	م.م. ماهر عبد الامير عطية	مدرس مساعد	ماجستير تمريض بالغين	٨ سنوات	جامعة البصرة/كلية التمريض
٧	م.م. زينب سلمان داود	مدرس مساعد	ماجستير تمريض بالغين	٧ سنوات	جامعة البصرة/كلية التمريض
٨	م.م. علي مالك ترياك	مدرس مساعد	ماجستير تمريض بالغين	٥ سنوات	جامعة البصرة/كلية التمريض

<u>**Appendix C1**</u>

Questionnaire

<u>**Part 1: Demographical characteristics of sample:**</u>

1. Age

- **20-25 years** ☐
- **26-30 years** ☐
- **31- 35 years** ☐
- **> 35 years** ☐

2-Gender

a. Male ☐   **b. female** ☐

3. Years of working experience

- **1- 5 years** ☐
- **6-10 years** ☐
- **> 10 years** ☐

4. Educational level

- **Preparatory** ☐
- **Diploma** ☐
- **Bachelor degree in nursing** ☐
- **Master degree in nursing** ☐

5. Working unit

- **Emergency department** ☐
- **Intensive care unit** ☐
- **Coronary care unit** ☐
- **Medical unit** ☐

6. Previous ECG training course

Yes ☐   No ☐

7. ECG information resource

- **University** ☐
- **Courses** ☐
- **Internet** ☐
- **Self-learning books** ☐

Part II: Knowledge of nurses on electrocardiogram

Statements	True	False
1. The number of leads on the electrocardiogram is 12 ?		
2. The main steps to assess a Electrocardiogram is Rhythm, frequency, wave, duration?		
3. To calculate the heart rate from the electrocardiogram, if it is regular: (300/ number of large squares between R-R)		
4. To calculate the heart rate from the electrocardiogram, if it is irregular: (Number of QRS in 10 squares * 30)		
5. The P wave represented right and left atrial repolarization		
6. The meaning of the QRS complex is Ventricular depolarization?		
7. T wave represents ventricular repolarization		
8. T wave is one of the negative waves in ECG		
9. Normal PR interval between 0.12 and 0.20 seconds		
10. In normal ECG V1 and aVR leads are negative waves		
11. Pathologic Q waves are a sign of previous myocardial infarction.		
12. Atrial fibrillation could be regular rhythm?		
13. ECG can detects left ventricular hypertrophy (LVH)		
14. ST elevation in inferior Myocardial infarction appears in leads: V1-V6.		
15. ST elevation in lateral myocardial infarction appears in leads: I, aVL, V5, V6		
16. ST elevation in anterior myocardial infarction appears in leads: II, III, aVF		
17. ST depression in ECG indicated ischemia myocardial		
18. T long wave and QRS wide wave seen in case of hypokalemia?		

Appendix C2

استمارة استبيان

الجزء الأول: الخصائص الديموغرافية للعينة:

