

# Comparison of Motivation to Participate in Physical Activity between Individuals with and without Smartwatch Use

MUHAMMET İRFAN KURUDİREK<sup>1</sup>, MUHARREM ALPARSLAN KURUDİREK<sup>2</sup>, GÜL EDA BURMAOĞLU<sup>3</sup>, MURAT ALI BİNDESEN<sup>4</sup>

<sup>1</sup>Artvin Çoruh University, School of Physical Education and Sports

<sup>2</sup>Ataturk University, Faculty of Sports Sciences

<sup>3</sup>Ataturk University, Faculty of Sports Sciences

<sup>4</sup>Ataturk University, Faculty of Sports Sciences

Correspondence to: Muhammet Irfan Kurudirek, Email. [irfan.kurudirek@gmail.com](mailto:irfan.kurudirek@gmail.com), Cell: +905342343274

## ABSTRACT

This study aimed to determine and compare the motivations of individuals using and not using smartwatches with the physical activity tracking feature to engage in physical activity. Of the 311 individuals who were contacted on social media platforms and volunteered to participate in the study, randomly selected 100 individuals, half using smartwatches and half not using smartwatches, were included in the sample. As data collection tools, a personal information form prepared by the researchers was used to determine the personal characteristics of the participants, and the fitness/energy release and action/activity status subscales of the Participation Motivation Questionnaire (PMQ), developed by Gill et al. in 1983 and adapted to Turkish by Oyar et al. in 2001, was administered to measure the participants' level of engaging in physical activity. The data obtained from the data collection tools were subjected to statistical analyses using SPSS v. 26 software. Parametrical statistics were used in line with the results of the data normality test. According to the research findings, the participants who used smartwatches had a significantly higher score in the fitness/energy release subscale of PMQ ( $\bar{x}2.14\pm.466$ ) compared to those that did not use smartwatches ( $\bar{x}1.79\pm.351$ ) ( $p=.036$ ). According to the point-biserial correlation analysis, there was a statistically significant, positive, and strong correlation between using smartwatches and motivation to participate in sports for the fitness/energy release subscale ( $r_{pb}=.694$ ,  $p<.001$ ).

**Keywords:** Smartwatch, Physical Activity, Motivation

## INTRODUCTION

Smartwatches, which have recently become available in many different brands and models, belong to the category of wearable technological products. Depending on the brand and model, smartwatches can detect and record the physical condition of a person, such as location change, movement direction, or movement speed through their integrated sensors.<sup>1</sup> Studies have investigated the ability of these devices to detect lying down, standing, running, and walking actions. As a result of tests performed, an accuracy of over 99% was obtained in the estimation of these four activities.<sup>2</sup> On the other hand, hardware, such as a pulse sensor and an oxygen saturation sensor allow the smartwatch to collect data about the basic physiological parameters of an individual. When these hardware features of smartwatches are coupled with appropriate software, individuals' movement status and their body reaction to movement can be detected, and therefore training applications suitable for these two variables can be designed. Some smartwatches also offer their users special training suggestions for many sports branches. Another important function of smartwatches is to process the details of training a user engages in and inform and guide them accordingly. Smartwatch users can examine various activity-related data, such as the amount of energy they spent during their training, distance they covered, and their speed, heart rate and oxygen saturation, allowing them to analyze their fitness activity and status.

Physical activity can be defined as an irreplaceable tool in dealing with the most serious health problems of our age. In a report published in 2021, the World Health Organization described cardiovascular diseases as the most common cause of death worldwide.<sup>3</sup> There are also

many scientific studies showing that physical activity reduces the risk of cardiovascular diseases.<sup>4,5,6</sup> It is essential for individuals to participate in physical activity to reduce their risk of fatal diseases and become healthier. Being healthy, which is an important source of motivation at the point of participation in physical activity, has a motivating power to the extent that it can be perceived by the individual. In other words, the more the individual realizes the positive effect of physical activity on their health, the higher their motivation to continue engaging in physical activity increases.

Concerning physical activity, smartwatches can be considered as a motivating element in participation in physical activity due to their functions of creating, recording, and processing data and presenting them to users. Aim of this study is determine and compare the motivations of individuals using and not using smartwatches with the physical activity tracking feature to engage in physical activity.

