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Investigation of the relationship between physical activity and park for some parks by SOPARC method in the case of Konya city (Karatay), Türkiye

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Abstract

In a rapidly evolving world, technological advancements have brought significant convenience to individuals. However, these developments have increasingly led to a sedentary lifestyle. The need for individuals to regain their natural right to move freely has become more pronounced. Parks, as the largest urban areas facilitating physical activity, play a critical role in addressing this need. This study examines the physical activity levels of park users in three parks in Konya, Türkiye. It also evaluates the park areas and features that enable physical activity. The research identifies the factors that either deter or encourage individuals from utilizing parks and recreational areas for physical activity. In addition, the aim was to calculate how much energy was expended by physical activity in these parks. According to the research findings, the parks have a large number of visitors. The majority of park users are female and the adult age group, while the senior age group prefers parks less. Despite the presence of visitors, inactivity is prevalent in these parks. There are large differences between the number of people in the target areas. While picnic areas are usually densely used, few people who used were observed in sports fields and walking paths. Pearson Chi-Square analysis was used to examine the differences between parks, target areas and periods, park users, and activity levels. The results indicated that among all target areas, picnic areas exhibited the lowest levels of physical activity. Based on these findings, the study offers design recommendations aimed at promoting higher levels of physical activity in parks.

Keywords: health, park, physical activity, quality of life, recreation

1. Introduction

Rapid change, which started with the Industrial Revolution and has spread to every field, leads to radical transformations from social institutions to cultural structures and lifestyles (Aykın, 2018). The human body needs to move constantly due to its innate characteristics (Zorba & Saygın, 2007). However, these transformations have imposed limitations on physical mobility. The fact that a person lives with so little movement also brings with it some health problems. These problems include slowing down the circulatory and respiratory systems, increased cardiovascular diseases, obesity, excessive changes in the digestive system, decreased joint movement limits and the formation of calcifications, decreased function in organs, and bone diseases (Bulut, 2013; Karaküçük; 1999; Tunay, 2008; Zorba & Saygın, 2007). A sedentary lifestyle also affects the quality of life, which expresses the feeling that life is going completely well. The concept of quality of life, in addition to representing the ability to do daily activities, also refers to the satisfaction that it provides from life and personal well-being (Genç et al., 2011). In widespread psychology, quality of life is called the conscious cognitive satisfaction value that someone has from his life (Rejeski & Mihalko, 2001). The search for a qualified life is one of the greatest struggles of mankind from birth to death (Vatansever et al., 2015). Today, living with improved quality of life has become as important as living longer (Akyol et al., 2008). In societies formed by sedentary and low-quality of

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life, the sustainability of human health is under threat, but it also imposes additional burdens on the economies of countries (Aykın, 2018).

Maintaining individual health, and hence public health, with a fun, low-cost, and highly efficient acquisition such as physical activity habits can also be used as an effective tool to reduce health expenditures, which are increasingly costly and have a large share in national budgets (Akyol et al., 2008; Bek, 2008). Many people are not physically active enough (McKenzie et al., 2006). In a study conducted in Turkey in 2013; In terms of physical activity in leisure time, 23% of men have adequate, 22% moderate and 55% low level of physical activity, these rates are 13%, 18% and 69% respectively for women. The proportion of men and women who engage in adequate and moderate physical activity decreases as age increases (Ünal et al., 2013). According to The World Health Organization (WHO), approximately 25% of adults and 81% of adolescents do not engage in enough physical activity. These rates are estimated to have increased with the measures taken due to the COVID-19 pandemic (Guthold et al., 2018, 2020; Şahin, 2022; WHO, 2022).

Physical activity is a basic human function. It is an important part of a healthy lifestyle for people of all ages. To be healthy and vigorous, physical activity is as important as eating, drinking, and sleeping (Ar, 2015; McKenzie et al., 2006; Zorba & Saygın, 2007). Regular physical activity has been shown to reduce morbidity and mortality by building and maintaining healthy bones, muscles, and joints, as well as reducing heart disease, diabetes, high blood pressure, colon cancer, depression/anxiety, and weight gain (HHS, 1996). WHO defines health as "a state of physical, mental and social well-being as a whole, not just protection from disease and harm". According to the age we live in, it can be defined as emotional, spiritual, intellectual, social, occupational, and physical well-being (McKenzie et al., 2006; Zorba & Saygın, 2007). The main purpose of physical activity for health is to prevent or slow down organic and physical disorders caused by a sedentary life, to increase physiological capacity, which is the basis of physical health, and to maintain physical fitness and health for many years. The effects of physical activity on health can be examined under three main headings as physical health, mental-social health, and its effects on future life (Bek, 2008; Demirel et al., 2014; Zorba & Saygın, 2007).

