The Effect of WhatsApp-Assisted ECG Training on Students' Knowledge Levels

Whatsapp Destekli EKG Öğretiminin Öğrencilerin Bilgi Düzeylerine Etkisi

ABSTRACT

Objective: Social media applications, such as WhatsApp, are widely used as teaching methods in many higher education institutions and have been shown to enhance student learning and motivation. It is believed that education supported by the WhatsApp application, which is easily accessible to university students via their phones, can positively influence students' knowledge levels in electrocardiography (ECG) training. The objective of this research is to investigate the effect of WhatsApp-assisted ECG training on students' knowledge levels.

Methods: This semi-randomized controlled study involved third-year nursing students enrolled in the elective Intensive Care Nursing course during the spring semester of 2022-2023. The study was conducted in the Nursing Department of the Faculty of Health Sciences at a university in the Western Black Sea region of Türkiye. After providing ECG information through online education, a pretest was administered. Following the pretest, ECG rhythm analysis videos, pictures, and links to ECG games and quiz websites were shared via WhatsApp for one week. A posttest was conducted after the one-week intervention.

Results: While there was an average difference in students' knowledge levels before and after the WhatsApp-assisted ECG training, this difference was not statistically significant.

Conclusion: As the average knowledge score of students increased after WhatsApp-assisted training, it may be beneficial to expand the use of web-based education approaches in the curriculum.

Keywords: ECG, Nursing education, WhatsApp

ÖZ

Amaç: WhatsApp gibi sosyal medya uygulamaları pek çok yükseköğretim kurumunda kullanılan ve öğrencilerin öğrenmelerine yardımcı olduğu, motivasyonlarını arttırdığı saptanan bir öğretim yöntemidir. Üniversite öğrencilerinin telefonlarıyla her an ulaşabileceği düşünülen WhatsApp uygulamasıyla Destekli Eğitimin EKG Öğretiminde Öğrencilerin Bilgi Düzeylerini etkileyeceği düşünülmektedir. Araştırmamızın amacı Whatsapp destekli EKG öğretiminin öğrencilerin bilgi düzeylerine etkisinin incelenmesidir.

Yöntem: Çalışma, 2022-2023 bahar döneminde öğrenim gören 3. Sınıf hemşirelik bölümü seçmeli derslerinden yoğun bakım hemşireliğini alan öğrencilerin katılımıyla yarı randomize kontrollü olarak yapılmıştır. Çalışma, Türkiye'de Batı Karadeniz bölgesinde yer alan bir üniversitenin Sağlık Bilimleri Fakültesi Hemşirelik Bölümü'nde gerçekleştirilmiştir. Öğrencilere EKG bilgisi online eğitim ile verildikten sonra öntest uygulaması yapıldı. Öntest uygulaması sonrası bir hafta boyunca Whatsapp üzerinden EKG ritm analizleri video, resim, EKG oyun ve quiz siteleri internet sitesi adresleri gönderildikten bir hafta sonra sontest uygulandı.

Bulgular: Öğrencilerin whatsapp destekli EKG eğitimi öncesi ve sonrası bilgi düzeyi ortalama bazında farklılık görülmesine rağmen fark istatistiksel olarak anlamlı bulunmadı.

Sonuç: WhatsApp destekli eğitim sonrasında öğrencilerin ortalama bilgi puanının artması nedeniyle web tabanlı eğitim yaklaşımlarının müfredatlarda arttrılması önerilebilir.

Anahtar Kelimeler: EKG, Hemşirelik eğitimi, WhatsApp

Canan Kaş[1] [ID]
Filiz Özel Çakır[2] [ID]

[1] Department of Midwifery, Kastamonu University, Health Sciences Faculty, Kastamonu, Türkiye
[2] Department of Nursing, Kastamonu University, Health Sciences Faculty, Kastamonu, Türkiye

Corresponding author:
Canan Kaş
✉ canankas@gmail.com

Introduction

Cardiovascular diseases (CVD) are the leading cause of death worldwide, including in our country.[1,2] According to the Turkish Statistical Institute (TURKSTAT) (2022), circulatory system diseases account for the highest mortality rate in our country at 35.4%, with 42.3% of these deaths attributed to ischemic heart disease caused