## MATERIAL AND METHODS

**Study Model:** This study was based on a relational screening model.

**Study Population and Sample:** The population of the research consisted of individuals aged 25-35 years who used and did not use smartwatches and had social media accounts in Turkey. The sample comprised 100 individuals, half using smartwatches and half not using smartwatches, randomly selected from 311 people who participated in the research voluntarily by responding to the invitation made on the social media platform. Therefore, the stratification criterion applied in the determination of the sample group was the age range and partially the use of smartwatches.

Data Collection: Data were obtained by the researchers by reaching the participants online between March and May 2021.

Data Collection Tools: As data collection tools, a personal information form prepared by the researchers was used to determine the personal characteristics of the participants, and fitness/energy release and action/activity status subscales of the Participation Motivation Questionnaire (PMQ), developed by Gill et al. in 1983 and adapted to Turkish by Oyar et al. in 2001, was administered to measure motivation levels concerning participation in physical activity. <sup>7,8</sup>

Data Analysis: The data obtained from the data collection tools were subjected to statistical analyses using SPSS v. 26 software. Parametrical statistics were used in line with the results of the data normality test.

## RESULTS

Most of the participants were aged 26 to 30 years and had an associate degree or higher education level (Table 1). As part of the research methodology, half of the participants used smartwatches. It was determined that the majority of the participants in this group had been using smartwatches for more than six months.

Table 1: Demographic Data of the Participants

		n	%
Age	26-30	66	66
	31-35	34	34
Smartwatch use	User	50	50
	Non-user	50	50
Duration of smartwatch use	Less than 3 months	11	22
	3-6 months	14	28
	More than 6 months	25	50
Educational level	High school and below	22	22
	Associate degree and above	78	78
Total		100	100

Table 2 shows that the participants' mean scores in the fitness/energy release and action/activity status subscales of PMQ were at a moderate level.

Table 2. Participants' Mean Scores in the Subscales of PMQ

	N	Min	Max	X ± SD
PMQ-fitness/energy release	100	1.00	3.00	1.96 ± .385
PMQ-action/activity status				1.71 ± .340

PMQ, Participation Motivation Questionnaire; SD, standard deviation

Table 3 presents the comparison of the participants' mean scores in the subscales of PMQ according to age. There was no statistically significant difference between the age groups in relation to the participants' scores in the fitness/energy release and action/activity status subscales of PMQ. However, the participants aged 31-35 years had a higher mean score in the fitness/energy subscale of PMQ, while those aged 26-30 years had a higher mean score in the action/activity status subscale.

Table 3. Comparison of the Participants' Mean Scores in the Subscales of PMQ according to Age Groups

Subscale	Age	N	X ± SD	t	p
PMQ-fitness/energy release	26-30	66	1.82 ± .290	-.516	.244
	31-35	34	2.01 ± .305		
PMQ-action/activity status	26-30	66	1.98 ± .300	-.552	.298
	31-35	34	1.77 ± .279		

PMQ, Participation Motivation Questionnaire; SD, standard deviation

A statistically significant difference was observed between the smartwatch users and non-users in terms of the fitness/energy release subscale scores of the participants (Table 4). The participants using smartwatches had a statistically significantly higher mean score in this subscale ( $\bar{x}2.14 \pm .466$ ) compared to those not using smartwatches ( $\bar{x}1.79 \pm .351$ ) ( $p = .036$ ). For the action/activity status subscale, there was no statistically significant difference between the smartwatch users and non-users, but the former had a higher mean score.

Table 4. Comparison of the Participants' Mean Scores in the Subscales of PMQ according to Smartwatch Use

PMQ subscale	Smartwatch use	N	X ± SD	t	p
Fitness/energy release	User	50	2.14 ± .466	-8.99	.036*
	Non-user	50	1.79 ± .351		
Action/activity status	User	50	1.84 ± .378	-4.99	.325
	Non-user	50	1.76 ± .346		

PMQ, Participation Motivation Questionnaire; SD, standard deviation

Table 5 shows the comparison of the participants' mean scores in the subscales of PMQ according to educational level. There was no statistically significant difference between the educational groups in terms of the mean scores of the participants in the fitness/energy release and action/activity status subscales. However, the participants with an associate degree or higher education level had higher mean scores in both subscales compared to those with a lower educational level.

The action/activity status subscale scores of the smartwatch users statistically significantly differed according to their duration of smartwatch use (Table 6). Table 7 presents the results of multiple comparisons performed to determine the groups that resulted in significant differences. Accordingly, the participants using smartwatches for three to six months had statistically significantly higher mean score in the action/activity status subscale ( $\bar{x}2.14 \pm .347$ ) compared to those using these devices for less than three months ( $\bar{x}1.74 \pm .288$ ).

