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# Effects of technological device usage time on body composition, physical activity level and physical activity participation motivation in young women

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**ABSTRACT**

This research was conducted to investigate the effect of technological device usage times on body composition, physical activity level and motivation to participate in physical activity in young women. The participant group of this study consists of 427 female students with an average age of 21.57 ± 2.59 studying at Van Yüzüncü Yıl University. In our study, height length (cm), body weight (kg), and body mass index (BMI) measurements were taken. Physical activity level was determined by pedometer, and the Participants' Physical Activity Participation Motivation Scale (PALMS) was applied. SPSS 23 package program was used to analyse the data. The average height of the subjects participating in the study was 1.63 ± 6.19 m, body weight was 56.34 ± 7.51 kg, BMI was 20.96 ± 2.63. The average hours of the group who are obese in television watching, and computer usage periods are higher. According to the BMI, there was no significant difference in the number of physical activity steps. When the physical activity level and the motivation to participate in physical activity were compared, there was no difference in the individual causes and causality sub-dimension, however, there was a significant difference in the environmental causes sub-dimension at $p < 0.05$ level. Again, a positive correlation was found between personal reasons and the duration of watching television, among the sub-dimensions of motivation to participate in physical activity. A negative correlation was found between smartphone usage time and physical activity level. While the time spent on the phone increases, the physical activity level decreases. As a result, it is thought that the use of technological devices has negative effects on body composition and physical activity level.

**Keywords:** Woman, body composition, physical activity.

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## INTRODUCTION

It is possible to see the different definitions regarding the concept of physical activity, which is indispensable for everyone. The first definition on this subject is that it is in the form of movements that occur with the help of skeletal muscles and cause energy expenditure in the body (Caspersen et al., 2000). When evaluated within the scope of the definitions, it is seen that almost every movement related to daily life can be handled within the scope of physical activity. In this context, evaluating all movements, such as running, walking, cycling, hand, arm and leg movements included in daily life, as physical activity will not be a wrong assessment (Bek, 2008). Physical activity is one of the sine qua non of any strategy aimed at dealing seriously with the problems associated with sedentary life and obesity in children and adults. Active life not only improves the physical and mental health of individuals but also contributes to social connectedness and well-being of society. Physical activity is not limited as sports activities and planned entertainment. Physical activity opportunities are everywhere where people live and work, in neighbourhoods, education and health institutions, in

short, everywhere. Physical activity is beneficial to health at any age. It is especially important for the healthy development of children and young people. Active aging can make important differences in the well-being of the elderly (Edwards and Thouros, 2006). Considering the literature, obesity has become one of the important problems that we face not only in developed countries but also in the world, starting in the last quarter of the 20th century. The same problem affects even the countries that were previously called poor. What worries us even more is that, as stated in many large national studies, the frequency of obesity in adults has increased (Saygın, 2012). Physical activity is important not only to improve physical health and prolong life, but also to prevent illness. However, lack of physical activity and improper diet is the widest secondary cause of death in America. Slentz et al. (2004) have found that regular physical activity reduces body fat in obese people. It is another fact that people cannot be disconnected from physical activities due to reasons such as getting away from negative thoughts, having fun, developing physical self, evaluating leisure time, developing healthy lifestyle behaviour, and desire to increase self-confidence. In this context, one of the factors that increase the effectiveness of the individual's purpose of participating in physical activity is motivation (Tekkurşun Demir, 2018).

Motivation is the power that mobilizes the person in line with their goals or objectives, and guides the person to achieve the goal or aim in the process of action. On the other hand, the motivation that enables the person to perform target behaviours due to their desires or needs also affects the emotional well-being after reaching the goal positively (Tekkurşun Demir, 2018).

Recent advances in digital technology have transformed the modern cellular/mobile telephone (cell phone) from a device once singular in function into a multi-function device with capabilities similar to an internet-connected computer. At almost anytime and anywhere, today's cell phones allow users to call, send and receive text messages, update social networking sites (e.g., Facebook, Twitter, and Instagram), stream videos and live events, play video games, and search the internet. Historically, these types of activities have been defined as sedentary behaviours (Rosenberg et al., 2010; Lepp et al., 2013).