The ability of the public to freely engage in the phenomenon of movement, which is their natural right, and expanding opportunities to increase physical activity is a promising tool for addressing sedentary behavior associated with various chronic diseases (Cohen et al., 2007; Kılbaş, 1994). It has been proven by scientific research that the physical environment has a stimulating or inhibitory effect on individuals' ability to engage in an adequate level of physical activity (Berrigan & McKinno, 2008; Çubukçu et al., 2010; Humpel et al., 2002; Romero, 2005; Saelens et al., 2003; Taylor et al., 2006; Wells et al., 2007). Given the growing consensus that the environment plays a key role in promoting energy expenditure, a healthy and safely planned built or structured environment positively affects the determinants of health (Akyol et al., 2008; Kiraz, 2015). Understanding these determinants is important for developing effective interventions to increase physical activity levels in the population (Ball et al., 2001).

Many studies on health and green spaces advocate the positive effects of green spaces on health (Akdoğan et al., 2021; Ayan et al., 2018; Cleland et al., 2008; Küçükali et al., 2016; Lovasi et al., 2008; McCurdy et al., 2010; Rappe et al., 2006; Takano et al., 2002). Parks within green spaces, particularly, have been identified as significant community resources to promote disease prevention through the enhancement of physical activity (Bedimo-Rung et al., 2005; Cohen et al., 2016; Shores & West, 2008). Parks are an important component of healthy communities and provide a low-cost environment for community members to access and engage in physical activity (Cohen et al., 2019; Librett et al., 2007; Rhodes et al., 2017; Sallis et al., 2012).

Parks have an important role in providing environments for urban populations to be physically active, as they provide equal opportunities to facilitate physical activity to a wide range of users from different age, ethnocultural, and socioeconomic groups (Arifwidodo, 2020). People often use park and recreation services in a way that includes physical activities and contributes to their

physical health. Parks are also one of the most important elements of communication between society and individuals. In other words, parks can play a role in facilitating physical activity. Parks also provide opportunities for people to engage in sedentary behavior. Information about who uses public parks and what they do there can explain the current and potential contribution of parks to physical activity (Cohen et al., 2007; Emür & Onsekiz, 2007; Evenson et al., 2013; Floyd et al., 2008a; Godbey et al., 2010).

Park-based physical activity levels and visitor numbers are associated with park characteristics such as park proximity-accessibility (Abercrombie et al., 2008; Grahn, 1994; Han et al., 2013; Maroko et al., 2009; Roemmich et al., 2006; Schipperijn et al., 2013), size (Abercrombie et al., 2008; Ellaway et al., 2005), safety (Addy et al., 2004; Babey et al., 2005; Gümüş et al., 2017), aesthetics, facility quality, and type of exercise equipment in the park (Jansson et al., 2019). Apart from these, park usage is also a reflection of individual preferences such as age, exercise habits, and race/ethnicity. Other important features include the land use in the surrounding area and the availability of organized events that attract people to the park (Cohen et al., 2007).

This study is important in determining the positive effects of the relationship between parks and physical activity on urban quality of life and contributing to the design of future parks in this regard. Three parks were selected: Aşkar Höyüğü Park, Muhsin Yazıcıoğlu Park and Adalet Park. In the study method, parks in the same region were selected due to simultaneous observation conditions, and the reason for choosing more than one park number is to be able to make comparisons thanks to different findings and to increase the number of people observed. The aim of the research is to systematically investigate the physical activity measures of park users in Aşkar Höyüğü Park, Muhsin Yazıcıoğlu Park, and Adalet Park as examples, and evaluate the spaces and facilities within the parks that enable physical activity. The factors that limit users from accessing or influencing their choice of parks and recreational areas for physical activity have been determined. Within the scope of the study, it was calculated how much energy was spent by physical activity in parks. In light of the findings obtained, suggestions were made to contribute to the planning and design of existing and future parks by providing qualified and necessary data, increasing the service level of physical activity areas, and creating new recreational areas to support physical activity.

2. Methods and Materials

2.1. Material

The main materials of the research were determined as Adalet Park, Muhsin Yazıcıoğlu Park, and Aşkar Höyüğü Park located in the Karatay district of Konya province of Turkey (Fig. 1). Adalet Park was built in 2007. With an area of 78,000 m^2, the park includes a miniature of the Bosphorus Bridge and Mevlana Museum, a 4,600 m^2 artificial lake for boating, a 713 m^2 waterfall restaurant, a 93 m^2 waterfall, a walking path, sports fields, lighting elements, pergolas, children's playgrounds, and fitness equipment. Muhsin Yazıcıoğlu Park; built in 2014. With an area of 58,000 m^2, the park is located between Karfet and Fetihkent housing estates and is built on a mound with a history of approximately 6000 years. It is located just behind the newly built Sports and Congress Center. Most of the lighting system is provided by solar energy. It consists of small hills. It includes large grass areas, sports fields, fitness equipment, children's playgrounds, pergolas and ornamental pools. Aşkar Höyüğü Park: With an area of 47,000 m^2, the park is located between Adana Ring Road and Fevzi Çakmak Neighborhood, Başak Street, Akhüyük and Karkent Housing Complexes. It consists of small hills. Built-in 2012, the park includes an ornamental pool, sports fields, fitness equipment, lighting elements, walking paths, pergolas, and seating elements.

The materials of the study consisted of SOPARC (System for Observing Play and Recreation in Communities) forms, camera, satellite images, and literature. AutoCAD, Photoshop, SPSS 22.0 programs, and Office Software were used for data collection and evaluation.

