H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
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Özgün Araştırma

Genç Bireylerin Mobil Sağlık Uygulamaları Kullanımı, Fiziksel Aktivite ve Sağlık Algısı Düzeyinin İncelenmesi

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Özet

Amaç: Mobil sağlık uygulamalarına olan ilgi günümüzde giderek artmaktadır. Bu çalışmada genç bireylerin mobil sağlık uygulamalarına yönelik tercihlerini, fiziksel aktivite düzeyini ve sağlık algısını incelemek amaçlandı.
Gereç ve Yöntem: Çalışma iki ayrı meslek yüksekokulunda öğrenim gören 283 öğrenci ile gerçekleştirildi. Katılımcıların mobil sağlık uygulama tercihlerine yönelik soruların yanı sıra Uluslararası Fiziksel Aktivite Anketi Kısa Formu ve Sağlık Algısı Ölçeği'ni yapmaları istendi. Veriler $p<0,05$ anlamlılık düzeyinde değerlendirildi.
Bulgular: Çalışma yaş ortalaması 20,6±2,01 yıl olan 283 katılımcı ile yürütüldü. Akıllı telefonunda sağlıkla ilgili uygulamaları kullanan katılımcıların sayısı 179'du (%63,3). Mobil sağlık uygulamalarını kullanmayan 104 kişinin %71,1'i uygulamaları düzenli kullanmayacağını düşündüğü için tercih etmediğini belirtti. On bir kişi ise mobil uygulamaların varlığından haberdar olmadığını ifade etti. Katılımcıların %41,9'u yaklaşık bir yıldır mobil sağlık uygulamalarını kullandığını belirtirken, en çok kullanılan uygulama adımsayarlar oldu (n=147). Mobil sağlık uygulamalarını kullanan bireylerin hem sağlık algısı hem de fiziksel aktivite puanları uygulamaları kullanmayanlardan yüksek bulundu (sırasıyla; $p=0,003$, $p<0,001$). Ayrıca fiziksel olarak aktif olan bireylerin sağlık algısı diğerlerinden yüksekti ($p=0,044$).
Sonuç: Halihazırda mobil sağlık uygulamalarının kullanımı hem sağlık algısı hem de fiziksel aktivite ile ilişkilidir. Ancak uygulamaların kullanımının sürekliliğine dair önemli eksiklikler vardır. Bu nedenle gerekli teşviğin ve motivasyonun sağlanması önem arz etmektedir.

Anahtar kelimeler: *Sağlığın geliştirilmesi, sağlık okuryazarlığı, mobil uygulamalar, fiziksel aktivite*

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H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

Orijinal Research

Investigation of Young People's Use of Mobile Health Apps, and Their Physical Activity and Health Perception Levels

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Abstract

Objectives: The interest in mobile health apps is increasing day by day. This study aimed to examine young people's preferences for mobile health apps, their physical activity levels, and health perceptions.
Materials and Methods: The study was conducted with 283 students from two vocational schools of higher education. Participants were asked to complete the International Physical Activity Questionnaire Short Form and the Perception of Health Scale, as well as questions about their mobile health application preferences. The data were evaluated at $p<0.05$ significance level.
Results: The study was conducted with 283 participants with a mean age of 20.6±2 years. The number of participants using health-related apps on their smartphones was 179 (63.3%). Of the 104 participants who did not use mobile health apps, 71.1% reported that they did not prefer them because they thought they would not use them regularly. 11 participants did not know about mobile apps. 41.9% had been using mobile health apps for about one year, and the most used app was pedometers (n=147). Both health perceptions and physical activity scores of individuals who used mobile health apps were higher than those who did not (respectively; $p=0.003$, $p<0.001$), and the health perception of physically active individuals was higher than the others ($p=0.044$).
Conclusion: Currently, the use of mobile health applications is associated with both health perception and physical activity. However, constant use of the apps cannot be ensured. Therefore, it is important to provide the necessary promotion and motivation to people.