## MATERIALS AND METHODS

This research was conducted to investigate the effect of technological device usage times on body composition, physical activity level and motivation to participate in physical activity in young women. The participant group of this study consists of 427 female students with an average age of 21.57 ± 2.59 studying at Van Yüzüncü Yıl University. In our study, height length (cm), body weight (kg), and Body Mass Index (BMI) measurements were taken.

### Length and body weight measurements

Body weight was measured with an electronic scale with an accuracy of 0.1 kg, while the length was measured with a digital height-measuring instrument with a precision of 0.01 cm.

### Body mass index

It was evaluated according to the body mass index. Body weight (kg) / Length (m) formula was used.

### Daily step count measurement

The protocol of the test applied with Pedometer device to determine the daily step count; Pedometer device was installed for a total of 2 days, a day on weekdays and the other day on weekends, for female university students. Pedometer devices are stuck in the time interval until the time when female university students wake up in the morning and sleep in the evening.

### Socio-demographic data

The questions such as television watching, computer and smartphone usage time were tried to be determined by a questionnaire developed by the researcher.

### Physical activity participation motivation scale

The Physical Activity Participation Motivation Scale was applied by its validity and reliability (Tekkurşun and Cicioğlu, 2018). According to Tekkurşun and Cicioğlu (2018), Physical Activity Participation Motivation Scale (PALMS) can be said to be a valid and reliable scale. The lowest score that can be obtained from the scale is 16, and the highest one is 80.

The fact that the participants got higher scores than the scale means that their motivation to participate in physical activity is positive. This questionnaire's items 1, 2, 3, 4, 5, 6 are individual, 7, 8, 9, 10, 11, 12 are environmental reasons but 13, 14, 15, 16 are the items without reasons. The measurement tool consisting of 16 items explains 54.69% of the total variance. In this context, the scores obtained by the participants from PALMS indicate that they have the motivation to participate in physical activity 1-16 very low, 17-32 low, 33-48 medium, 49- 64 high, 65-80 very high. Items 3, 9, 13, 14, 15 and 16 are reverse substances.

### Statistical analysis

SPSS 23 program was used to evaluate the data

obtained. Arithmetic mean and standard deviation values of individual properties were taken. Comparisons by BMI and physical activity level were made using one-way analysis of variance (ANOVA). In the event of differences in the results of ANOVA, Tukey HSD analysis was used to detect these differences. In addition, crosstab analysis and k-square analysis and percentile comparisons were made. Correlation analysis was applied to determine the relationship between the variables.

## FINDINGS

The average age of the subjects participating in the study was 21.57 ± 2.59 years, the average height 1.63 ± 6.19 m, body weight 56.34 ± 7.51 kg and the BMI 20.96 ± 2.63 (Table 1).

The television watching time of the subjects participating in the study was determined as 2.40 ± 0.68, computer usage time 1.83 ± 1.02 and smartphone usage time 3.47 ± 1.22 hours (Table 2). Technological device usage times in total were determined as 7.70 ± 0.97 hours.

Technological device usage times are evaluated according to BMI in Table 3. According to the analysis, no significant difference was found between television, computer and smartphone usage times and BMI. The obese group has higher average hours than others in terms of watching TV and using computer.

According to Table 4, 12.9% of the women participating in the research mostly and 38.4% stated that the use of technological devices sometimes prevents them from exercising. However, 48.7% stated that there was never any obstacle. According to the k-square analysis, there was no significant difference between the answers given.

There was no significant difference in the number of physical activity steps according to BMI in Table 5. However, it is seen that while obese individuals have less physical activity level, normal individuals have more than obese ones.

When the physical activity level and the motivation to participate in physical activity were compared in Table 6, although there was no difference in the individual causes and causelessness sub-dimension, there was a significant difference in the environmental causes sub-dimension at $p<0.05$ level. This difference arises from participants with bad-good and bad-normal physical activity levels.

