Araştırma Makalesi

University Students' Usage of Mobile Health Applications

Üniversite Öğrencilerinin Mobil Sağlık Uygulamaları Kullanımı

Erkan EROL[1] ID, **Nilşah YILMAZ**[2] ID, **Zeynep ACUNGİL**[3] ID, **Ayla GÜNAL**[4] ID, **Funda DEMİRTÜRK**[5] ID

[1] PhD, PT, Asst Prof., Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Tokat Gaziosmanpaşa University, Tokat, Turkiye.

[2] MSc, PT, Lecturer, Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Tokat Gaziosmanpaşa University, Tokat, Turkiye.

[3] PhD, PT, Asst Prof., Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Tokat Gaziosmanpaşa University, Tokat, Turkiye.

[4] PhD, PT, Assoc Prof., Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Tokat Gaziosmanpaşa University, Tokat, Turkiye.

[5] PhD, PT, Professor, Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Tokat Gaziosmanpaşa University, Tokat, Turkiye.

ABSTRACT

Objectives: Mobile health applications (mHealth apps) are used for exercising, tracking personal health and physical activity data, losing weight, dieting, and monitoring daily fluid intake. This study aimed to examine the use of mHealth apps among university students. **Materials and Methods:** A total of 899 university students were included in the study. We created a 19-question survey to examine individuals' reasons for using or not using mHealth apps, frequency of use, effectiveness, user profile, and other related factors. **Results:** 60.3% of the participants reported being aware of mHealth apps. 24.1% of the participants said they use an mHealth app, while 75.9% do not. mHealth applications are mainly used by students to monitor their physical activity levels. **Conclusion:** mHealth apps are effective and low-cost options for increasing people's physical activity, and efforts should be made to expand their use.

Keywords: mHealth; mobile health; students; smartphone

ÖZ

Amaç: Mobil sağlık uygulamaları (mSağlık uygulamaları), egzersiz yapmak, sağlık ve fiziksel aktiviteye ilişkin kişisel verileri takip etmek, kilo vermek, diyet yapmak, günlük alınan sıvı miktarını takip etmek gibi amaçlarla kullanılmaktadır. Üniversite öğrencilerinde mSağlık uygulamalarının kullanımını incelemeyi amaçladık. **Gereç ve Yöntem:** Toplam 899 üniversite öğrencisi çalışmaya dahil edildi. Bireylerin mSağlık uygulamalarını kullanma veya kullanmama nedenleri, kullanım sıklığı, etkinliği, kullanıcı profili gibi özelliklerini incelemek amacıyla 19 soruluk bir anket hazırladık. **Bulgular:** Katılımcıların %60.3'ü mSağlık uygulamalarından haberdar olduğunu bildirdi. Katılımcıların %24.1'i mSağlık uygulaması kullandığını, %75.9'u ise kullanmadığını söyledi. mSağlık uygulamaları öğrenciler tarafından en çok fiziksel aktivite düzeylerinin takibinde kullanılmaktadır. **Sonuç:** mSağlık uygulamaları insanların fiziksel aktivitelerini artırmak için etkili ve düşük maliyetli seçeneklerdir ve kullanımlarının yaygınlaştırılması için çaba gösterilmelidir.

Anahtar Kelimeler: mSağlık; Mobil sağlık; Öğrenciler; Akıllı telefon.

In recent years, smartphones have been developing rapidly in terms of functionality and frequency of use (Martínez-Pérez et al., 2015). We use mobile phones in a large part of our daily lives. Due to their functionality and potential, smartphones are increasingly recognised for their significance in healthcare, leading to widespread adoption (Singh & Alva, 2019). Utilising mobile technologies for diverse health-related objectives is termed mobile health (Vonholtz et al., 2015). Mobile health is thought to improve healthcare and provide a platform for individualised medicine. More than 97,000 mobile health applications (mHealth apps) are on Google Play and Apple stores, with 1000 more are added monthly (Peng et al., 2016). mHealth apps became more popular during the COVID-19 pandemic (Bokolo, 2021).

mHealth apps are used for exercising, tracking personal health and physical activity data, losing weight, dieting, and monitoring daily fluid intake (Bhuyan et al., 2016). mHealth applications have been shown to influence users' health behaviours, including physical activity, dietary habits, alcohol consumption, sexual behaviour, and medication adherence (Free et al., 2013). Furthermore, mHealth technology has been utilised to manage various health conditions, including diabetes, asthma, depression, hearing impairment, anaemia, and migraines (Martínez-Pérez et al., 2013). The mHealth apps industry is still developing. The use of mHealth apps affects the success of mobile health services (Gelderman, 1998).