Figure 1 The locations of the parks within the scope of the research in Konya province((Google Earth, 2019), 1. Aşkar Höyüğü Park (Anonymous1, 2014), 2. Muhsin Yazıcıoğlu Park (Anonymous2, 2014), 3. Adalet Park (Anonymous3, 2017))

2.2. Method

Relationships between physical activity and parks were revealed through literature research. The parks selected as the study material and the regions where the study will be carried out for each park are defined. These zones are functionally selected from the units located in 3 parks; a sports field, a children's playground, a picnic area, and a walking path. As a method, SOPARC was chosen, which will be carried out based on observations in 3 parks.

SOPARC is designed to obtain direct information about park use about the intersecting characteristics of parks and their users. It provides an assessment of park users' physical activity levels, gender, activity modes/types, age, and ethnic groups. Additionally, it provides information on individual park activity areas such as accessibility, usability, supervision, and organization. The validity of the activity codes used by SOPARC was established through heart rate monitoring. Direct observations are made at designated target areas that represent all standard locations that may offer opportunities for park users to be physically active (McKenzie et al., 2006; McKenzie et al., 1991).

SOPARC implementation; SOPARC observations were conducted throughout the day, including specific times in the morning, noon, afternoon, and evening (7:30; 11:30; 15:30; 18:30). Observations started in June and ended in July. For each park, observations were made for one week (7 days) and 4 hours per day. In total, 28 hours of observations were made in 1 week. On rainy days, observations were not made for that day and were made up later.

Observation materials were prepared before going to the park and were available in the park at least 20 minutes ago. SOPARC is based on systematic and periodic surveys with instant time sampling techniques, in which individuals and contextual factors are established within predetermined target areas located in parks. During the screening, the activity of each individual is coded as (walking, or vigorous), and sedentary (i.e., lying down, sitting, or standing). Separate screenings are conducted for men and female and the age groups of the participants are estimated. The accessibility of the area, the availability of space, the presence of supervision and equipment, and the presence and classification of organized activities were carried out with simultaneous entries throughout the day. Summary counts, the number of participants by gender, types, and levels of activity, and estimated age and gender groups were defined. The method allows for comparisons of physical activity levels in the same environment between different environments or at different times dec. Energy expenditure estimates (Kcal/kg/min) for the target area of the park can be calculated based on pre-approved constants for each activity level. To estimate the

kilocalories/kg expended, the number of people counted in the stationary, walking, and very active categories are multiplied by the constants 0.051kcal/kg/min, 0.096kcal/kg/min, and 0.144kcal/kg/min, respectively. Kilocalories/kg in each category can be summed to provide a measure of the total kilocalories/kg spent by park users in a given area. These values can be interpreted as the number of kilocalories per kg of body weight per minute spent in each area during the observed day (McKenzie et al., 2006). The energy expenditure calculations within the scope of the research were carried out over the more valid and widely used metabolic equivalent of task (MET). However, if desired, it is possible to obtain data based on the unit of kcal / kg/min using the constants given above.

Energy expenditure is calculated as MET. 1 MET is the amount of energy that a person burns per minute at rest and corresponds to 1.25 calories. Following the previous studies, 1.5, 3, and 6 MET values were given to park users observed in sedentary, walking, or vigorous activity, respectively (Suau et al., 2012).

3. Results and Findings

3.1. Features of Park Users

Observers made a total of 84 visits to the parks (21 days 4 visits/day). A total of 21,255 people were observed in the parks. 14.750 (69.3%) of the observed people are female users and 6505 (30.7%) are male users. Overall, more female users than males were seen at the parks. 28 visits were made separately for 3 parks (7 days 4 visits/day). During the observations made in Aşkar Höyüğü Park, 6952 people were observed. Female users constitute approximately 72% of the total number of people observed. During the observations made in Muhsin Yazıcıoğlu Park, 3451 people were observed. Female users make up about 64% of the total number of people observed. In the observations made in Adalet Park, 10,852 people were observed. In Adalet Park, where the most users are observed, the number of female users is higher than the number of male users. Female users constitute about 70% of the total number of people observed.

Age distribution was divided into four groups as children (0-12 years old), young (13-20 years old), adults (21-59 years old) and senior (60 and over years old). It is seen that the highest amount of users is in the adult group with 9283 people. It was observed that adults (43.6%) used the parks more than children (31.4%), young people (19.3%) and the elderly (5.7%). The number of elderly users in the parks is quite small. It is seen that the majority of the Aşkar Höyüğü Park users are adults in the age distribution. Children, young and seniors come respectively. The elderly age group makes up 6% of the park users, which is quite low. It is seen that the majority of Muhsin Yazıcıoğlu Park users are children and adults in the age distribution. Young and senior people come, respectively. In Muhsin Yazıcıoğlu Park, the elderly users are very few, making up 5.3% of the park users. According to the age distribution of Adalet Park users, it is seen that adults make up the majority. Children, young and seniors come respectively. The same is true in Adalet Park. Elderly users constitute 5.6% of park users (Table 1).

