ETHIOPIAN INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

eISSN: 2349-5715 pISSN: 2349-5707

Volume: 12, Issue 03, March-2025 SJIF 2019: 4.702 2020: 4.737 2021: 5.071 2022: 4.919 2023: 6.980 2024: 7,662

Yunusova Z.V.

Department of Propedeutics of internal diseases for the Faculty of Pediatrics

Andijan State Medical Institute.

TEACHING THE INTERPRETATION OF ELECTROCARDIOGRAMS TO STUDENTS

Annotation: Electrocardiography is the most important emergency tool in the prehospital stage. It is a useful non-invasive diagnostic method for the rapid detection of various heart diseases. The clinical value of an electrocardiogram (ECG) depends on the doctor's ability to accurately interpret the ECG result. [1]Electrocardiography is an essential tool in prehospital emergency care. It is a useful, non-invasive diagnostic method for the rapid detection of various heart diseases, in particular acute coronary syndrome and electrocardial arrhythmias. ECG monitoring is often recommended for patients at risk of arrhythmia or suspected coronary artery disease. [3] It can be handled appropriately to assist in the diagnosis or treatment of a number of life-threatening diseases. In intensive care units, including emergency departments (ERs), intensive care units (ICUs), and cardiac units (ICUs), patients are highly dependent on healthcare professionals for treatment[4]. Patients in these units usually require ECG monitoring. In this regard, medical staff must acquire the necessary knowledge and skills to provide comprehensive and appropriate medical care to all patients with various heart diseases, especially seriously ill in hospitals [2].

Keywords: electrocardiogram, medical students, interpretation, practice, effectiveness

The clinical value of an ECG depends on the physician's ability to accurately interpret the electrocardiogram (ECG) result. As current medical students who have already been taught ECG interpretation, we can vouch for the complexities of an ECG trace and the challenges posed in trying to master its analysis. At our institutions, a more integrated approach is currently adopted. In addition to traditional learning using a mixture of textbooks and lectures,an approach similar to the aforementioned “graphics-sequence memory method” is being trialled to aid ECG interpretation. This novel method of teaching is one that we feel would have been extremely beneficial to our learning. Such an approach allows students to carry out a step-by-step analysis, ensuring that crucial ECG wave forms and, therefore, diagnoses are not missed. Unreliable ECG interpretation can lead to poor treatment decisions, which will adversely affect patient outcomes. Identification of potentially serious conditions, including acute myocardial infarction or other severe arrhythmias, is required immediately and accurately, as these cases are time-sensitive. working with patients should be able to receive and interpret the ECG. If they are able to read 12-lead ECG readings on their own, they can anticipate any emergency treatment and suggest the necessary interventions[6,7]. Thus, the purpose of this study is to assess the competence and confidence in ECG interpretation among medical students at the Andijan State Medical Institute, Uzbekistan.

Method. This prospective crossover study was conducted at the Andijan State Medical Institute, Uzbekistan. in 2023 using a self-conducted, pre-administered questionnaire created by Vishnevsky et al. Students were observed during the completion of the survey to ensure the authenticity of the answers. The questionnaire consists of two sections. The first section contains biographical data such as gender, year, GPA, as well as a question about their sources for ECG study. The second section contains eight ECG cases, and students are asked to determine the diagnosis and level of confidence in their response. The last question concerns the general confidence in the interpretation of the ECG. The medical students' competence and confidence in interpreting the ECG were assessed using eight

eISSN: 2349-5715 pISSN: 2349-5707

Volume: 12, Issue 03, March-2025 SJIF 2019: 4.702 2020: 4.737 2021: 5.071 2022: 4.919 2023: 6.980 2024: 7,662

different ECG cases. Competence was assessed by identifying the correct answer for each case. Each correct answer was coded as 1, while the wrong answer was coded as 0. Summing up all eight items, we got an overall competency score, the possible score of which ranged from 0 to 8 points. The higher the score, the higher the competence in interpreting the ECG. Using 60% as a cut-off point to determine level of competence, medical students were considered to have low competence if the score was 60% or lower, and above 60% were considered highly qualified. After assessing the level of competence, the level of trust was further assessed. This was measured on a 5-point Likert scale from "not at all sure" (1) to "extremely confident" (5). The overall confidence score was obtained by adding up all eight items, resulting in a score ranging from 8 to 40 points. The higher the score, the greater the confidence in the interpretation of the ECG. Following the same criteria as competence, medical students were classified as having low confidence if the score was 60% or lower, and above 60% were categorized as having a high confidence level. All participants completed a 30-minute ECG analysis test at the start and at 5 weeks of their cardiology internship. The test consisted of 10 ECG tracings accompanied by open-ended questions. Importantly, no correction was provided after the initial test and the same tracings were used for both initial and final evaluations. Some questions contained brief summaries of medical records and required participants to provide a complete and accurate ECG diagnosis. These 10 tracings were selected to represent key conditions that graduating medical students should be able to diagnose, such as complete heart block, myocardial infarction, ventricular tachycardia, atrial fibrillation, atrial flutter. To ensure comprehensive assessment, some ECGs included multiple diagnoses. Additionally, participants completed the previously described survey on ECG learning at baseline and 5 weeks. All exam papers were graded by the same instructor, who was blinded to the participants' assigned groups. A 100-point grading scale (10 points per tracing) was established prior to the study. The primary endpoint was the difference between the scores at the end of the stud and the baseline scores.

