

Evaluation of Nurses' Knowledge regarding Correct Electrocardiographic Procedures in Medical Wards of Thi-Qar Governorate Hospitals

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ABSTRACT

Objective: This study aimed to evaluate the level of knowledge of nurses working in the medical wards of Thi-Qar Governorate hospitals regarding correct electrocardiographic procedures and to identify the relationship between their knowledge and demographic variables.

Study Design: A descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the multiple government hospitals in the Thi-Qar, southern Iraq from February 2022 and August 2023.

Methods: The study conducted with 60 nurses in Thi-Qar Governorate hospitals. Data were collected using a structured questionnaire that assessed knowledge of cardiac anatomy, physiology, ECG interpretation, and correct lead placement. Descriptive statistics and chi-square tests were used for the data analysis.

Results: Most nurses demonstrated insufficient knowledge of ECG procedures. Specifically, 46.7% of the participants had very low knowledge levels, and 53.3% had low knowledge levels. No participant achieved moderate or high levels of knowledge about the disease. Statistically significant associations were found between nurses' knowledge and both educational attainment ($p = 0.000$) and years of experience in the medical wards ($p = 0.002$).

Conclusion: This study demonstrates that the degree of nursing practice for performing ECGs in Thi-Qar hospitals is appropriate. Not to mention the fact that such a gap in knowledge is potentially dangerous: it is putting patients at risk.

Key Words: Electrocardiography, Nursing Knowledge, ECG Procedures.

Citation of article: Hammood HJ, Al-Aubaidy HFK, Younis NM. Evaluation of Nurses' Knowledge regarding Correct Electrocardiographic Procedures in Medical Wards of Thi-Qar Governorate Hospitals. Med Forum 2026;37(9):111-115. doi:10.60110/medforum.370921.

INTRODUCTION

Electrocardiography is one of those necessary evils in modern medicine you just cannot live without it especially in the ER or on medical floors, where rapid recognition of a heart problem can lead to life-saving interventions. From a practical standpoint, nurses are flexible and capable of performing ECGs, interpreting basic results, and ensuring proper electrode and lead placement for the procedure to be valid. Mistakes made during this phase could lead to misdiagnosis, delayed treatment, and ultimately, unsatisfactory patient care¹.

In particular, in a hospital environment, where cardiovascular disease is common, an accurate ECG must be assured. However, many international studies have reported low levels of nurses' knowledge and skills in ECG performance, particularly in resource-limited healthcare settings². Nurses are part of the emergency services team and their ability to use and interpret ECGs is highly recognized as they perform the majority of the hospital's medical duties and often have contact with patients. Analysis, interpretation and mastery of the clinical symptoms and diagnostic techniques in relation to CVD should be a key aspect of the education priorities for nursing³. The nurse should be knowledgeable of ECG equipment and feel confident in documenting significant and potentially life-threatening arrhythmias and in their response to them⁴. These gaps might be attributed to pre-service nurse training and in-service staff development programs. In addition, insight into how demographic factors (age, level of education, number of years in practice, and attendance in training courses) correlate with ECG proficiency might support focused actions⁵. This study aimed to investigate the actual level of

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Received: May, 2026

Reviewed: June-July, 2026

Accepted: August, 2026

knowledge towards conducting ECGs properly among nurses working in medical wards of Thi-Qar regarding ECG performance. We further examined whether demographics, such as experience or education, played a role. Lastly, we wanted to know what exactly the nurses struggle with so that we can improve their training and fix the overall system of the hospital.

METHODS

This study utilized a cross-sectional descriptive design, which is a snapshot once off. This cross-sectional study aimed to assess the knowledge of nurses working in the medical wards of Thi-Qar regarding proper ECG techniques at one moment. This type of question is why this approach works so well and is common in nursing education and practice research. The findings of this study were conducted between February 2022 and August 2023 in multiple government hospitals in the base of Thi-Qar, southern Iraq. These hospitals are both referral centers that see all patients and rely on these nurses to perform frontline roles, such as ECGs. Focused on registered nurses operating in these areas of medical wards, hospital wards, and places where ECGs are regularly performed. This is because they are embedded in patients with cardiac symptoms. Hence knowing how to perform an ECG correctly is not just beneficial, but a necessity for these nurses.

The inclusion criteria included that the registered nurse working in a medical ward, at least one year of clinical experience and willingness to participate and provide informed consent. While, the inclusion criteria included that the administrative nurses or those not involved in clinical ECG procedures and nurses on leave during the data collection period. The methods of sampling and sample size the researcher was used a non-probability convenience sampling. A convenience sampling might restrict generalizability, but is suitable for exploratory and feasibility studies where random sampling is not practical. The study involved 60 participants. Similar studies on nursing knowledge of ECG procedures as well as practical realities surrounding the availability of nurses in the participating hospitals guided the number of participants.