According to Table 7, as the time of watching television increases, the BMI level also increases. Again, a positive correlation was found between individual causes and the duration of watching television, among the sub-dimensions of motivation to participate in physical activity. In addition, a relation was found between the causelessness sub-dimension and spending time of watching television, usage of computer and smartphone and participation barrier to do exercises. A negative correlation was found between smartphone usage time and physical activity level. While the time spent on the phone increases, the physical activity level decreases.

**Table 1.** Average of age, height, body weight and BMI of the participants.

| | Mean | SD |
|---|---|---|
| Age (year) | 21.57 | 2.59 |
| Height (m) | 1.63 | 6.19 |
| Body weight (kg) | 56.34 | 7.51 |
| BMI (kg/m$^2$) | 20.96 | 2.63 |

**Table 2.** Averages of participants' technological devices usage time.

| | Mean | SD |
|---|---|---|
| Watching TV (h) | 2.40 | 0.68 |
| Usage time of computer (h) | 1.83 | 1.02 |
| Usage time of smart phone (h) | 3.47 | 1.22 |
| Total (h) | 7.70 | 0.97 |

## RESULTS AND DISCUSSION

This research was conducted to investigate the effect of technological device usage times on body composition, physical activity level and motivation to participate in physical activity in young women.

Computer technology, which has a great role in today's technology age and technology society, affects daily life in many ways, especially with the developing internet technology. With the development of technology in our age, games played with phone-tablet, console, computer, namely digital games and the demand or desire to play these types of digital games cause toys and played traditional ones to be less preferred.

The digital natives, who are young people of today, grow in developing technology and thus keep up with the rapidly developing technology, causing them to be interested in technological tools instead of traditional games. This situation brings with it the interest in digital games (Tekkurşun and Bozkurt, 2019).

The average age of the subjects participating in the study was 21.57 ± 2.59 years, the average height 1.63 ± 6.19 m, body weight 56.34 ± 7.51 kg and the BMI 20.96 ± 2.63. The television watching time of the subjects participating in the study was determined as 2.40 ± 0.68, computer usage time 1.83 ± 1.02 and smartphone usage time 3.47 ± 1.22 hours. Technological device usage times in total were determined as 7.70 ± 0.97 hours.

When the technological device usage times were evaluated according to the BMI, according to the analysis, there was no significant difference between the

**Table 3.** Evaluation of technological device usage times according to BMI.

| Technological device usage time | BMI | N | Mean | SD | F | p |
|---|---|---|---|---|---|---|
| Watching TV (h) | Normal | 285 | 2.43 | .65 | 1.076 | 0.342 |
| | Medium-weight | 124 | 2.33 | .76 | | |
| | Obese | 18 | 2.47 | .73 | | |
| | Total | 427 | 2.40 | .68 | | |
| Usage time of computer (h) | Normal | 285 | 1.76 | .99 | 1.969 | 0.144 |
| | Medium-weight | 124 | 1.96 | 1.05 | | |
| | Obese | 18 | 2.00 | 1.23 | | |
| | Total | 427 | 1.83 | 1.02 | | |
| Usage time of smart phone (h) | Normal | 285 | 3.49 | 1.20 | 0.442 | 0.643 |
| | Medium-weight | 124 | 3.45 | 1.20 | | |
| | Obese | 18 | 3.22 | 1.55 | | |
| | Total | 427 | 3.47 | 1.22 | | |

**Table 4.** Does technological device use prevent you from exercising?

| | BMI | | | Total | $x^2$ |
|---|---|---|---|---|---|
| | Normal | Medium-weight | Obese | | |
| Mostly | 33 | 18 | 4 | 55 | 0.543 |
| | 7.7% | 4.2% | 0.9% | 12.9% | |
| Sometimes | 107 | 51 | 6 | 164 | |
| | 25.1% | 11.9% | 1.4% | 38.4% | |
| Never | 145 | 55 | 8 | 208 | |
| | 34.0% | 12.9% | 1.9% | 48.7% | |
| Total | 285 | 124 | 18 | 427 | |
| | 66.7% | 29.0% | 4.2% | 100.0% | |

