Descriptive Analysis of Interpretive Ability of Supporting Examinations in Emergency Cases of Medical Professional Study Program Students

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Abstract

Medical competence is an important index to prepare students to enter the clinical stage in the education process. One of the competencies of doctors in Indonesia is 3B, which is the ability to deal with emergency cases. Patients who experience emergencies must receive immediate help and proper treatment. If the treatment is not appropriate, it can result in patient disability and even death. The purpose of the study was to analyze the ability of doctor study program to interpret supporting examinations in the form of ECG in emergency cases. This study is a quantitative study with a descriptive analytic method with cross sectional design. The samples of this study were all UNIMUS medical professional program students who participated in the UKMPPD OSCE tryout in May 2023 period which was taken through the total sampling technique. This study uses secondary data consisting of the results of ECG interpretation scores and the final results of the stase assessment given by the examining lecturer. The results of the study with 41 samples showed that the majority of students answered incorrectly on heart rate frequency (53.7%), P wave (65.9%) and PR interval (75.6%). While the majority of students answered correctly on rhythm (56.1%), axis (58.5%), transition zone (63.4%), QRS complex (58.5%), ST segment (51.2%) and conclusion (61%). Based on the Competency Test for Medical Professional Program Students OSCE try-out score, most of the sample did not pass (65.9%). The ability of medical professional study program students to interpret supporting examinations in the form of ECG in emergency cases in cardiovascular staging is categorized as low.

Keywords: EKG; emergency; OSCE; try out

Introduction

The competency achievement target at SKDI has not been met by 36.01% to 60.55% of students in Indonesia. Physician competence is an important index to prepare students to enter the clinical stage in the educational process. Many factors cause students not to meet these competency goals. Some factors that can affect students include the curriculum, teaching lecturers, environment, and facilities during learning (Konstantinidis, 2024). Teaching lecturers, medical education curriculum developers or students are an important part of implementing efficient and effective medical education (Tjahjadinata et al., 2020).

One of the competencies of doctors in Indonesia is 3B, which is the ability to deal with emergency cases. Patients who experience an emergency must receive immediate help and appropriate treatment. If handled inappropriately, it can result in patient disability and even death (Obermeyer et al., 2015). Medical students have difficulty in dealing with emergencies, especially when handling accident patients. Medical students are more confident in dealing with cases involving breathing than in bleeding cases (Wheeler, 2015).

When dealing with emergency cases, medical students must have skills honed during learning during pre-clinical learning (Mustika et al., 2024). In the results of Huo et al. (2020) It shows that 60% of medical students have low skill ability, even though students' motivation to learn skills is higher. One of the skills in handling emergency cases is basic life support and the ability to interpret ECG (Steinberg et al., 2021). ECG interpretation is very important to be used in helping to establish the diagnosis of heart-related diseases, especially in emergency patients. (Dharma, 2015)

In a previous study, conducted at the University of Khartoum, it was shown that the ability of medical students to handle emergency cases and the ability to interpret ECGs were still considered to be poor (Abdalrahman et al., 2017). Other research related to students' ability to interpret ECGs has also been carried out and shows that students' ability to interpret ECG is categorized as low (Kopeć et al., 2015). In accordance with the hadith that explains the emergency:

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عَنْ أَبِيْ ذَرْ الْغِفَارِيّ عَنْ النّبِي صَلَى اللّٰهُ عَلَيْهِ وَ سَلَّمِ فِيْمَا يَرْوِي عَنْ رَبّهِ عَزَّ وَجَلَّ أَنَّهُ

قَالَ: يَ عِبَادِي إِنِّي حَرَّمْتُ الظُّلْمَ عَلَ نَفْسِي وجَعَلْتُهُ بَيْنُكُمْ مُحَرَّمًا فَلاَ تَظَا لَمُوْاز. [27]

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Meaning: From Abu Dzar Al-Ghifari r.a., from the Prophet Muhammad PBUH, in a hadith narrated from his Rabb, he said. "O my servants, I have forbidden tyranny against myself and I have forbidden it against you, so do not oppress one another". The above hadith explains that Islam prohibits unjust acts against fellow humans. One example is the refusal of medical services to patients in

emergency conditions. In emergencies, patients must immediately receive treatment from hospital medical personnel to prevent more serious circumstances that can endanger their lives.

