Evaluating The E-Health Literacy of Pharmacy Students in A Health Science Laboratory Using a Mobile Health Application

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ABSTRACT
This study aims to assess the behaviors of Pharmacy Learners (PL) about Mobile Health applications (MH-app) and their electronic health (e-Health) literacy. It focused on PL and used a descriptive and cross-sectional approach. A survey was developed using the findings from prior research to assess the understanding and actions, perspectives, and perceptions of PL on MH apps. The e-Health Literacy Scale was administered to PL using health science. The responding rate was 91.2%, with a sample size of 250. Of the 250 PL, those who used MH-apps and male PL had higher scores than non-users and female PL. The fifth-grade PL achieved considerably higher marks than the third-grade PL. A study revealed that 84% of PLs believe that MH apps enhance the quality of life for patients. In comparison, 34.2% of students expressed that pharmacists need an adequate understanding of MH apps. Enhancing PL's e-health literacy will improve their knowledge and behaviors regarding health science.

1. Introduction

Mobile devices, commonly known as handheld computers, are increasingly integrated into healthcare evaluation, administration, and provision [1]. Mobile phones and tablets provide convenient access to healthcare data and healthcare-related mobile applications, such as health conditions, prescription data, laboratory citations, medical calculators, medical updates, and continuing education activities. Integrating mobile devices into pharmacy operations is advantageous for pharmacists and their patients. Several data support the idea that most pharmacists in different regions utilize smartphones and mobile applications in their profession [2]. These apps are seen as having a beneficial effect on patient care. Pharmacists view them as valuable for enhancing healthcare learning, advising patients, confirming orders during patient rounds, evaluating experiential learners, boosting efficiency in practice duties, and improving effectiveness in patient care [11].

Pharmacists, as the most easily accessible and often visited healthcare practitioners, have a vital role in actively involving, teaching, and improving the public's knowledge and understanding of electronic health (e-Health) information [4]. This empowers individuals to make well-informed decisions about their health [3]. To accomplish this, pharmacists must possess a high level of e-health literacy [14]. This is significant given the growing prevalence of healthcare professionals, especially pharmacists, utilizing tablets or cell phones to use e-health programs for clinical decision-making. With the increasing incorporation of innovative technologies such as web-based surveillance systems, telehealth solutions, and electronic medical records into the pharmacy profession, pharmacists must possess a proficient understanding of technology to deliver the best possible patient care [13].

No research has been conducted on self-perceived e-health education and utilization of e-health applications among pharmacy students. The study evaluated the degree of self-perceived knowledge of and behavior toward e-health apps among Pharmacy Learners (PL) in government and private institutions [5]. The study examined notable disparities in e-health learning.

Background

Mobile devices are utilized and valued in clinical training environments, in addition to their application in practical situations. A recent study found that most hospital neurology residents used mobile devices and considered them beneficial for enhancing clinical care [6]. They expressed a high likelihood of continuing to use these devices. A significant proportion of individuals residing in a family medicine residency scheme and their mentors expressed that using mobile devices enhanced the teaching and

learning experience by providing greater convenience, increased engagement, and facilitating the attainment of educational objectives. The distribution of mobile devices to medical students of various specialties at the University of Virginia led to a significant number of physicians indicating that the mobile devices enhanced the coordination of patient care [7]. As a result, they strongly advised that all residents and associates universally adopt mobile devices. The mobile device benefited doctors in learning by improving the rate at which physical health and rehabilitation course trainees could accomplish tasks related to their training. Most instructors questioned at various pharmacy job sites expressed their endorsement for educating PL on using cell phones and pertinent software [13].

Integrating cell phones into the early educational and practical curriculum in medical professions courses can be a crucial first step toward enhancing how future clinicians perceive, utilize, and master mobile technology [8]. The healthcare students' year-long utilization of mobile devices led to a notable augmentation in their utilization and proficiency with mobile devices. PL has expressed positive feedback regarding integrating mobile devices into problem-based learning discussions and using mobile devices to complete and submit clerkship tasks [9]. Nursing and midwifery learners indicated that mobile devices enhanced their access to information, facilitated better time administration, and bolstered their capacity to deliver patient information. PL indicated that mobile devices were suitable for accessing clinical data and utilizing pharmacy-related applications. PL found that using mobile devices throughout their practical experiences made them want more mobile applications related to drug knowledge and helping patients.

Universities should find ways to include cell phones in the early curriculum of future doctors, notwithstanding the difficulties that arise from this integration [15]. Many PL, healthcare residents, and medical professionals said that the main obstacle they faced while accessing medical information on mobile devices was a need for more knowledge about the available options [10]. A further study revealed that integrating mobile devices into pharmacy programs for note-taking and slide annotation did not garner a favorable response from the students. While there is a significant push to include cell phones in the pharmacy curriculum, more evidence-based articles on integrating mobile technology in pharmacy learning must be needed.

2. Methodology

Study sample

The present research used an electronic cross-sectional design at the Marmara University Faculty of Pharmacy in Istanbul, Turkey. The study was done from 25 March 2021 to 25 June 2021. The sample size is not determined, and the research includes the total population. The desired group consisted of 250 individuals. The inclusion criteria are (1) willingness to engage in the research and (2) being at least 18 years old. An email invitation was delivered to PL, inviting them to participate in a study. The learners subsequently finished the survey online—digitally acquired information. The Marmara University Institute of Health Sciences gained authorization from the Ethical Committee. The necessary approval is obtained from the dean of the faculty.