To determine the extent of nurses' knowledge about performing ECGs, we compiled a quick, self-directed questionnaire. We developed it based on previous research findings, ECG education literature, and expert opinions. The questionnaire consisted of two parts. Part one: Demographic Data included age, gender, education level, total years of experience working in the nursing field, years of working in a medical department, and previous training in ECG measurement. Part two: Knowledge Assessment: 20 multiple-choice items covering: Cardiac anatomy and physiology, ECG basics and interpretation and electrode and lead placement. Correct answers received 1 point each, while incorrect or unanswered questions received Zero. The content

validity of the questionnaire was established through reviews by cardiologists and senior nursing educators. This was first used to pilot the questionnaire with 10 nurses, whose responses were not included in the study. We wanted to ensure that the questions were clear, of reasonable length, and that the answers made sense. The questionnaire had a Cronbach's alpha of 0.78, indicating an acceptable level of reliability for research purposes.

The data collection procedure for four weeks, we printed the questionnaire and handed it to passing nurses on their breaks so as not to hinder their work. Prior to commencing, we provided the participants with a summary of the study, ensured confidentiality, and obtained written informed consent. Once they completed their questionnaires, the nurses placed them in envelopes to ensure anonymity. To ensure data accuracy and reduce bias: (Researchers remained available on-site to clarify any questions, no identifying information was collected on the survey forms and participation was entirely voluntary, with no incentives offered. The data were analyzed using IBM SPSS Statistics Version 25. The following statistical techniques were applied: Descriptive statistics (frequency, percentage, mean, and standard deviation).

RESULTS

Most nurses demonstrated insufficient knowledge of ECG procedures. Specifically, 46.7% of the participants had very low knowledge levels, and 53.3% had low knowledge levels. No participant achieved moderate or high levels of knowledge about the disease. Statistically significant associations were found between nurses' knowledge and both educational attainment ($p = 0.000$) and years of experience in the medical wards ($p = 0.002$).

Table No.1: Distribution of Demographic Data for Medical Department Nurses

Variables	Categories	Freq.	%
Age Groups	20 – 24	6	10
	25 – 29	15	25
	30 – 34	16	26.7
	35 – 39	7	11.6
	≥ 40	16	26.7
Gender	Male	35	58.3
	Female	25	41.7
Achievement Education	College of Nursing	10	16.7
	Nursing Institute	30	50
	secondary Nursing School	20	33.3
Years of Experience in Nursing Field	≤ 5	13	21.7
	6 – 10	11	18.3
	11 – 15	12	20
	16 – 20	8	13.3
	21 – 25	10	16.7
	26 – 30	6	10

Table No.2: Assessment of Nurses' Understanding of Appropriate ECG Procedures in Medical Wards

Questions	M.S.	S.D.	R.S.%	Eva.
Heart Anatomy				
1- The heart receives freshly oxygenated blood.	0.25	0.44	25	2
2-The amount of blood pumped by the heart per minute in the natural situation	0.30	0.47	30	2
3- The brain contains the primary cardiac control area.	0.23	0.43	23	1
4-The electrical initiation of a heartbeat begins in the chamber wall	0.53	0.51	53	3
5-How many layers composed of cardiac muscle?	0.70	0.47	70	3
6-The primary extrinsic regulator of heart activity is the ANS.	0.17	0.38	17	1
Heart Physiology				
7- As a nursing student, you are aware that the purpose of an ECG is to	0.40	0.50	40	2
8- Which area of the heart is most likely to act as a pacemaker if the SA node is damaged?	0.27	0.45	27	2
9- Which option lists the cardiac conduction system's parts in the proper order?	0.30	0.47	30	2
10- If the AV bundle's cells were damaged, the cardiac impulse would not be able to reach the	0.33	0.47	30	2
11- Junctional fibers in the cardiac conduction system link	0.30	0.47	30	2
12- The following will undoubtedly be impacted if communication between the SA node and the AV node is blocked:	0.20	0.41	20	1
Location Limb Leads:				
13.a. Right arm	0.83	0.38	83	4
13.b .Left arm	0.70	0.47	70	3
13.c. Right leg	0.77	0.43	77	4
13.d. Left leg	0.77	0.43	77	4
14. Just to the right of the sterna border is the V1-fourth intercostals area.	0.73	0.45	73	3
14. b. V2, the fourth intercostal gap immediately to the left of the border of the sterna	0.63	0.49	63	3
14.c. halfway between leads V2 and V4	0.60	0.50	60	3
14.d. V4 middle clavicle line, below the fifth interspace	0.43	0.50	43	2
14.e. V5: anterior axillary line at V4's level	0.40	0.50	40	2
14.f. Leads V4 and V5 are at the same level as the midaxillary line (V6).	0.50	0.51	50	3
The 10 rules for a normal ECG.				
15- After going over his ECG notes, the student nurse would correctly comprehend that the electrodes should be connected.	0.20	0.41	20	1
16- His ECG notes are being reviewed by the student nurse.	0.27	0.46	17	1
17- Ventricular rate and rhythm are determined by measuring a single QRS complex.	0.50	0.57	50	3
18-From an ECG reading , PR interval represents;	0.23	0.43	23	1
19- The AV node's typical rate of spontaneous depolarization is	0.23	0.43	23	1
20- What is happening in the heart according to the electrocardiogram (ECG) QRS wave?	0.63	0.49	63	3