Research on the ability of medical students to interpret supporting examinations in emergency cases has not been widely researched in Indonesia, especially at FK UNIMUS, so the researcher is interested in conducting a research entitled "Descriptive Analysis of the Interpretive Ability of Supporting Examinations in Emergency Cases of Students of the Medical Professional Study Program".

Method

This study is a quantitative study using a descriptive analytical method with a cross-sectional design conducted at a single point in time. The study was conducted in August 2023, and the research was completed in September 2023. The study sample consisted of 41 participants, all of whom were medical students from the UNIMUS Medical Program who participated in the OSCE UKMPPD practice exam in May 2023 at the Faculty of Medicine, Muhammadiyah University of Semarang, and met the inclusion criteria using total sampling technique. The study utilized secondary data comprising EKG interpretation results and final assessment scores provided by the examiners.

Results

In Table 1, the results show that most of the respondents were female (95.1%). The duration of the study was 6 years, involving 37 people (90.2%). In the results of the ECG interpretation assessment, the majority of the sample answered incorrectly on the heart rate frequency of 22 people (53.7%), PR of 31 people (75.6%) and P wave of 27 (65.9%). Meanwhile, the majority of the sample answered correctly in the rhythm of 23 people (56.1%), axis of 24 people (58.5%), transition zone of 26 people (63.4%), QRS complex of 24 people (58.5%), ST segment of 21 people (51.2%) and conclusion of 25 people (61%). Based on the OSCE UKMPPD try out score, most of the sample did not pass amounting to 27 people (65.9%).

Table 1. Respondents Characteristics

No.	Assessment Characteristics	Frequency	Percentage
1.	**Gender**		
	- Women	39	95,1
	- Men	2	4,9
2.	**Length of Study**		
	- 8 years	2	4,9
	- 7 years	2	4,9
	- 6 years	37	90,2

No.	Assessment Characteristics	Frequency	Percentage
3.	**Heart Rate**		
	- True	19	46,3
	- Wrong	22	53,7
4.	**Rhythm**		
	- True	23	56,1
	- Wrong	18	43,9
5.	**Axis**		
	- True	24	58,5
	- Wrong	17	41,5
6.	**Transition Zone**		
	- True	26	63,4
	- Wrong	15	36,6
7.	**Interval PR**		
	- True	10	24,4
	- Wrong	31	75,6
8.	**QRS**		
	- True	24	58,5
	- Wrong	17	41,5
9.	**P Wave**		
	- True	14	34,1
	- Wrong	27	65,9
10.	**ST Segment**		
	- True	21	51,2
	- Wrong	20	48,8
11.	**Conclusion**		
	- True	25	61
	- Wrong	16	39
12.	**OSCE UKMPPD Try-Out Score**		
	- Passing	14	34,1
	- Not passing	27	65,9

Table 1 indicates that most students were female (95.1%) and had been studying for 6 years (67.5%). Regarding ECG interpretation, more than half of the respondents failed to correctly assess basic parameters, including heart rate (48.6% correct), rhythm (43.2% correct), and axis (54.1% correct). Only 34.1% of respondents passed the OSCE UKMPPD try-out. These results indicate the need for further reinforcement in ECG interpretation skills among medical students.

Disscussion

The results of this study show that the graduation rate of students in the OSCE UKMPPD trial for cardiac emergency status is categorized as low, at 34.1%. In line with Han et al (2020) research which states that first-year resident students have very poor ability to interpret ECGs despite having good clinical experience as general practitioners. In addition, Francois et.al's research has shown that the ability to interpret the ECG possessed by emergency department residents has an average score of less than 40%. The results of this study are in line with the above research; one of the causative factors is the lack of experience and skill training in ECG interpretation. The research conducted on Sudanese

medical students was conducted by Kheir et.al. that the graduation rate of clinical competence in emergency cases is considered low. Therefore, medical students need to be given training to improve the ECG interpretation ability in handling emergency cases (Barthelemy et al., 2017; Han et al., 2020; Kheir et al., 2017).

According to Vishnevsky et al., sixth-year medical students are better at interpreting abnormal ECGs than third-, fourth- and fifth-year students. This can happen because sixth-year students have passed the professional stage and are more likely to handle cases related to the interpretation of the ECG. Students who are used to or experienced in handling emergency cases that relate to the interpretation of ECG in the hospital or learning during the medical profession are better than students who only study on their own or take part in learning during pre-clinic (Vishnevsky et al., 2022). The results of this study are not by the research of Kewcharoen, et al. conducted in the Thai medical faculty, the ability to interpret ECG by independent study or with a tutor in fifth-year students remained relatively low and there was no significant difference. Meanwhile, students in the fourth year have differences (Kewcharoen et al., 2020).