Keywords: *Promotion of health, Health literacy, Mobile applications, Physical activity*

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H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

Introduction

Mobile health apps were first designed in the 1960s to monitor the health status of astronauts in space. Today, these apps have gained more popularity with the widespread use of smartphones (Bhuyan et al., 2016). Popularity of these apps is evidenced by a large number of mobile health apps that can be downloaded to smartphones (Ferrara et al., 2019). Commonly used mobile health apps include pedometers, heart rate monitors, calorie counters, diet apps, and exercise apps (Seto et al., 2012). Through these apps, relevant data are passively collected, and thus inferences are made about the mental and physical health of individuals (Trifan et al., 2020).

Mobile health apps can be roughly divided into 2 categories. Those designed for disease management and those that support behavioral changes in health. Mobile health apps that encourage physical activity are considered in the category of apps that support behavioral changes (Ndayizigamiye et al., 2020). So these apps might create behavioral changes in individuals, increase activity levels, reduce negative health-related habits, and contribute to achieving a healthy life. Mobile health apps can also increase people's perceptions of their health (Bhuyan et al., 2016; Burke et al., 2012). Having and maintaining healthy life behaviors such as balanced nutrition, adequate and regular exercise, not smoking, and good social communication are directly related to health perceptions (Khorshid and Efteli, 2016; Agacdiken et al., 2017; Gomleksiz et al., 2020). Unhealthy life behaviors such as smoking/alcohol consumption or lack of regular physical activity, on the other hand, reduce health perception and increase the risk of developing many diseases among young people (Marques et al., 2020; Pradal-Cana et al., 2020). The use of mobile health apps that could encourage physical activity or exercise might be useful in preventing diseases (Pradal-Cana et al., 2020). Therefore, this study was conducted to examine which mobile health apps that support behavioral changes young people prefer, how often they use them, and their physical activity and health perception levels.

Material and Methods

Study design and participants

Ethics committee approval was obtained from Ordu University Clinical Research Ethics Committee on 06.05.2022 with decision number 2022/129. Written informed consent was obtained prior to participation in the questionnaires.

The population consisted of a total of 350 students studying at Trabzon University Tonya Vocational School of Health Care Services and Giresun University Vocational School

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

of Health Services, Therapy and Rehabilitation Departments in the spring semester of 2021-2022. In this descriptive study, it was aimed to reach the entire population without a sample selection.

The data were collected between May 2022 and July 2022. At the beginning of the study, the mobile health applications used by the participants were questioned. Daily usage times and frequencies of mobile health services were recorded. In addition, the health perception of the participants was measured with the Perception of Health Scale (PHS) and their physical activity levels were measured with the International Physical Activity Questionnaire short form (IPAQ) (Kadıoğlu and Yıldız, 2012; Sağlam et al., 2010). All questionnaires were asked to the participants through face-to-face interviews.

The perception of health scale

The PHS, developed by Diamond et al. (2007), is a 5-point Likert-type scale with 15 items. Each item is scored between one and five points. Items with negative expressions are reverse scored and included in the calculation. The total score to be obtained from the scale is between 15 and 75, and high scores indicate a good perception of health (Diamond et al., 2007). The Turkish version of the scale was conducted in 2012. The Cronbach Alpha coefficient of the scale was reported as 0.77 in the study. In the factor analysis, it was stated that the items of the scale explained 53.21% of the total variance. (Kadıoglu and Yildiz, 2012).

The international physical activity questionnaire short form

The IPAQ is a standardized instrument to measure health-related physical activity. The scale includes questions about the time individuals spent on physical activity in the last week. The IPAQ takes into account physical activities lasting at least 10 minutes during the day. According to the total physical activity score calculated from the scale, including seven questions and four sections, the physical activity levels of individuals are classified as “low, moderate, and high” (Craig et al., 2003; Saglam et al., 2010). The application time of the scale is 4 minutes on average.