**Table 5.** BMI comparisons by level of physical activity.

| | BMI | N | Mean | SS | F | P |
|---|---|---|---|---|---|---|
| Physical activity level (number of steps) | Normal | 285 | 7097 | 3715 | 0.296 | 0.744 |
| | Medium-weight | 124 | 6791 | 3663 | | |
| | Obese | 18 | 6991 | 3512 | | |
| | Total | 427 | 7003 | 3686 | | |

usage times of television, computer and smartphone and BMI. The obese group has higher average hours than others watching TV and using computer.

According to Table 4, 12.9% of the women participating in the research mostly and 38.4% stated that the use of technological devices sometimes prevents them from exercising. However, 48.7% stated that there was never any obstacle. According to the k-square analysis, there was no significant difference between the answers given. According to the BMI, there was no significant difference in the number of physical activity steps. However, it is seen that obese individuals have less physical activity level and normal individuals have more physical activity level. When the physical activity level and the motivation to participate in physical activity were compared in the table, although there was no difference in the individual causes and causelessness sub-dimension, there was a significant difference in the environmental causes sub-

**Table 6.** Comparing motivation to participate in physical activity according to physical activity level.

| | | Physical activity level | N | Mean | SD | F | p | Tukey HSD |
|---|---|---|---|---|---|---|---|---|
| Physical Activity Participation Motivation | Individual reasons | Very Bad | 141 | 22.39 | 4.41 | 2.019 | 0.091 | ---- |
| | | Bad | 112 | 22.84 | 5.07 | | | |
| | | Normal | 89 | 23.42 | 4.88 | | | |
| | | Good | 52 | 23.59 | 4.11 | | | |
| | | Very Good | 33 | 24.66 | 5.21 | | | |
| | Environmental reasons | Very Bad | 141 | 18.80 | 3.94 | 3.647 | 0.006* | Bad –good* Bad -Normal* |
| | | Bad | 112 | 18.02 | 4.57 | | | |
| | | Normal | 89 | 19.76 | 4.10 | | | |
| | | Good | 52 | 20.13 | 4.95 | | | |
| | | Very Good | 33 | 20.06 | 3.74 | | | |
| | Causelessness | Very Bad | 141 | 13.92 | 4.71 | 1.720 | 0.145 | --- |
| | | Bad | 112 | 14.12 | 4.60 | | | |
| | | Normal | 89 | 13.42 | 4.88 | | | |
| | | Good | 52 | 15.15 | 4.86 | | | |
| | | Very Good | 33 | 15.39 | 5.25 | | | |

**Table 7.** The relationship between technological device usage times and BMI, physical activity and physical activity participation motivation.

| | | BMI | Physical activity level | Individual reasons | Environmental reasons | Causelessness |
|---|---|---|---|---|---|---|
| Watching TV time | r | .101* | .006 | .248** | -.052 | .280** |
| | p | .037 | .905 | .000 | .283 | .000 |
| Usage time of computer | r | .071 | -.058 | -.068 | .080 | -.171** |
| | p | .143 | .234 | .162 | .098 | .000 |
| Usage time of smart phone | r | -.057 | -.341** | .029 | -.066 | .137** |
| | p | .243 | .000 | .547 | .171 | .005 |
| Participation barrier to exercise | r | -.056 | .061 | .079 | -.086 | .128** |
| | p | .246 | .210 | .104 | .077 | .008 |

dimension at p<0.05 level. This difference arises from participants with bad-good and bad-normal physical activity levels.

According to Table 5, as the time of watching television increases, the BMI level also increases. Again, a positive correlation was found between individual causes and the duration of watching television, among the sub-dimensions of motivation to participate in physical activity. In addition, a relation was found between the causelessness sub-dimension and spending time on watching TV, computer and smartphone usage and barrier to participation in exercise. A negative correlation was found between smartphone usage time and physical activity level. As long as the time spent on the phone increases, the physical activity level decreases. In our country, it has been shown in previous studies that internet use is quite high among the young population.