Results. Our research has several strengths. First, to our knowledge, this is the first study to compare small-group online ECG training with standard e-learning. Second, the randomized trial design allowed us to minimize allocation bias. Next, the web-based approach was useful for quantifying the level of activity during collaborative e-learning, which would be difficult to obtain in a traditional learning mode. There are also a few limitations to consider. This was a single-center study, and so it would be useful to test our data on a larger sample of students from different medical centers. However, the ECG curriculum is not unified at medical universities in Poland; Therefore, students from different universities may have different levels of ECG knowledge at baseline. This can skew the results of a multicenter study. Due to this limitation, to the best of our knowledge, all studies comparing 2 methods of teaching ECG interpretation in medical students have so far had a single-center value. In our study, we were able to reach students with the same level of education with similar ECG knowledge at baseline. This is what the results of the preliminary test showed. The final assessment was carried out a few days after the completion of the study, which represents a short-term effect. We don't know if this effect persisted for a long time. However, the assessment of the long-term outcome may depend to a large extent on differences in access to ECG training by participating students after course completion. It is possible that some external factors may have affected the students' performance on the final test. During the period of study, students participated in standard classes and practical exercises, which may differ from one student to another.[5,8] Be that as it may, the study period was planned between sessions to eliminate potential deviations from the course. Moreover, the course was elective, and we believe that only students interested in studying ECG applied.

eISSN: 2349-5715 pISSN: 2349-5707

Volume: 12, Issue 03, March-2025 SJIF 2019: 4.702 2020: 4.737 2021: 5.071 2022: 4.919 2023: 6.980 2024: 7,662

Conclusion. This study aims to assess the impact on the effectiveness of interpretation of different groups of medical students from different disciplines and levels of training. In doing so, we hope to gain insights that can improve the diagnostic performance of the software, address gaps in ECG interpretation skills, and prepare for the growing role of diagnostic and predictive analytical models in medical practice.

References:

1. Salerno SM, Alguire PC, Waxman HS. Training and Competence Assessment for Interpreting 12-Channel Electrocardiograms: Guidelines from the American College of Physicians. Ann Intern Med. 2003; 138:747–50. doi: 10.7326/0003-4819-138-9-200305060-00012. [DOI] [PubMed] [Google Scholar]

2. Viljoen CA, Millar RS, Manning K, Burch VC. Prioritizing Electrocardiography Training for Medical Students Using a Modified Delphi Method? BMC Med Educ. 2020;20:431. doi: 10.1186/s12909-020-02354-4. doi: 10.1186/s12909-020-02354-4. [DOI] [Free PMC Article] [PubMed] [Google Scholar]

3. Ардекани А., Рахимиан З., Фейли А., Амини М., Табари П., Мусави М. Компетенции, необходимые студентам-медикам для борьбы с пандемией COVID-19: исследование по оценке потребностей? J Educ Health Promotion. 2021;10:326. doi: 10.4103/jehp.jehp_1358_20. doi: 10.4103/jehp.jehp_1358_20. [DOI] [Бесплатная статья PMC] [PubMed] [Google Scholar]

4. Siontis KC, Noseworthy PA, Attia ZI, Friedman PA. Electrocardiography using artificial intelligence in the treatment of cardiovascular diseases. Nat Rev Cardiol. 2021; 18:465–78. doi: 10.1038/s41569-020-00503-2. [DOI] [Free PMC Article] [PubMed] [Google Scholar]

5. Cook DA, Oh SY, Pusic MV. Accuracy of Physician Interpretation of Electrocardiograms: A Systematic Review and Meta-Analysis. JAMA Intern Med. 2020; 180:1461–71. doi: 10.1001/jamainternmed.2020.3989. [DOI] [Free PMC Article] [PubMed] [Google Scholar]

6. Fent G, Gosai J, Purva M. Learning to interpret electrocardiograms: which method is best? J Electrocardiol. 2015; 48:190–3. doi: 10.1016/j.jelectrocard.2014.12.014. [DOI] [PubMed] [Google Scholar]

7. Raupach T, Harendza S, Anders S, Schuelper N, Brown J. How to Improve ECG Interpretation Skills Training? Results of a prospective randomized trial. J Electrocardiol. 2016; 49:7–12. doi: 10.1016/j.jelectrocard.2015.10.004. [DOI] [PubMed] [Google Scholar]

8. Monteiro S, Melvin L, Manolakos J, Patel A, Norman G. Evaluation of the Impact of Training and Practice Schedules on ECG Interpretation Acquisition Perspect Med Educ. 2017; 6:237–45. doi: 10.1007/s40037-017-0365-x. [DOI] [Free PMC Article] [PubMed] [Google Scholar]