Statistical Analysis

IBM SPSS 23.0 program was used for data analysis. To present descriptive statistics, percentages and frequency values were calculated for categorical variables. Mean and standard deviation values were given for continuous variables. Accordingly, an independent t-test or ANOVA was used for normally distributed data, and the Mann-Whitney U test or Kruskal Wallis test was used for not normally distributed data. Independent t-test test was used to test whether there was a statistically significant difference between two independent groups, and ANOVA was used to test whether there was a statistically significant difference between more

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

than two groups. Mann-Whitney U test was used to test whether there was a statistically significant difference between the two dependent groups, and Kruskal Wallis was used to test whether there was a statistically significant difference between more than two groups. The significance level was considered $p<0.05$.

Results

Individuals who did not attend the education program (n=33) were excluded from the study. Of the remaining 317 students, 34 refused to participate, so the study was completed with 283 students. Accordingly, the rate of participation in the research was calculated as 89.2%. The mean age of participants was 20.6±2 years, and 71% were female. The average age of individuals using mobile health applications was similar to non-users (respectively 20.7±2, 20.5±1.9). Most of the female participants (n=140) were using mobile health applications. In contrast, 60 women did not use the apps. In male participants, the number of mobile health apps users and non-users were close to each other (n=39, n=43, respectively). More than half of the participants (n=179, 63.3%) used health apps on their smartphones. Among the 104 participants, the rate of those who did not prefer health applications because they thought that they would not use them regularly was 71.1%. The rate of those who were unaware of mobile health applications was 10.6% (n=11). In addition, 34.6% of the participants were using mobile health applications 3 days a week and 41.9% for about a year (Table 1).

99.4 % of the users of health apps found them useful. The average total score on the IPAQ scale was 3526.46±2814.34, and the average total score of the PHS was 53.60±8.04. Based on these total scores, it was concluded that the participants were physically active, and their health perceptions were relatively high (Table 1).

According to Figure 1, the 3 most frequently used health apps on smartphones are pedometers (n=147), menstrual period tracking (n=61), and fitness exercises (n=56). The 3 least used apps are medication tracking (n=11), diet/weight loss application (n=29), and sleep pattern tracking (n=30).

According to Table 2, participants whose daily mobile phone usage time is less than four hours have higher physical activity levels. Participants who use health-related apps on their mobile phones have higher physical activity levels than those who do not. The physical activity level of those who use mobile health apps every day of the week is higher than those who use apps one day or three days a week or a few times a month.

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

Table 1. Descriptive characteristics of the participants.

	N	**%**
Categorical Variables		
Gender		
Female	201	71
Male	82	29
How much time do you spend on your mobile phone?		
Less than 4 hours	68	24
More than 4 hours	215	76
Do you use health apps on your mobile phone?		
Yes (female-male)	179 (140-39)	63.3 (78.2-21.8)
No (female-male)	104 (61-43)	36.7 (58.6-41.4)
Why don't you use health apps?		
I don't think I will use them regularly	74	71.1
I don't find them useful	13	12.5
I do not trust the accuracy of the information	6	5.8
I don't know about mobile health apps	11	10.6
How often do you use mobile health apps?		
1 day a week	49	27.4
3 days a week	62	34.6
Every day of the week	31	17.3
Several times a month	37	20.7
How long have you been using mobile health apps?		
About 1 year	75	41.9
1-2 years	64	35.8
3 years and longer	40	22.3
Do you think the apps you use are useful?		
Yes	178	99.4
No	1	0.6
Have the apps had a positive impact on your health?		
Yes	172	96.1
No	7	3.9
Continuous Variables		
	Mean±SD	**Min-max.**
Age (total)	20.6±2	18-40
Age (using mobil app)	20.7±2	18-40
Age (not using mobil app)	20.5±1.9	18-36
PHS total point	53.60±8.04	25-75
IPAQ total point	3526.46±2814.34	0-15144

PHS: Perception of Health Scale; **IPAQ:** The International Physical Activity Questionnaire