In a study on internet usage of Turkish youth, 3975 middle school and high school students were asked about the time they spent on the internet and 7.6% of the participants stated that they spent more than 12 hours in a week online (Tahiroğlu et al., 2008). In a study conducted by Gökçearslan and Günbatar (2012) on 172 high school students, it was reported that 2.33% of the participants were identified as internet addicts and 17.45% were internet users in the risk group. In the study examining the internet addiction levels of high school students, it was determined that 1.6% of 961 students were internet addict and 37.6% were in the category of “potentially dependent at risk” (Can et al., 2018). In the

study examining the frequency of internet usage, it was reported that the majority of middle school students use the Internet frequently and spend more time on the internet as the age grows (Orhan and Akkoyunlu, 2004).

In another study on internet use, 97.7% of 355 participants are connected to the internet and 39.7% spend 4 hours or more on the internet per day, all of the participants are interested in social media and 86.2% are connected to the internet. It has been determined that it uses wireless networks (Topal et al., 2018). In their study Yüksel and Yılmaz (2016) found that boys have more internet use than girls, and the reason for this is that gender inequality, boys' having the opportunity to spend more time on the internet more freely, and social responsibilities of girls (housework, family service etc.).

Burmaoğlu (2010) examined the physical activity levels of teachers working in primary and secondary education. In the conducted research, significant ($p < 0.05$) differences were found between BMI values according to gender, age and marital status. As the age increases, the rate of BMI increases. According to the basal metabolism results, when the genders were compared, a significant difference was found ($p < 0.05$). In the study of Hallal et al. (2003), the physical activities of the single or single women were found to be lower than the married ones. In their research, Burton and Turrell (2000) reveals that parents who are dependent on children are doing less physical activity than parents who do not have children. University years are a period when other vital habits are shaped, especially nutrition, physical activity and stress. Both the National Longitudinal Study of Adolescent Health and the National Health and Nutrition Examination Survey show that a high proportion of adolescents develop and remain obesity in transition from youth to adolescent, and this is a significant risk (Gordon-Larsen et al., 2004; Racette et al., 2005). In university students, physical activity levels are similar to the general adult population (US Dept. of Health and Human Services, 2000). Fifty one percent of students were found to have low physical activity levels (Martin et al., 2000).

In our study, there are studies showing the negative relationship between physical activity and BMI in young people (Clement et al., 2004; Anding et al., 2001). Mestek et al. (2008) found a relationship between pedometer and determined physical activity and BMI. As TV's effect metabolism, it is thought to decrease physical activity level, increase energy input, exposure to food advertisements and decrease sleep time (Cox et al., 2012). It has been stated that the increase in the time spent with physical activity or active play is inversely related to lubrication and overweight in the preschool period (Janz et al., 2002). The time spent spending time with television, tablet, mobile phone and computer is increasing day by day. It is known that BMI and obesity prevalence increase as the time spent on the screen increases (Reilly et al., 2005). Each time spent in front of the screen has been shown to increase the risk of being obese in adulthood by 7% (Viner and Cole, 2005). It has been shown as one of the reasons for the increase in weight, where sleep duration is shortened and longer awake causes more eating. Hart et al. (2013) and Cox et al. (2012) reported that there was a low but significant relationship between excessive use of technological devices and BMI in preschool period, and that it paved the way for weight gain in the future. Mustafaoğlu et al. (2018) said that according to the parents, 65.7% of the children reported that they used a computer, 72.1% a smartphone, and 85.2% a tablet. Television watching has been defined as an important behaviour related to weight and obesity in children (Hancox and Poulton, 2006). Wen et al. (2014) stated that the limit of digital technology usage in children is 2 hours, and every hour that this limit is exceeded is related to the increase in BMI. As a result, technological device use was thought to have negative effects on body composition and physical activity level.

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