Data collection and analysis

A web-based survey was administered using LimeSurvey software. The questionnaire gadget comprises four demographic-related inquiries and semi-structured questionnaires. The inquiry was developed based on existing research to explore PL's knowledge and behaviors (five inquiries), perception (eight inquiries), and point of view (four questions) regarding mobile health applications (MH-app). The survey comprises 20 topics and is divided into different pieces. Each segment is assessed using five-point Likert-type ratings. The questionnaire had a projected median period of 5-6 minutes, and learners were informed about this period. The Turkish iteration of the e-Health Literacy Scale, comprising eight items with a scoring range of 8 to 40, was administered. A higher score signifies a higher level of e-health proficiency.

Data analysis

The continuous factors were represented by the mean value plus the standard deviation, whereas the ordinal and nominal information were presented as counts and percentages. The evaluation of categorical parameters was conducted using the chi-square test. The statistical tests were conducted using the SPSS (Windows 11.0) software. The standard distribution is validated using the Kolmogorov-Smirnov normality testing. The unbiased t-test was used to compare two categories, whereas the ANOVA test was used to compare more than two categories. The outcomes were assessed using a 95% trust interval and a significant level of $p<0.05$.

3. Results and discussion

Respondents were selected among PL in their third, fourth, and fifth years of study. A study was conducted with 250 PL, consisting of 150 females (60%) and 100 males (40%). The rate of response was 91.2%. The participants' average age (standard deviation) was 21.4 ± 3.2 years. The average score was recorded as 29.7±4.1. The Cronbach's alpha coefficient was 0.832 for e-health and 0.793 for the PL's perceptions regarding utilizing MH-apps. Based on the score, male PL exhibited significantly higher scores than females, and fifth-grade PL had higher scores than third-grade learners. Table 1 displays the demographic features of learners and their e-health results.

Table 1. Democratic analysis

Features	Size (count)	Size (%)	Score (mean)	Score (SD)
Gender				
Women	150	60	28.4	0.5
Men	100	40	32.5	4.8
Pharmacy class				
Third	90	36	27.3	5.4
Fourth	50	20	34.2	3.7
Fifth	110	44	30.7	2.5
Mobile app for health monitoring				
Yes	150	60	31.8	0.7
No	100	40	28.5	0.3

Every pupil was utilizing either a smartphone or a tablet gadget. Of the participants, 60% (n=150) utilized a mobile application to modify their health-related behavior. Within this group of PL, those who used MH apps had significantly higher scores than those who did not use them. Out of the total respondents, 79.48% reported that the Internet assists them in making decisions regarding their health problems. Most students (89.2%) expressed a strong desire to obtain information on drugs through MH apps. Table 2 displays the PL's understanding and actions regarding MH apps.

Table 2. E-health application analysis

Question	Helpful		Not helpful		No opinion	
	Response	(%)	Response	(%)	Response	(%)
Health decision making using internet	168	67.2	43	17.2	39	15.6
Health resource in internet	216	86.4	19	7.6	15	6
Mobile health app usage	86	34.4	153	61.2	11	4.4
Usefulness of mobile health application	231	92.4	9	3.6	10	4

A small proportion of the respondents (9) expressed reluctance to offer patients MH-apps. Of the respondents, 4.4% (n=11) said they did not know any MH apps. The research revealed that 86.4% of PLs believe that MH-apps enhance the quality of life for recipients, whereas 27.6% expressed that pharmacists lack appropriate understanding about using MH-apps. 34.4% of learners expressed the necessity of having sufficient time before implementing changes. Most students reported that MH-apps

enhance patients' adherence to medicine (86.4%) and their understanding of their health conditions (67.4%). Most PL (92.4%) believed MH apps enhance communication between patients and pharmacists. There needed to be more certainty regarding the extent of pharmacists' familiarity with the utilization of MH apps, with only 51.7% being confident. They emphasized the need for experts to establish essential legal regulations, with a majority of 81.4% in agreement.

4. Conclusion and future scope

The study revealed that PL was willing to offer MH-apps to its clients, but only if healthcare experts had designed the apps. Students believe mobile apps have significant potential to enhance the pharmacy profession by improving the quality of life for patients. Research has revealed that PLs frequently utilize MH apps to modify health behaviors. These applications could be used to provide medical facilities in the future. Further research must assess and enhance PL's perspectives regarding using MH-apps in a substantial sample size.

The study focused on using mobile apps in the realm of health. A correlation was discovered between the rising utilization of MH apps and the e-health literacy rates of learners, indicating a positive association. Predictions suggest that using MH apps in pharmacy classes will enhance patient adherence, knowledge, and abilities, as observed by PL.

Furthermore, it was observed that most learners who do not offer MH-apps to their clients expressed a need for more awareness regarding these programs. Incorporating mobile healthcare applications into education can enhance students' knowledge and understanding of these apps and their ability to provide informed suggestions. Hence, initiating training programs at the university level focusing on MH apps is crucial. These classes should specifically include the proper utilization of mobile medical procedures and identifying suitable mobile healthcare activities for individuals. As the level of training in pharmacy improves, the knowledge and abilities of learners in the health area improve, improving their health literacy skills. Therefore, offering education on MH apps during the last years of universities would be more advantageous.

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