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

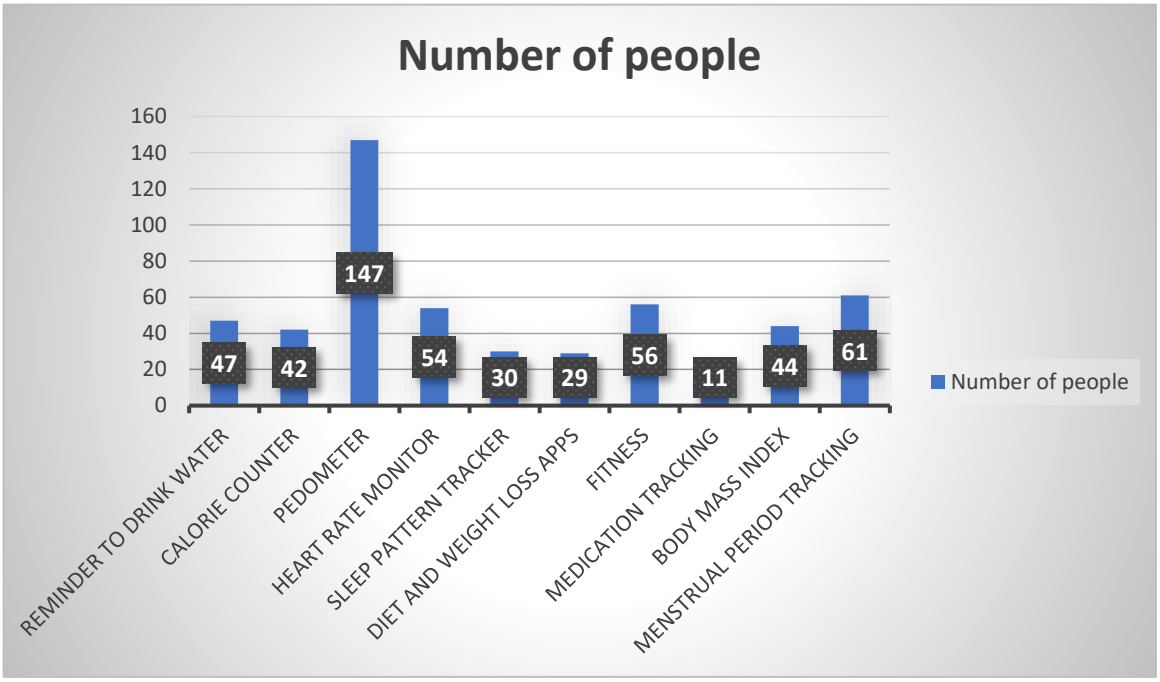

Figure 1. Distribution of the use of health-related apps (more than one option marked).

The participants were grouped according to the reasons for not using health apps, and no significant difference was found between the physical activity levels (p= 0.241). However, in the comparison between groups, the median physical activity level score of individuals who stated that they did not use health apps because they did not trust the accuracy of the information was found to be higher. There was no difference in physical activity scores between those who had been using mobile health apps for at least one year, 1-2 years, or 3 years or more (p=0.590). However, the median physical activity score was higher in the group using health apps for three years or more (Table 2).

Table 3 shows that health perception was found to be higher in individuals who used health apps on their phones (p=0.003). Apart from this, no significant difference was found between the groups in terms of health perception according to the daily mobile phone usage time (p=0.125), the reason for not using health apps (p= 0.765), frequency (p=0.866) or duration of use of mobile health apps (p=0.069).

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

Table 2. Physical activity status of participants according to their descriptive characteristics.