Table 1 Features of Park Users

User Features		PARKS TOTAL	AHP	MYP	AP
	Number of users	21255	6952	3451	10852
Gender	**Female**	14750	4956	2228	7566
	Male	6505	1996	1223	3286
Age	**Child**	6661	2488	**1428**	2745
	Young	4081	1078	556	2447
	Adult	**9283**	**2959**	1282	**5042**
	Seniors	1230	427	185	618

AHP; Aşkar Höyüğü Park, MYP; Muhsin Yazıcıoğlu Park, AP; Adalet Park

3.2. Terms of Target Areas

In the observations made in 3 parks, the conditions of the target areas in the parks are given in Fig. 2 3 parks are accessible (88%) and usable (84%), but are empty at some times. Specially in the

morning and at noon, the user could not be observed in some areas. In terms of security, the control (56%) is insufficient especially in the morning and evening periods. Urban equipment elements (76%) and rarely organized efficiency (1%) were provided. It is dark (15%) due to the lack of equipment and its non-use; therefore, access is rarely restricted. Considering the parks, Muhsin Yazıcıoğlu Park has deficiencies in terms of usability (wet, windy, etc.). While Aşkar Höyüğü Park and Muhsin Yazıcıoğlu Park are inadequate in terms of supervision, Adalet Park is supervised. There is a lack of equipment with fountains, lights, and trash cans in Adalet Park. While very few organized events were held in Aşkar Höyüğü and Muhsin Yazıcıoğlu Parks, no organized events were held in Adalet Park. In three parks it is dark in the evening. Rarely, in some periods, some target fields are empty.

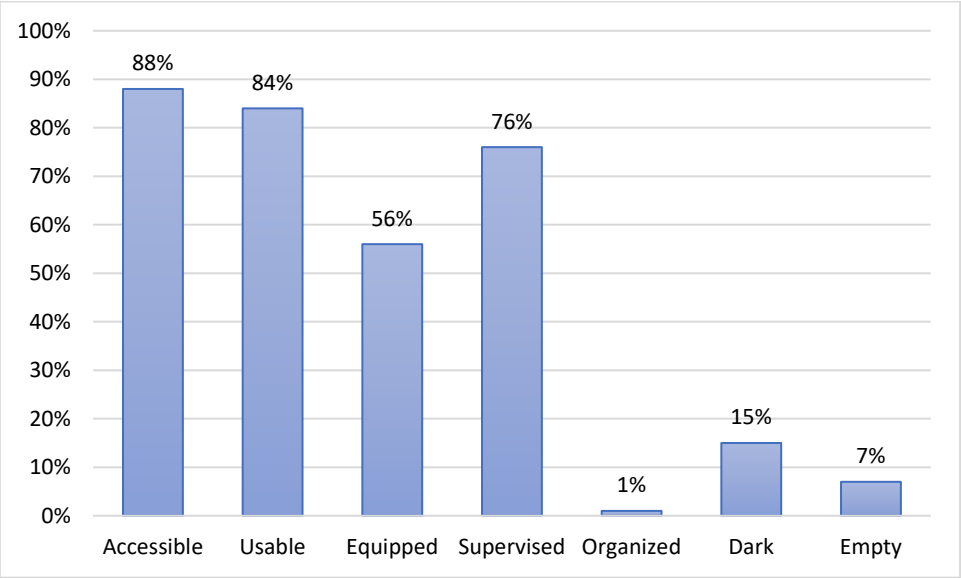

Figure 2 The conditions of the target areas of the three parks

3.3. Periods

The distribution of the people observed in the 3 parks according to the periods is given in Figure 3. The parks were observed in four periods: morning, noon, afternoon and evening (7:30; 11:30; 15:30; 18:30). Looking at the distribution of the 3 parks according to periods, more park users were observed in the afternoons (35.9%). Periods were observed in the afternoons (28.1%), evenings (25.6%) and mornings (10.4%), respectively. According to observations, park users do not visit parks in the morning periods. The reason for the intensity of the number of users in the park in the afternoon is the decrease in the noon temperature and the escape to green areas in the city where the temperature is felt less. The period when all age groups have the most users is in the afternoon. When viewed by gender, it is also afternoon during the peak period of male and female users.

Looking at the distribution of each park by period, it was observed that more park users in the Aşkar Höyüğü Park and the Adalet Park in the afternoon, noon, evening, and morning time intervals. The number of users observed in Muhsin Yazıcıoğlu Park in these time intervals changed as evenings, afternoons, noon, and mornings. The number of users in the morning period of Aşkar Höyüğü Park constitutes 9.3% of the total number of users, the number of users in the morning period of Muhsin Yazıcıoğlu Park constitutes 11.3% of the total number of users and the number of users in the morning period of Adalet Park constitutes 16.6% of the total number of users.