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by CVD.[3] Various diagnostic methods have been employed to reduce morbidity and mortality associated with cardiovascular diseases.[4] One such method is electrocardiography (ECG). ECG diagnoses certain cardiac conditions by recording the electrical impulses generated during the depolarization and repolarization of the myocardium on paper, using electrodes placed on the body surface.[5,6] Nurses are healthcare professionals who are often the first to recognize changes or risks during the follow-up of patients with ECG monitoring. They play a crucial role in managing the 24-hour active care and treatment process. It is essential for nurses to receive training at the undergraduate level to accurately evaluate rhythm and lead parameters in ECG for effective healthcare.[7] The 2017-2020 strategic plan of the American Nurses Association (ANA) emphasizes nurse-driven innovation in the healthcare system, with the goal of "understanding the value of nurses and promoting and disseminating innovation that leads to improvements in healthcare".[2,8] Social media applications, such as WhatsApp, have become popular teaching tools in many higher education institutions and have been shown to enhance student learning and motivation.[9-11] No studies on ECG rhythm analysis using different teaching methods were found in the literature. It is believed that the effectiveness of ECG education can be enhanced by incorporating various supporting materials, as this approach can save both time and resources. Additionally, visual applications are crucial in ECG training. For this reason, online training that includes visual materials was considered potentially beneficial for nursing students, leading to the planning of this study. It is assumed that ECG training via the WhatsApp application, which students can easily access at any time through their phones, will positively impact their knowledge levels. In light of this, the study was designed to evaluate the effectiveness of WhatsApp-assisted ECG training delivered through online education to nursing students. The aim of this study is to investigate the effect of WhatsApp-assisted ECG training on students' knowledge levels.

Material and Methods

Purpose of the Research
The purpose of this research is to determine the effect of WhatsApp-assisted ECG training on nursing students' knowledge levels.

Hypotheses of the Research
H0: WhatsApp-assisted ECG training does not affect the knowledge levels of nursing students.

H1: WhatsApp-assisted ECG training affects the knowledge levels of nursing students.

Study Design
This research was conducted as a quasi-experimental study using a one-group pretest-posttest design. It involved nursing students enrolled in the third-year elective Intensive Care Nursing course at Kastamonu University Faculty of Health Sciences during the spring semester of the 2022-2023 academic year. All students participating in the study had received basic ECG instruction during the 2nd-year Internal Medicine Nursing course. Students who had previously

completed the Intensive Care Nursing course or participated in an ECG course or certificate program were excluded from the study.

Population and Sample of the Research
The population of the research consisted of third-year students who enrolled in the elective Intensive Care Nursing course during the spring semester of the 2022-2023 academic year (n = 30). A sample population with a known size was used for the study. With a 95% confidence interval (alpha 0.05) and an accepted sampling error of d = 0.05, the required sample size was determined to be 10 students. A total of 24 students completed the pre-test online, and 21 students completed the post-test online. The study was finalized with 21 nursing students.

Procedure
Due to the earthquake, the Intensive Care Nursing course was conducted online. Within this course, ECG rhythm reading and rhythm analysis were taught online over a period of three weeks by the course instructor. At the end of the course, a pre-test survey was administered to the students on a voluntary basis. To prevent bias, students logged in using nicknames. After completing the ECG reading and rhythm analysis lesson, YouTube videos on ECG rhythms were shared with the students via WhatsApp, and they were encouraged to use games and learning tools from [SkillStat's ECG simulator] (https://www.skillstat.com/tools/ecg-simulator/) to practice rhythm learning daily. A total of 24 students participated in the pre-test.

Following the completion of the lecture, students' ECG rhythm reading skills were reinforced for one week through the daily sharing of videos, ECG rhythm analysis games, and quiz site links via WhatsApp. After this week of reinforcement, the same survey was administered again as a post-test through Google Drive. Pre-test and post-test survey forms were coded to ensure that the data belonged to the same individuals during evaluation.

Data Collection Tools
The data collection tools used in this study were the Individual Introduction Form and the ECG Information Form, both created by the researchers after reviewing relevant literature.

Individual Introduction Form
This form consists of 3 questions regarding the students' age, gender, and whether they had taken the course before.

ECG Information Form
This form, designed to measure students' ECG knowledge levels, was developed by the researchers and reviewed by five experts to finalize its content. It consists of 10 questions focused on interpreting ECG waveforms and recognizing visually presented rhythms. The data was collected online using a Google Drive survey.

Ethical Consideration
The study was conducted in accordance with the principles outlined in the Declaration of Helsinki. Approval was obtained from the clinical research ethics committee of Kastamonu University Faculty of Medicine (Approval Number: 2023/39;

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Date: 05.04.2023). Additionally, permission for the study's implementation was granted by the Faculty of Health Sciences. Voluntary consent was obtained from the students prior to data collection.