In this study, the majority of respondents answered incorrectly on heart rate frequency, PR interval and P wave. The results of this study are in line with the research of Francois, a resident of the internal medicine department in the first year in interpreting ECG in the form of PR intervals and P waves to diagnose AV block is rated low (<25%) (Barthelemy et al., 2017). The PR interval, P wave and QRS wave are important points in the interpretation of the ECG to provide further management (Mahendra & Yuliani, 2022). Medical students find it difficult to interpret heart rate and AV block identification, one of which is due to the factor of not remembering the formula for calculating heart rate frequencies, both regular and irregular, and the normal value of PR intervals. This factor can be caused by students experiencing anxiety and panic during the OSCE exam.

In this study, the majority of respondents answered correctly on rhythm, axis, transition zone, QRS complex, ST segment and conclusion. The research conducted by Francois is in line with this research in the form of the ST segment. First-year residents of the department of internal medicine have better ability to interpret ECGs in cases of acute coronary syndrome compared to first-year residents of the emergency department. The ST segment is indispensable in establishing the diagnosis of acute coronary syndrome (Vishnevsky et al., 2022). In addition, there are similarities with the research conducted by Getachew, a medical student at Addis Ababa University both in the interpretation of abnormal ECGs in the form of heart rate, rhythm and axis compared to medical students of Haramaya University (Getachew et al., 2020). In another study, internal medicine residents had higher rhythm interpretation skills than general practitioners (Jablonover et al., 2014).

Medical students in interpreting rhythm, axis, transition zone, QRS, ST segments are better because the difference is significant enough between normal and abnormal so that with a little time the exam can be answered well. The interpretation of the ECG conclusions in students in this study is good because cases are often found in the world of work such as inferior STI, atrial fibrillation, supraventricular tachycardia and the ease of identification of these cases by looking at the results of the ECG. The interpretation of the ECG that can be found in systemic sclerosis patients is AF, PVC and NSVT. The occurrence of sudden cardiac death, arrhythmias and conduction disorders can occur in patients with systemic sclerosis (Fairley et al., 2023).

In this study, it was found that the majority of respondents could not interpret the ECG correctly. Several factors contributed to this issue, including the limited time allocated for ECG learning during pre-clinical education (less than 4 hours) and the absence of structured, simulation-based learning. Moreover, a lack of continuous feedback and minimal clinical exposure to real ECG cases also impacted the students' interpretation skills (Fairley et al., 2023). To manage this situation, several solutions can be implemented. First, curriculum designers should increase the number of ECG practice hours and integrate ECG interpretation modules across both pre-clinical and clinical phases. Second, structured and interactive methods, such as simulation-based ECG interpretation using real-case scenarios, should be employed. Third, formative assessments with direct feedback should be incorporated to monitor student progress and correct misconceptions early. Finally, collaborative learning strategies, such as peer-assisted learning (PAL) or small group tutoring led by clinical mentors, have been shown to enhance diagnostic confidence and competence in ECG interpretation (Alamrani et al., 2018; Riera et al., 2022).

Conclusions

Based on the discussion and the results of the research, it can be concluded that the majority of students answered incorrectly on questions related to heart rate frequency, homework interval, and the P wave, while most students answered correctly on rhythm, axis, transition zone, QRS complex, ST segment, and conclusion. However, despite these results, the overall graduation rate of students in the OSCE UKMPPD try-out for the cardiac emergency stase is categorized as low.

Recommendations

For students, it is recommended that they actively utilize feedback to enhance their clinical skills. Through feedback, students can identify their mistakes and areas for improvement, thereby increasing their readiness and performance in the actual UKMPPD OSCE. In addition, repetition of practice sessions is advised to help reinforce previously acquired knowledge and skills. For future researchers, it is recommended to conduct similar studies involving students who participate in UKMPPD OSCE practice sessions across different periods or combinations thereof, to explore

variations in outcomes. Moreover, future studies are encouraged to involve participants from multiple institutions, which would broaden the generalizability and applicability of the research findings.

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