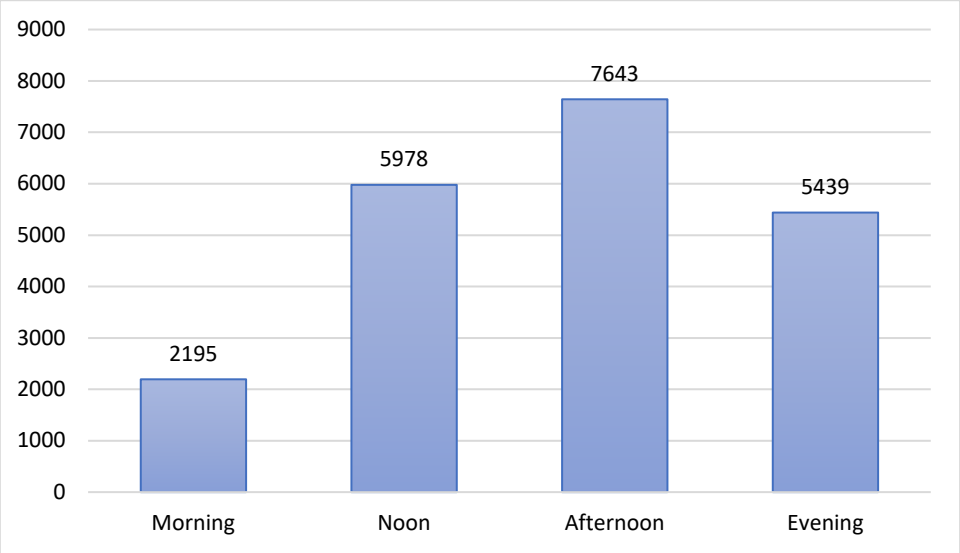

Figure 3 Distribution of park users by periods

The average number of people observed in the parks on weekdays and weekends is given in Fig. 4. The average number of users observed at the weekend (58%) of the parks is higher than the average number of users observed during the week (32%). This ratio is almost equal in Muhsin Yazıcıoğlu Park. Aşkar Höyüğü Park has 44% of users on weekdays and 56% on weekends. Muhsin Yazıcıoğlu Park has %50,4 of users on weekdays and 49.6% on weekends. Adalet Park has %38 users on weekdays and 62% on weekends. There are significant differences in the average number of users on weekdays and weekends in Adalet Park; users come in large groups on weekends.

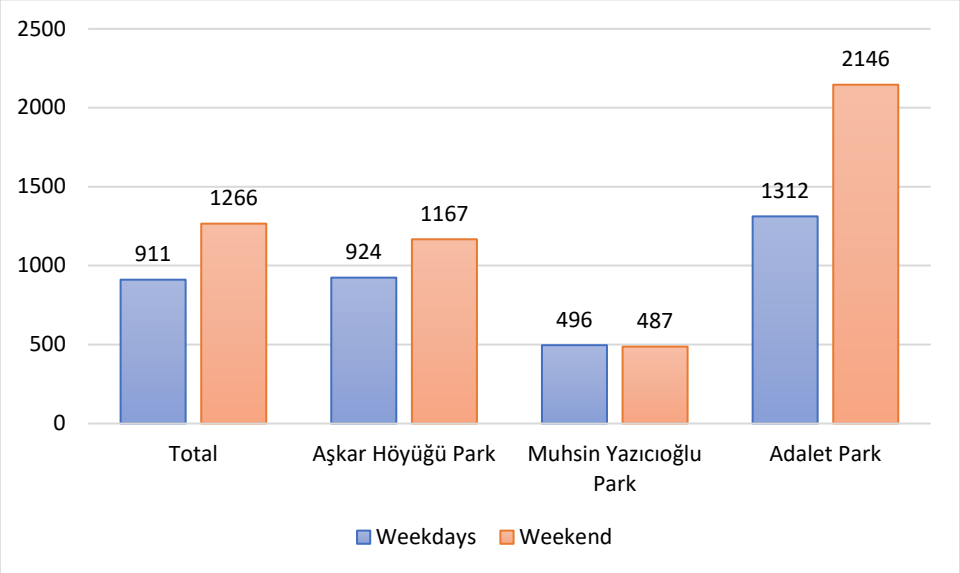

Figure 4 The average number of observed people on weekdays and weekends

3.4. Number of People Observed in Target Areas

Users were observed according to four target areas as picnic, children's playground, walking path and sports area. The number of people observed in the target areas is given in Figure 5. The ranking of parks according to the number of users in the target areas is picnic (77.7%), children's playground (16%), sports field (3.2%) and walking path (3.1%).

In Aşkar Höyüğü and Muhsin Yazıcıoğlu Parks, the ranking according to the number of users in the target areas is in the form of picnic, children's playground, sports field and walking path. This ranking is in the form of a picnic, a children's playground, a walking path, and a sports field in the Adalet park. The use of the walking path in Adalet Park is more than the sports field.