A study conducted among health college students in Saudi Arabia revealed that 56% of the participants utilize mHealth applications (Jabour et al., 2021). Another study conducted with medical school students in the UK reported that 79.8% have an mHealth app (Payne et al., 2012). In France, 34.9% of the participants reported using mHealth applications (Montagni et al., 2018).

Understanding the purpose of people's use of mHealth apps, the barriers to their use, and the benefits they provide offers valuable insights into the potential access and effectiveness of mHealth apps. This knowledge can lead to more effective and widespread use of mHealth apps. Therefore, our study aimed to examine the use of mHealth apps among university students. To achieve this, we created a 19-question survey to investigate individuals' reasons for using or not using mHealth apps, frequency of use, effectiveness, user profile, and other related factors.

MATERIAL AND METHOD

Subjects

This survey study examines the mHealth app usage of health sciences students. The current study is a descriptive research. Students from the Faculty of Health Sciences at Tokat Gaziosmanpaşa University were included in the study. This faculty has five departments at the undergraduate level: a) Emergency Disaster Management, b) Midwifery, c) Nursing, d) Nutrition and Dietetics, and e) Physiotherapy and Rehabilitation. There are 1,379 undergraduate students in these five departments, and 899 agreed to participate. The survey was created via Google Forms, and participants were asked to complete it online. The study was approved by the Tokat Gaziosmanpaşa University Clinical Researches Ethics Committee (Date: 18.02.2021, Number: 83116987-228). The study was conducted by the principles outlined in the Declaration of Helsinki. Participants were provided information regarding the research, and only those who consented to participate were included. The exclusion criteria for the study were not having a smartphone or internet access.

Data Collection Instruments

After reviewing the literature and examining surveys for mHealth apps used in similar studies (Vonholtz et al., 2015; Singh & Alva, 2019), the authors created the survey for this study. The survey included characteristics questions and 19 questions about mHealth apps. After the participants filled in the demographic questions, they answered the mHealth app survey. The first two questions were answered by all participants (Q1. Are you aware of mHealth apps? Q2. Do you use an mHealth app?). The third question was answered only by the participants who do not use an mHealth app, as it inquired about the reasons for not using mHealth apps. Participants who do not use an mHealth app were asked to complete the survey after the third question. Participants using an mHealth app were asked to complete the survey up to the 19th question.

Data Analysis

Descriptive statistics were used to characterize the participants' demographics, health, and mHealth app usage. All analyses were performed using SPSS 22.

RESULTS

Participant characteristics are shown in Table 1.

mHealth app awareness and usage

60.3% of the participants reported that they are aware of mHealth apps. Interestingly, 24.1% of the participants said they used an mHealth app, while 75.9% did not.

Purposes of use and non-use

"To track my physical activity level (42.9%)" was the most common reason for using an mHealth app. Participants who did not use the mHealth app (75.9%) were asked why they did not use one. The most frequently given answer was "I don't need an mHealth app"(37.6%). The results are shown in Table 2.

Table 1. Participant characteristics

Characteristic	mean (±SD)	Alcohol	n (%)
Age (years)	20.14 (±1.64)	Yes	21 (2.3)
Height (cm)	165.38 (±7.77)	No	878 (97.7)
Weight (kg)	60.37 (±12.14)	**Regular exercise**	**n (%)**
Body mass index (kg/m²)	22.00 (±3.70)	Yes	153 (17.0)
Sex	**n (%)**	No	746 (83.0)
Female	750 (83.4)	**Department**	**n (%)**
Male	149 (16.6)	Emergency disaster management	99 (11.0)
Body mass index classification	**n (%)**	Midwifery	182 (20.2)
< 18.5 (Underweight)	115 (12.8)	Nursing	295 (32.8)
18.5 - 24.9 (Normal weight)	626 (69.5)	Nutrition and dietetics	104 (11.6)
25 - 29.9 (Overweight)	131 (14.6)	Physiotherapy and rehabilitation	219 (24.4)
> 30 (Obese)	27 (3.0)	**Grade**	**n (%)**
Smoking	**n (%)**	I	414 (46.1)
Yes	78(8.7)	II	200 (22.2)
No	821 (91.3)	III	185 (20.6)
		IV	100 (11.1)

SD: Standart Deviation

Table 2. Purpose of use and not to use mHealth apps

Purpose of use	n (%)	Purpose of not to use	n (%)
To track my physical activity level	143 (42.9)	I don't need an mHealth app	289 (37.6)
To maintain fitness	65 (19.5)	I want to use an mHealth app, but I have no idea which one to choose	228 (29.7)
To lose weight	59 (17.7)	I don't know how to access mHealth apps	153 (19.9)
To increase strength	37 (11.1)	I believe mHealth apps are useless	38 (4.9)
Other	29 (8.7)	Other	60 (7.8)