Table 6. Comparison of the Smartwatch Users' Mean Scores in the Subscales of PMQ according to the Duration of Smartwatch Use

PMQ subscale	Duration of smartwatch use	N	X ± SD	f	p
Fitness/energy release	Less than 3 months	11	1.82 ± .305	.996	.094
	3-6 months	14	2.06 ± .322		
	More than 6 months	25	2.01 ± .314		
Action/activity status	Less than 3 months	11	1.74 ± .288	1.011	.027*
	3-6 months	14	2.14 ± .347		
	More than 6 months	25	2.12 ± .339		

PMQ, Participation Motivation Questionnaire; SD, standard deviation

Table 7. Multiple Comparisons of the Action/Activity Status Subscale Scores according to Duration of Smartwatch Use

Comparison		Mean score difference	Significance
Less than 3 months	3-6 months	.869	.040*
	More than 6 months	.036	1.000

Table 8 presents the results of point-biserial correlation analysis between smartwatch use and PMQ subscale scores. There was a statistically significant, positive and strong correlation relationship between using a smartwatch and motivation to participate in sports for the fitness/energy release subscale ( $r_{pb} = .694, p < .001$ ).

Table 8. Results of the Point-biserial Correlation Analysis between Smartwatch Use and PMQ Subscale Scores

Smartwatch use	PMQ-fitness/energy release	PMQ-action/activity status
	.694**	.203

## DISCUSSION

According to the Wearable Technology Research<sup>9</sup>, 52% of consumers stated that they had heard of tools such as smart glasses, smartwatches and wearable fitness trackers<sup>10</sup> (cited by Karamehmet, B.)

This study, conducted to determine and compare the motivations of individuals who used and did not use smartwatches with the physical activity tracking feature to engage in physical activity, reached the following results:

The participants' mean scores in the fitness/energy release and action/activity status subscales of PMQ were at a moderate level. There was no statistically significant difference in the participants' mean scores in either subscale according to age groups. However, the participants aged 31-35 years had a higher mean score in the fitness/energy release subscale of PMQ, while those aged 26-30 years had a higher mean score in the action/activity status subscale of PMQ.

According to the results of the study, a statistically significant difference was found between the smartwatch users and non-users in relation to their mean scores in the fitness/energy release subscale of PMQ. The participants using smartwatches had a statistically significantly higher mean score in this subscale ( $\bar{x}2.14 \pm .466$ ) compared to those that did not use these devices ( $\bar{x}1.79 \pm .351$ ) ( $p = .036$ ). For the action/activity status subscale, there was no statistically significant difference between the smartwatch users and non-users, but the former was found to have a higher mean score.

We determined that the participants' mean scores in the fitness/energy release subscales of PMQ did not statistically significantly differ according to their educational level. However, the participants with an associate degree or higher education level had higher mean scores in both subscales.

Our results indicated a statistically significant difference in the action/activity status subscale score of the participants using smartwatches according to their duration of smartwatch use. The multiple comparisons revealed that the participants who used smartwatches for three to six months had a statistically significantly higher mean score in

the action/activity status subscale of PMQ compared to those using these devices for less than three months.

According to the results of our point-biserial correlation analysis, there was a statistically significant, positive and strong correlation relationship between using a smartwatch and motivation to participate in sports for the fitness/energy release subscale of PMQ.

Nielsen (2014) listed the most important features of wearable technology users as functionality (81%) and comfort (79%) for smartwatch users and accuracy (70%) and battery life (64%) for fitness band owners. The durability of wearables is also critical for smartwatches (82%) and fitness bands (73%) owners. These findings indicate that smartwatch users are conscious about physical activity.

## CONCLUSION

In conclusion, notifications and reminders sent by smartwatches related to physical activity at regular intervals affect people's motivation to engage in such activity. Considering that there are only very few studies on the relationship of wearable technological devices with physical activity in the relevant literature, the current study is important in terms of revealing that smartwatch use can affect physical activity behaviors of individuals and motivate them to increase their activity, especially under the current conditions of the COVID-19 pandemic. Based on the findings obtained from this study, it is recommended that future research investigated summer and winter sportsmen, people with chronic diseases, and athletes who engage in corrective exercises after injury.

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