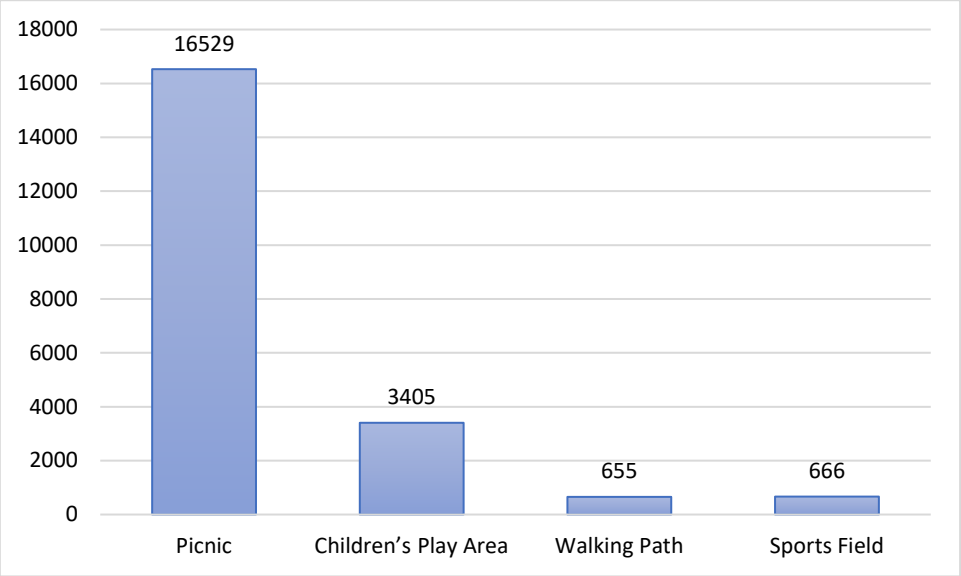

Figure 5 Number of people observed in target areas

3.5. Activity Statuses

Users are classified according to the activity statuses they do in the parks. Accordingly, 23 activity statuses were determined in the parks. 3 the activity status of the observed people in the park is given in Figure 6. Looking at the parks in general, picnic (39%) is the most common activity. Other activities are sitting (33%) and climbing/sliding (9%). The least performed activity was reading (0.04%).

When looking at the general structure of the parks in Aşkar Höyüğü Park and Muhsin Yazıcıoğlu Park, the most common activity is sitting (38%-32%). Other activities are picnicking (36%-29.4%) and climbing/sliding (7.9%-15.2%). The least performed activity is reading (0.04%- 0.05%). In addition, running is one of the least performed activities in Muhsin Yazıcıoğlu Park (0.08%).

When examining the activity status of observed individuals in Adalet Park, the most common activity is picnicking (41.2%). Other activities include sitting (29.7%) and climbing/sliding (8.1%). The least performed activities are reading (0.04%) and cycling (0.04%).

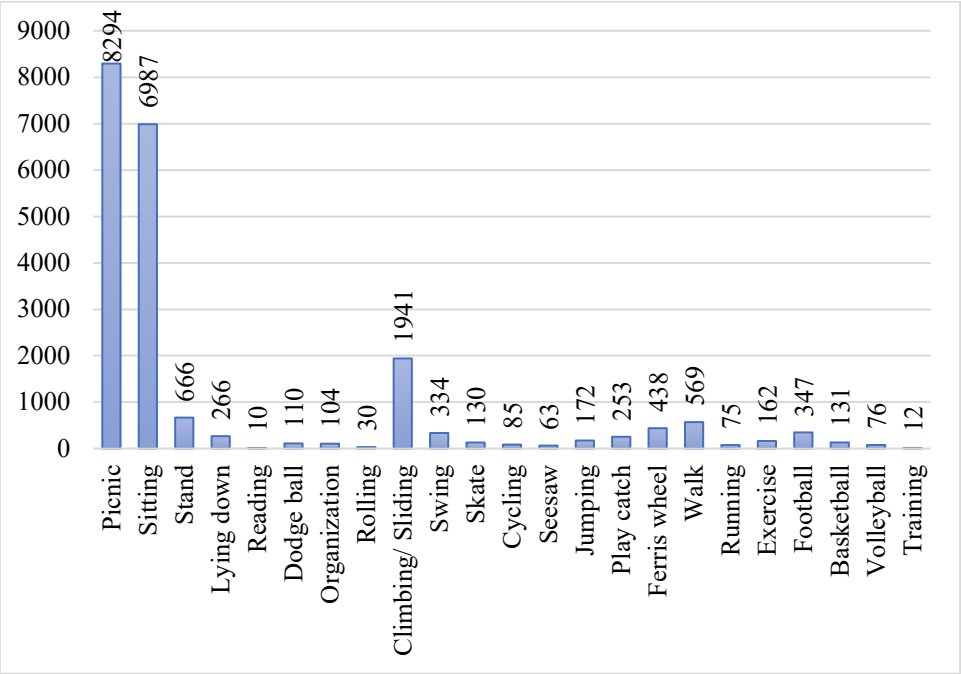

Figure 6 Total activity status of the three parks

3.6. Activity Levels and Energy Expenditure

Users were classified into three groups according to their energy levels in the parks: sedentary, walking, and vigorous. The activity levels of the parks are given in Figure 7. Looking at the 3 parks in general, inactivity is dominant but vigorous activity level is very low (sedentary 77%, walking 18.5%, vigorous 4.5%). According to observations, men are generally more physically active than female. Overall, men are three times more active than female in vigorous physical activity (3% vs. 9%). They are almost twice as active at the walking level of activity (15% vs. 26.5%).