	n	**IPAQ**	
		Median (Min-Max)	**Statistics U/KW**
How much time do you spend on your mobile phone?			
Less than 4 hours	68	3286.5 (0-13860)	U=5648
More than 4 hours	215	2772 (0-15144)	**p=0.005***
Do you use health apps on your mobile phone?			
Yes	179	3300 (248-15144)	U=5617.5
No	104	1470 (0-13224)	**p=0.000***
Why don't you use health apps?			
I don't think I will use it regularly	74	1506 (0-13173)	
I don't think it will be useful to me	13	1080 (0-9492)	KW
I do not trust the accuracy of the information	6	5253 (798-12264)	p= 0.241
I don't know about mobile health apps	11	792 0-13224)	
How often do you use mobile health apps?			KW
A few times a month[a]	37	2772 (297-13860)	**p=0.013***
1 day a week[b]	49	2852 (248-8316)	**P^{b-c}=0.026***
3 days a week[c]	62	4059 (537-15144)	**P^{b-d}=0.009***
Every day of the week[d]	31	4158 (438-8718)	P^{b-a}=0.721
			P^{c-d}=0.651
			P^{c-a}=0.039*
			P^{d-a}=0.016*
How long have you been using mobile health apps?			KW
About 1 year	75	3306 (330-13860)	p=0.590
1-2 years	64	3045 (248-15144)	
3 years and above	40	3457.5 (438-9012)	
Do you think the apps you use are useful?			
Yes	178		
No.	1	3303 (248-15144)	U=52.000
		2376 (2376-2376)	p=0.474
Have the apps had a positive impact on your health?			
Yes	172	3303 (248-15144)	U=564.5
No	7	2970 (594-8370)	p=0.780

U: Mann Whitney U KW: Kruskal Wallis * p<0.05

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

Table 3. Health perceptions of participants according to their descriptive characteristics.

		Perception of Health Scale	
	n	**Mean± Standard deviation**	**Statistics t/F/KW**
How much time do you spend on your mobile phone?	68	54.91±7.02	t=1.541
Less than 4 hours	215	53.19±8.31	p=0.125
More than 4 hours			
Do you use health apps on your mobile phone?	179	54.69±7.87	t=3.044
Yes	104	51.72±8.04	**p=0.003***
No			
Why don't you use health apps?			
I don't think I will use it regularly	74	51.52±7.25	F=0.384
I don't think it will be useful to me	13	53.69±8.75	p= 0.765
I do not trust the accuracy of the information	6	52.33±6.12	
I don't know about mobile health apps	11	50.36±12.80	
How long have you been using mobile health apps?	75		
About 1 year	64	54.37±8.22	F=0.144
1-2 years	40	55.09±7.51	p=0.866
3 years and above		54.67±7.91	
		Median (min-max)	**KW**
How often do you use mobile health apps?			
1 day a week	49	53 (41-68)	
3 days a week	62	56.5 (41-73)	p=0.069
Every day of the week	31	54 (25-67)	
A few times a month	37	54 (41-73)	

t: Independent samples t-test, F: ANOVA, KW: Kruskal Wallis, *p<0.05

The participants were classified according to their physical activity scores, and a significant difference was found between the groups in terms of health perception (p=0.044). Accordingly, those with an IPAQ total score of 3000 and above and a high physical activity level had higher health perception (Table 4).

Table 4. Participants' perception of health according to IPAQ scores.

IPAQ scores		**Perception of Health Scale**	
	n	**Mean±Standard Deviation**	**Statistics (Welch)**
Less than 600 (low physical activity)[b]	28	50.53 ± 10.66	Levene test= 0.004
600-3000 (moderate)[c]	128	53.03 ± 8.29	F^{a}=3.262
3000 and above (high)[d]	127	54.85 ± 6.88	**p^{a}=0.044***
			p^{b-c}=0.251
			p^{b-d} =0.049
			p^{c-d}=0.059

IPAQ: International physical activity Questionnaire, *p<0.05

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

Discussion

This study, which examined the views of young adults on mobile health apps, showed that approximately 6 out of 10 people (63.3%) use mobile health apps on their smartphones. In a study conducted in Turkey in 2018, the rate of use of mobile health apps among university students was found to be 34.2% (Guner et al., 2018). The rate of use of mobile health apps by adults was reported to be 36% in a 2016 study conducted in the USA (Bhuyan et al., 2016). In 2021, another study conducted on medical students in Malaysia showed that 76.3% of students used mobile health apps related to health and fitness (Jembai et al., 2022). The reason why mobile health apps have been used more frequently in recent years is that home-based exercises are preferred during the Covid-19 pandemic (Jembai et al., 2022; Ratanawong et al., 2022). Therefore, the gradual development of technology and the implementation of policies for remote health services, especially after covid 19, may have increased the use of mobile health applications on smartphones.