Evaluation of Data

The study data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows, Version 21.0 (IBM SPSS Statistics for Windows, Version 21.0, Armonk, New York, USA). Descriptive statistical methods, along with the Mann-Whitney U test, Kruskal-Wallis test, and Tamhane's T2 test, were employed for data evaluation. Spearman's Rho analysis was used to determine the relationship between the scores, and the Paired Samples test was used to assess differences between the scores. The findings were evaluated at a 95% confidence level with a 5% significance level.

Results

A total of 71.42% of the participants were aged 20-22, and 85.7% of them were female. All students participating in the study were taking the course for the first time (Table 1). The mean total knowledge score of the students after the online ECG training in the course was 5 ± 1.556, while the mean total knowledge score after one week of WhatsApp-assisted online training was 5.45 ± 1.191. Although there was an observed difference in the students' mean knowledge levels before and after the WhatsApp-assisted ECG training, the difference was not statistically significant ($P > 0.05$). However, the scores obtained by the students after WhatsApp-assisted training were significantly higher than those obtained through online education alone ($P < 0.01$) (Table 2).

Discussion

Due to the COVID-19 pandemic in December 2019 and the earthquakes in Türkiye in 2023, education was shifted to a remote format. In addition to distance education, the widespread use of social media among students has prompted the exploration of alternative methods in health education. This study evaluated the effect of WhatsApp-assisted ECG training on the knowledge levels of third-year nursing students enrolled in the Intensive Care Nursing course. Given that few

Table 1. Distribution of Students' Descriptive Characteristics (n = 21)

Variable	n	%
Age, years		
20-22	15	71.42
23 and above	6	28.57
Gender		
Female	18	85.7
Male	3	14.3
Status of having taken the Intensive Care Nursing course before	0	0

Table 2. Comparison of Students' Knowledge Level Scores After Online ECG Training and WhatsApp-Assisted Training (n = 21)

Score Type	$\bar{x}$ ± SD	Min-Max	T	P
ECG Knowledge Level				
Before WhatsApp Assistance	5 ± 1.556	2-7	-1.630	0.119
After WhatsApp Assistance	5.45 ± 1.191	3-7		

studies have explored the use of WhatsApp for educational purposes, the findings of this study are supported by a limited body of research.[12]

There was an increase in the mean scores between the pretest, following the online ECG lesson, and the posttest, after the students had received additional ECG training via WhatsApp for one week. This supplemental training included ECG rhythm videos, ECG game sites, and quiz site links. However, this increase was not statistically significant. The literature reveals limited research on this subject. Tower et al[13] demonstrated that 89.8% of students who shared critical thinking and interpretation-based questions in a Facebook group before an exam saw improvements in their knowledge, with 83.2% of these students also enhancing their skill development. Similarly, another study showed that mobile technology can significantly improve students' learning and clinical skills.[14] In a study examining the impact of WhatsApp-assisted training on nursing students' knowledge of safely administering intramuscular injections into the ventrogluteal region, it was found that the group using WhatsApp support had a significant increase in their mean skill scores.[12] Similarly, in a study involving teachers' perspectives on the use of social networks in science lessons, it was observed that videos and pictures shared via WhatsApp helped to concretize abstract concepts.[15] Additionally, in a study comparing the full learning model with WhatsApp-assisted training for nasogastric catheter insertion skills, students who received WhatsApp-supported training were found to be more successful than those who did not.[11] In Al-Ak'hali et al.'s[16] study, which aimed to evaluate the effectiveness of using WhatsApp instant messages to improve oral hygiene in patients with gingivitis, it was found that WhatsApp messages did not offer any additional benefit compared to traditional motivation and education methods. However, in-depth interviews conducted in a study by Naz et al[17] revealed that participants and their peers found WhatsApp interventions and peer support to be appropriate, flexible, and supportive. Based on these findings, it can be concluded that WhatsApp-assisted training has the potential to be useful both in patient education and in educating students on various subjects.

Limitations

A limitation of this research is that it was conducted in a single center, and not all students enrolled in the course could be reached.

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Conclusion

The use of WhatsApp, a mobile social communication tool, allowed students to access pictures and videos related to ECG rhythm analysis under the guidance of their instructors. The research results indicated an increase in students' knowledge scores following the WhatsApp-assisted ECG training.

The integration of technology into training methods has become increasingly important due to the widespread use of smartphones and the ease with which students can access information. It is recommended to enhance training by incorporating web-based applications to further support and reinforce learning.

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