The level of inactivity is quite high in Aşkar Höyüğü and Adalet Parks. It is lower in Muhsin Yazıcıoğlu Park compared to the others. The vigorous level is very low in Adalet Park. The park with the highest level of vigorous activity is Aşkar Höyüğü Park.

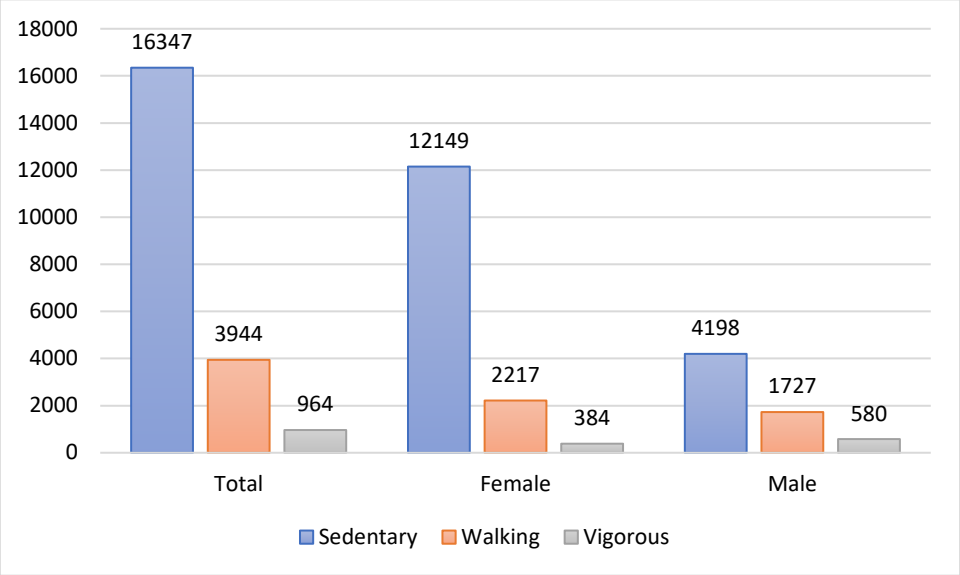

Figure 7 The distribution of activity levels in parks according to gender

The average METs of the 3 parks considered within the scope of the research were calculated and, accordingly, the METs were determined for each park. According to the findings, the METs are 2.18 for Muhsin Yazıcıoğlu Park, 2.02 for Aşkar Höyüğü Park, and 1.88 for Adalet Park (Table 2). According to this result, although the METs of each park are close to each other, it has been determined that the most effective park as a MET is Muhsin Yazıcıoğlu Park. The unit m^2 area METs were calculated over the parking areas. Accordingly, it was found to be 0.30 for Aşkar Höyüğü Park, 0.26 for Adalet Park, and 0.13 for Muhsin Yazıcıoğlu Park. The reason why the MET, which falls to m^2 in Muhsin Yazıcıoğlu Park, is low is that the number of users is small compared to the park size.

Table 2 METs According to Parks

	Number of users	Average number of users each day	Park Size (m^2)	MET per m^2	Total MET	METs per capita
AHP						
Female	4956	708			9178,5	1,85
Male	1996	285,1			4932	2,47
Total	6952	993,1	47.000	0,3	14110,5	2,02
MYP						
Female	2228	318,2			4416	1,98
Male	1223	174,7			3126	2,55
Total	3451	493	58.000	0,13	7542	2,18
AP						
Female	7566	1080			13584	1,79
Male	3286	469,4			6900	2,09
Total	10852	1550	78.000	0,26	20484	1,88

AHP; Aşkar Höyüğü Park, MYP; Muhsin Yazıcıoğlu Park, AP; Adalet Park, MET; Metabolic Equivalent of Task

In the scope of the research, average METs were calculated based on the target areas of the three parks, and accordingly, METs were determined for each target area in each park. According to the findings, the METs per person vary in target areas, but in all three parks, the lowest MET is observed in the picnic area. In Aşkar Höyüğü Park, the most effective area in terms of METs based on target areas is the children's play-ground with 4.17 METs. In Muhsin Yazıcıoğlu Park, the most effective area is the sports area with 3.79 METs, and in Adalet Park, it is the walking path with 3.49 METs (Table 3). METs per square meter were calculated for the parks based on target areas.

Table 3 METs According to Target Areas in the Parks

	Number of users	Average number of users each day	Park Size (m^2)	MET per m^2	Total MET	METs per capita
AHP						
Picnic	5530	790	39660	0,21	8403	1,51
Children's Play Area	1005	143,5	620	6,76	4195,5	4,17
Walking Path	151	21,5	2120	0,23	507	3,35
Sports Field	266	38	3000	0,33	1005	3,77
MYP						
Picnic	2273	324,7	54600	0,06	3477	1,51
Children's Play Area	869	124,1	600	4,98	2988	3,43
Walking Path	131	18,7	1700	0,23	402	3,06
Sports Field	178	25,4	910	0,74	675	3,79
AP						
Picnic	8726	1246,5	63500	0,21	13633,5	1,56
Children's Play Area	1531	218,7	1700	2,81	4785	3,12
Walking Path	373	53,7	4000	0,32	1305	3,49
Sports Field	222	31,7	1200	0,63	760,5	3,42

AHP; Aşkar Höyüğü Park, MYP; Muhsin Yazıcıoğlu Park, AP; Adalet Park, MET; Metabolic Equivalent of Task

The average METs were calculated for the three periods considered in the scope of the research, and accordingly, METs were determined for each period in each park. According to the findings, METs per person vary across the periods, but in all three parks, the lowest MET is observed during the afternoon period. In Aşkar Höyüğü Park, the most effective period in terms of METs is the morning period with 2.38 METs. In Muhsin Yazıcıoğlu Park and Adalet Park, the most effective periods are the evening periods with 2.32 and 2.08 METs respectively (Table 4).