١. العمر

- ٢٠ـ٢٥ سنة ☐
- ٢٦ ـ ٣٠ سنة ☐
- ٣١ـ ٣٥ سنة ☐
- ٣٥ و اكثر ☐

٢.الجنس

أ) ذكر ☐   ب) انثى ☐

٣. عدد سنوات الخبرة العملية

- ١ـ٥ سنوات ☐
- ٦ـ١٠سنوات ☐
- ١٠ سنوات فما فوق ☐

٤. مستوى التعليمي

- اعدادية تمريض ☐
- معهد ☐
- بكالوريوس تمريض ☐
- ماجستير تمريض ☐

٥. مكان العمل

- الطوارئ ☐
- وحدة العناية المركزة ☐
- وحدة الانعاش القلبي ☐
- ردهة الباطنية ☐

٦. دورة تدريبية سابقة في التخطيط القلبي

نعم ☐   لا ☐

٧. مصدر معلومات التخطيط القلبي

- الجامعة ☐

- دورة ☐

- الانترنت ☐

كتب التعلم الذاتي ☐

الجزء الثاني: معارف الممرضين في مخطط كهربائية القلب

خطأ	صح	الاسئلة	ت
		عدد الاقطاب في مخطط كهربائية القلب ١٢؟	١ـ
		الخطوات الرئيسية لتقييم مخطط كهربائية القلب هو الإيقاع ، التكرار ، الموجة ، المدة؟	٢ـ
		لحساب معدل ضربات القلب من مخطط كهربائية القلب ، إذا كان منتظمًا:(٣٠٠ / عدد المربعات الكبيرة بين R-R)	٣ـ
		لحساب معدل ضربات القلب من مخطط كهربائية القلب ، إذا كان غير منتظم:(عدد QRS في ١٠ مربعات * ٣٠)	٤ـ
		الموجة P تمثل عودة الاستقطاب الأذيني الأيمن والأيسر	٥ـ
		معنى مجمع QRS هو إزالة الاستقطاب البطيني؟	٦ـ
		الموجة T تمثل عودة الاستقطاب البطيني	٧ـ
		الموجة T هي إحدى الموجات السلبية في مخطط كهربائية القلب	٨ـ
		فترة العامة العادية بين ٠.١٢ و ٠.٢٠ ثانية	٩ـ
		في تخطيط القلب العادي V1 و aVR تكون الاقطاب الموجات السلبية	١٠
		موجات Q المرضية هي علامة على احتشاء عضلة القلب السابق	١١
		هل يمكن أن يكون الرجفان الأذيني إيقاعًا منتظمًا؟	١٢
		يمكن أن يكتشف مخطط كهربية القلب تضخم البطين الأيسر	١٣
		ارتفاع ST في مستوى أدنى يظهر احتشاء عضلة القلب في الاقطاب: V1-V6.	١٤
		ارتفاع ST في الجانب يظهر احتشاء عضلة القلب في الاقطاب: I، aVL، V5، V6؟	١٥
		ارتفاع ST في الأمام يظهر احتشاء عضلة القلب في الاقطاب: II، III، aVF؟	١٦
		يشير انخفاض ST في مخطط كهربائية القلب إلى نقص تروية عضلة القلب؟	١٧
		الموجة الطويلة T و موجة QRS عريضة تظهر في حالة نقص بوتاسيوم الدم.	١٨

الخلاصة

الخلفية: مخطط كهربائية القلب (ECG) هو أداة تشخيصية تُستخدم بشكل روتيني غير جراحي لتقييم الوظائف الكهربائية والعضلية للقلب. يجب أن يكون جميع الممرضين قادرين على التعرف على إيقاعات مخطط كهربائية القلب الأساسية.

الأهداف: لتقييم معرفة مخطط كهربائية القلب بين الممرضين ، لاكتشاف العلاقة بين معرفة الممرضين تجاه مخطط كهربائية القلب والخصائص الاجتماعية والديموغرافية.

المنهجية: تم إجراء تصميم مقطعي وصفي في الدراسة الحالية، امتدت فترة الدراسة من ٢١ نوفمبر ٢٠٢١ إلى ٣٠ مارس ٢٠٢٢. تم اختيار(١٠٠) عينة احتمالية (عشوائية) من الممرضين في مستشفى البصرة التعليمي ومستشفى الفيحاء. تم استخدام استبيان منظم كأداة لجمع البيانات لتقييم معارف الممرضين وتم تحليل البيانات باستخدام البرنامج الاحصائي اصدار ٢٢ حيث تم استخدام المقاييس الوصفية والاستدلالية.

النتائج: اظهرت نتائج الدراسة ان مستوى معرفة الممرضين تجاه مخطط كهربائية القلب كانت جيدة.

الاستنتاجات: الغالبية العظمى منالممرضين البالغين ،ذكور ، الجامعيين، معظمهم يعملون في وحدة الطوارئو لديهم من (١-٥ سنوات) من الخبرة، معظمهم حصلو على المعلومات حول مخطط كهربائية القلب من تدريبات سابقة و من الجامعة . وجد علاقة دلالة بين (العمر والجنس وسنوات الخبرة العملية ووحدة العمل) فيما يتعلق بالمعرفة بتفسير مخطط كهربائية القلب و لا توجد علاقة ذات دلالة إحصائية بين (المستوى التعليمي والدورة التدريبية السابقة لتخطيط القلب ومصدر معلومات تخطيط القلب).

التوصيات: يجب إجراء دورات تدريبية مكثفة منعشة تحت إشراف موظفين مؤهلين في تخطيط القلب كل عامين على الأقل ، ويجب دمج الدورات الإضافية المتعلقة بمعرفة وممارسة تخطيط القلب في مناهج تعليم التمريض ، ويجب إعداد الكتيبات لتحسين معرفة الممرضين بمخطط كهربائية القلب.

جامعة البصرة / كلية التمريض

معارف الممرضين تجاه تفسير مخطط كهربائية القلب في مستشفيات البصرة التعليمية.

مشروع بحث مقدم الى كلية التمريض / جامعة البصرة
لنيل درجة البكالوريوس في علوم التمريض

من قبل

ندى كريم أبراهيم   و   **زهراء عبد العباس سوادي**

إشراف

م.م. خديجة محمد جاسم

أذار، ٢٠٢٢م   شعبان ، ١٤٤٣هـ