Table No.3: Overall Evaluation of Nurses' Level of Knowledge

Level of Knowledge	Frequency	Percent
Low Low (0 - 24)	28	46.7
Low High (25 – 49)	26	53.3
High Low (50 – 74)	6	0
High High (75 – 100)	0	0
$\bar{x} \pm S.D$	0.44 $\pm$ 0.461	

Table No.4: Relationship Between Nurses' Demographic Factors and Knowledge.

Demographic	Knowledge	X ²	D. F	p	Sig.
Age		1.348	4	0.853	NS
Gender		0.069	1	0.793	NS
Achievement Education		19.260	2	0.000	HS
Years of Experiences in the Nursing		2.012	5	0.848	NS
Years of Expert in the Medical De.		11.456	3	0.002	HS
Training Courses in Nursing		5.600	3	0.133	NS

DISCUSSION

The greatest number of healthcare staff is occupied by nurses, and they deal with patients all the time; therefore, their opinions and perspectives on the quality of care received are highly relevant^{6,7}. Nurses have numerous complementary skills available to them in the Medical Department, and evidence of nursing interventions that are found to be useful in ECG. Therefore, this study was conducted to assess the knowledge of nurses toward the performance of electrocardiograms in the medical field. The table 1: is in agreement with the same line with⁸. In the current study, of the nurses were in the age group (30-34) & (40) 16 (27.7%) and (≥40) respectively, while 35(58.3%) of the nurses were male⁹. Also obtained identical results. With regard to gender, the majority of the studied nurses 35(58.3%) were male. Our findings reveal in table 2 and table 3 an alarming finding that nurses working in medical wards of Thi-Qar Governorate have insufficient knowledge to perform ECG. This is important because electrocardiograms are important for diagnosing and treating cardiac problems. In contrast, the results were alarming: no one scored moderate or high knowledge. The balance of 53.3 per cent were in the low range, and almost half of these (46.7 per cent) were classified as having very low levels. This is a serious skills gap. This is not local either. Similar conclusions have also been catalogued in other parts of the world. For example, Chan et al, in a study on Singaporean nurses,² found that the ECG leads were misplaced and the heart conduction pathways misread by nurses¹⁰⁻¹³. Hospitalists in the clique, mainly frontline nursing. Timely interpretation of ECG relates directly to the accuracy and speed of patient management. One of the more interesting things we learned was that education and experience both count.¹⁴ Those nurses who had more education and experience working in medical wards performed better on the ECG knowledge test. This is in agreement with additional researchers who have discovered targeted education and exposure during an authentic clinical context enhances psychomotor skills. In table 4; there was no significant relationship between good E.C.G knowledge and training. In fact, training had no effect whatsoever. Nurses trained in the skills did not perform better than

those who lacked another training. And this is precisely what¹⁵ demonstrated: that we should not expect the rare or mediocre training to deliver very meaningful advances in improving any-one outcome. The national situation, especially with regard to medical facilities in Iraq, is still characterized by poor staffing and issues over funding and access to further training in Iraq. This could explain for maybe why nurses in our study did not have ECG knowledge even though they were working clinically. In contrast, studies from high-income countries generally show better levels of ECG literacy because of regular competency assessment and access to simulation laboratories¹⁶.

CONCLUSION

The result of this study disclosed the fact that there is a little bit worried about some major defected knowledge about the instruction for taking ECG from all medical wards hospitals in Thi-Qar Governorate. The nurses exhibited low knowledge scores with none achieving moderate to high competency. These results highlight the imperative to implement systemic change surrounding ECG knowledge and skills as nursing competences through educational curricula, continuing professional education initiatives.

Recommendations

The study recommends the implement structured ECG training programs should be integrated into both pre-service education and in-service professional development, conduct regular competency assessments to ensure nurses maintain and apply ECG knowledge accurately, incorporate simulation and hands-on workshops as part of ECG education can help bridge the gap between theory and practice.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 27/332 Dated 13.01.2022

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