Approximately 50% of the participants stated that they used mobile health apps at least 3 days a week or every day. However, the other half of the participants did not use these apps actively enough. Although mobile health apps are preferred, the constant use of apps cannot be ensured. Similarly, a study conducted in 2017 revealed that mobile health apps were followed by 73.9% of the participants during the first 100 days but decreased to 16% after 320 days. Therefore, it was emphasized that more attention should be paid to the technical and user experience aspects of the apps (Hermsen et al., 2017). In this study, most users had been using mobile health apps for one year. Considering that one year is a relatively short period, interventions are important for those to adopt the use of mobile health apps as a form of behavior. In the study, almost all the individuals who used mobile health apps found them useful. Applications increase the awareness of the participants and provide benefits such as taking more steps during the day and drinking water more often. Therefore, with appropriate guidance, the frequency of mobile app use can be increased.

Among mobile health apps that support behavior change, pedometers are the most used application. It was preferred by 82% (n=147) of the participants who used mobile health apps. Pedometers can collect and store information about daily physical activity and may even be effective in the strategy of encouraging and motivating individuals to increase the number of daily steps (Hernandez-Reyes et al., 2020). The finding that the physical activity score was significantly higher in those using mobile health apps in the study supports this finding. Physical activity scores were found to be higher in individuals who used mobile health apps more frequently and whose daily mobile phone usage time was less than four hours. It was

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

reported that daily smartphone use of more than four hours is regarded as smartphone addiction (Jung et al., 2016). From this point of view, it is concluded that the physical activity level is lower in participants with smartphone addiction (those who used smartphones for more than four hours daily). While mobile apps have positive effects on human health, excessive use of smartphones can negatively affect health. Therefore, young people should be guided to ensure the appropriate use of smartphones.

In the study, no difference was found between physical activity levels according to the year of use of mobile health applications, which may be attributed to the lack of constant use of these applications. Apart from this, no difference was found between physical activity scores according to the reason for not using mobile health apps. However, physical activity scores of those who do not use mobile health apps are higher than other groups because they do not trust the accuracy of the information. Therefore, it can be concluded that more attempts should be made to increase people's trust in these practices and to encourage them. Indeed, in a systematic review conducted in 2020, it was reported that mobile applications were effective in increasing physical activity in 13 of 14 studies. However, it has been stated that longer-term studies with larger samples are needed to confirm the effectiveness of mobile health applications in increasing physical activity (Pradal Cano et al., 2020).

On the other hand, the health perception of the participants was examined in the study. Health perception was found to be significantly higher in using mobile health apps. In addition, it was observed that the perception of health was higher in the participants who were more physically active. In support of these results, a study conducted in 2021 reported that mobile health apps made a significant contribution to developing positive health behaviors (Donmez, 2021). The effect of other factors on health perception could not be demonstrated in this study. However, the average health perception score was found to be higher in those who used mobile phones less than four hours per day, who did not think that health apps would be beneficial, and who had been using mobile health apps for 1-2 years.

Conclusion

As a result, the use of mobile health applications is related to both health perception and physical activity level. In this respect, mobile health apps are expected to be complementary in many areas where traditional health services are not sufficient. One of the most significant points for the more effective use of mobile health apps in the development of health is to ensure the constant use of apps, so the necessary promotions and motivation resources should be applied.

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

Limitation

In this study, the rate of individuals benefiting from mobile health services was found to be around 60%. However, the research was conducted on participants who were receiving health education. Therefore, the awareness levels of the participants about health practices may have been found to be higher than the general population. This situation can be considered as a limitation of the study. In addition, the physical activity and health perception levels of the participants before they started using mobile applications are not known. Therefore, it is recommended to repeat the study on different groups and larger samples.

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Conflict of interest

The authors declare no conflicts of interest.

H.Ü. Sağlık Bilimleri Fakültesi Dergisi
Cilt:10, Sayı:3, 2023
Doi:10.21020/husbfd.1215037

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