*Multiple answers can be selected

mHealth apps used

The mHealth apps used by the participants are shown in Table 3.

mHealth app usage duration, frequency and regularity

It was calculated that the participants used the mHealth app 4.3±2.49 days a week on average. Participants were asked how long they had been using an mHealth app; the most common answer was 1-3 years (30%). The most popular response regarding how regularly they use the mHealth app was "several times a week (33.2%)."

mHealth app recommendation, satisfaction, usefulness and motivation

The participants rated the usefulness and motivational capability of the mHealth app as 7.18±2.10 and 6.63±2.24 out of 10, respectively. Participants rated their satisfaction with the mHealth app as 7.44±2.03 out of 10. The participants were asked who recommended the mHealth app to them, and the most common answer was, "I searched and found it myself in the app market (65.9%)". 94.5% of the participants stated that they would recommend the mHealth app they use to someone else. The results are shown in Table 4.

Table 3. mHealth apps used

Name of mHealth app	n (%)	Name of mHealth app	n (%)
Pedometer	40 (14.29)	Women exercises	11 (3.90)
Samsung Health	36 (12.77)	Home exercises	9 (3.19)
E-pulse	27 (9.57)	30 days fit	7 (2.48)
Life fits home	24 (8.51)	Huawei health	6 (2.13)
Apple health	12 (4.26)	Weight loss for women	5 (1.77)
Mi fit	12 (4.26)	Fit 7 day	3 (1.06)
Nike training club	12 (4.26)	Fitify	3 (1.06)
Central physician appointment system	11 (3.90)	Other mHealth apps	54 (19.15)
Fat secret	11 (3.90)		

*Multiple answers can be selected

Table 4. mHealth app recommendation, satisfaction, usefulness and motivation

Who recommended the mHealth app to you	n (%)	Would you recommend the app to others	n (%)
I searched and found it myself in the app market	143 (65.9)	Yes	205 (94.5)
I saw it recommended on a website	32 (14.7)	No	12 (5.5)
A friend recommended it	28 (12.9)		**mean (±SD)**
My doctor/physiotherapist recommended it	6 (2.8)	**Usefulness**	7.18±2.10 out of 10
Other	8 (3.7)	**Motivational capability**	6.63±2.24 out of 10
		Satisfaction	7.44±2.03 out of 10

Tracking and sharing the mHealth app data
The results are shown in Table 5.

Aspects they like and don't like
Participants were asked what they liked about the mHealth app they used; the most common answer was "data tracking (calorie, heart rate, step)". The most common response to the question "What aspects don't you like?" was the "paid app" feature. The results are shown in Table 6.

Table 5. Tracking and sharing mHealth app data

Tracking the mHealth app data	n (%)	Sharing the mHealth app data	n (%)
Yes	169 (77.9)	I share on social media	4 (1.8)
No	48 (22.1)	I send it to my friend/friends	49 (22.0)
		I send it to my physiotherapist/doctor	8 (3.6)
		I send it to my gym trainer	7 (3.1)
		I don't share	155 (69.5)

Table 6. Aspects of the mHealth app you use that you like and don't like

Aspects you like (most popular answers)	n (%)	Aspects you don't like (most popular answers)	n (%)
Data tracking (chlorine, heart rate, step)	77 (33.8)	Paid app	6 (2.8)
Motivational	20 (8.8)	Incorrect measurements	4 (1.8)
Simple/practical	10 (4.4)	Programs are not personalized	4 (1.8)
It helps organize my life	10 (4.4)	Insufficient notifications	3 (1.4)
Variety of exercises	10 (4.4)	Too many ads	3 (1.4)
Other	43 (18.9)	Other	17 (7.8)
None	58 (25.4)	None	180 (82.9)

Multiple answers can be selected

Other features they would like to have
Participants were asked what other features they would like to have in the mHealth application they use. The most common answer was "none" (74.7%), followed by "calorie calculator" (5.1%), "sending notification" (2.8%), "heart rate measurement" (1.8%), "drinking water reminder" (1.8%), and "nutrition information" (1.8%).

Source of access to health-related information
Participants were asked about their sources of access to health-related information. The most common answer was "internet" (43.7%), followed by "health professionals" (27.1%), "mobile apps" (27.1%) and "other" (2.0%).

DISCUSSION
Only 24.1% of participants in our study reported using an mHealth app. Considering the studies in the literature, this rate is relatively low. A study conducted with medical school students in India found that mHealth apps were used 59.1% of the time (Singh & Alva, 2019). Vonholtz et

al. (2015) stated that the use of mHealth apps among patients admitted to the emergency department is 44% (Vonholtz et al., 2015). Despite the widespread use of smartphones and mobile applications, the low usage of mHealth applications in our study is thought to be related to the sedentary nature of the population we examined, as only 17% of the participants exercise regularly. While mHealth apps encompass more than just exercise apps, the participants primarily chose "to track my physical activity level" as their reason for using an mHealth app. As a result, it is consistent that the use of mHealth apps is low in a population with low physical activity levels.

We determined that mHealth apps are mainly used for physical health purposes. The most common reason for not using them was "I don't need an mHealth app". Given the low physical activity level of the examined group, they might not feel the need to use any mHealth app. However, a significant number of participants answered, "I want to use an mHealth app, but I have no idea which mHealth app to use." These results indicate a need for information about which mHealth apps should be used and the importance of physical activity. Healthcare professionals (doctors/physiotherapists) can provide this information and guidance. The vast majority of the participants found the mHealth app they use themselves, with only a tiny proportion (2.8%) having an mHealth app recommended by a doctor/physiotherapist. Studies underscore the significance of healthcare professionals' acceptance of mHealth apps as integral components of healthcare services. Healthcare professionals are more inclined to endorse and recommend mHealth apps to their patients if they utilize them (Gagnon et al., 2016; Leigh et al., 2020). Furthermore, healthcare professionals are more likely to advocate for their patients' adoption of mobile health technologies if they engage with mHealth apps (Jabour et al., 2021). Healthcare professionals should emphasize the use of mHealth apps to increase society's physical activity level and enable people to exercise in any environment. Because mHealth apps are an effective way for people to access and increase their physical activity levels, exercise should be done under professional supervision to avoid injuries. Therefore, an mHealth app must first pass a professional inspection.

Participants rated the usefulness, motivational capability, and satisfaction with the mHealth app they use as 7.18, 6.63 and 7.44 out of 10, respectively. These scores are relatively low. This may be because people need help choosing the most suitable mHealth app. The mobile health field is still developing and in its early stages. More scientific evidence about current mHealth apps needs to be provided, and existing apps should be reviewed by experts. Users' satisfaction will increase with

more studies in mobile health and the recommendation of the most suitable app according to the needs of the person after the mHealth apps have passed expert supervision. The two apps the participants used the most were Pedometer and Samsung Health. People often use mHealth apps to track their physical activities. mHealth apps also enable individuals to communicate with health professionals and institutions. Similarly, health institutions can follow up with their patients through mHealth apps (Güler & Eby, 2015). In this study, the 3rd and 4th most used apps enable communication with health institutions. These apps include health services provided to the citizens by the Turkish government. The e-pulse app in third place allows people to access all their health records, including laboratory tests, radiology images, hospital visits, and appointment histories, and share these records. The Life Fits Home app in fourth place shows citizens their risk of COVID-19 (Kopmaz & Arslanoğlu, 2018).

Vonholtz et al. (2015), in their study with patients admitted to the emergency department, reported that 59% of the patients share their app data, 29% share their data with their social networks, and a lesser number share it with health professionals (Vonholtz et al., 2015). In our study, most participants (69.5%) reported that they did not share their health-related data, while 22.0% shared their data with their friends, and very few participants shared it with a health professional. Directing people about mobile health and encouraging more data sharing with health professionals will contribute to improvement. It has been suggested that doctors are unfamiliar with mHealth apps and, therefore, do not recommend them to their patients (Steinhubl et al., 2013). Due to the lack of rigorous evaluation for many apps, physicians may hesitate to recommend their usage to patients, citing the absence of scientific data (Powell et al., 2014; Steinhubl et al., 2013).

Participants most liked the mHealth app's features such as data tracking, motivation, and simplicity. However, they also stated that they wanted their applications to include features such as calorie calculation and notification sending. Professionals should consider these features when choosing the most suitable mHealth app for individuals. In addition, mHealth app developers should keep in mind that people like applications with these features.

One limitation of the present study is that it was conducted in only one center, so our results cannot be generalized to the entire population. The second limitation is that it is a cross-sectional study. Participants' preferences may change over time.

Using mHealth apps is uncommon among students of Tokat Gaziosmanpaşa University, Faculty of Health Sciences. Our study revealed that mHealth apps are mainly used to track physical activity levels among students. mHealth apps are effective and low-cost options for increasing people's physical activity, and efforts should be made to expand their use.

Ethics Approval
The study was approved by Tokat Gaziosmanpaşa University Clinical Researches Ethics Committee (Date: 18.02.2021, Number: 83116987-228).

Authorship Contributions
Conceptualization: EE, FD; Methodology: EE, ZA, AG, FD; Formal Analysis: EE; Data collection: EE, NY, ZA, AG; Writing-original draft preparation: EE, NY; Writing-review and editing: NY, ZA, AG, FD; Supervision: FD.

Conflict of Interest
No conflict of interest was declared by the authors.

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