Table 4 METs According to Periods in the Parks

	Number of users	Average number of users each day	Total MET	METs per capita
AHP				
Morning	653	93,2	1558,5	2,38
Noon	2003	286,1	3820,5	1,9
Afternoon	2653	379	5223	1,96
Evening	1643	234,7	3508,5	2,13
MYP				
Morning	393	56,1	796,5	2,02
Noon	836	119,4	1663,5	1,98
Afternoon	973	139	2179,5	2,23
Evening	1249	178,4	2902,5	2,32
AP				
Morning	1149	164,1	2203,5	1,91
Noon	3139	448,4	5554,5	1,76
Afternoon	4017	573,8	7423,5	1,84
Evening	2547	363,8	5302,5	2,08

AHP; Aşkar Höyüğü Park, MYP; Muhsin Yazıcıoğlu Park, AP; Adalet Park, MET; Metabolic Equivalent of Task

3.7. The Relationships Between Physical Activity, Parks, and Park Users

Pearson Chi-Square analysis was performed according to the number, gender, and age characteristics of the park users observed and identified in the 3 parks within the scope of the research, and it was determined whether there was a difference between the demographic characteristics of the users in terms of parks. According to the find-ings, no statistically significant difference was detected in terms of the number of users and gender characteristics across the parks. However, when looking at the ages of the users, a statistically significant difference was

found among users in the child age group (p=0.038) (Table 5). While the number of child users in Aşkar Höyüğü Park and Muhsin Yazıcıoğlu Park are close to each other, the number of child users in Adalet Park is low. Since Adalet Park is larger than the other parks and has the characteristics of an urban park, the playgrounds in it are more comprehensive and larger than the other two parks. However, it is striking that the number of child users in this park is lower than in the other parks.

Table 5 Comparison of Users' Demographic Characteristics Across Parks

User Features	PARKS	Pearson Chi-Square	P Value
	Number of users	261,583	0,358
Gender	**Female**	219,124	0,253
	Male	156,927	0,292
Age	**Child**	190,985	**0,038***
	Young	126,697	0,196
	Adult	190,935	0,074
	Senior	64,622	0,385

****P<0,01, *P<0,05**

Pearson Chi-Square analysis was performed according to the number, gender and age characteristics of the park users observed and identified in 4 target areas in each of the 3 parks within the scope of the research, and it was investigated whether there was a difference in user characteristics between the parks (Table 6). According to the findings, statistically significant differences were found in the number of users, gender and age (p=0.000). The number of users in target areas is higher in picnic areas than in other target areas. Female are in the majority in the picnic area, but in the minority in the sports area. Children are in the majority in the children's playground, but in the minority on the walking path.

Table 6 Comparison of Target Areas in Terms of Demographic Characteristics of Their Users

User Features	TARGET AREA	Pearson Chi-Square	P Value
	Number of users	577,166	**0,000****
Gender	**Female**	528,105	**0,000****
	Male	426,404	**0,000****
Age	**Child**	551,224	**0,000****
	Young	285,411	**0,000****
	Adult	389,921	**0,000****
	Senior	293,145	**0,000****

****P<0,01, *P<0,05**

Observations and determinations were made regarding the number, gender, and age characteristics of park users during the periods in the three parks covered in the study. A Pearson Chi-Square analysis was conducted to investigate whether there was a difference in user characteristics across parks. According to the findings, there was no statistical difference in the number of users according to the periods (Table 7). However, a statistically significant difference was found in the number of male participants according to gender (p= 0.001). Male users were observed in small numbers during the morning period. When examined by age, a statistically significant difference was found among young park users (p= 0.032). The young age group was observed nearly 4 times more during the afternoon period than the morning period.

Table 7 Comparison of Users' Demographic Characteristics Across Periods

User Features	PERIOD	Pearson Chi-Square	P Value
	Total number of users	423,614	0,065
Gender	**Female**	331,736	0,179
	Male	290,544	**0,001****
Age	**Number of Child**	238,171	0,466
	Number of Young	206,915	**0,032***
	Number of Adult	258,330	0,282
	Number of Senior	97,866	0,345

****P<0,01, *P<0,05**

3.8. Relationships Between Parks and Activity Levels

Observations and determinations were made regarding the activity levels of park users in the three parks covered in the study. A Pearson Chi-Square analysis was conducted to investigate whether there was a difference in activity levels across parks (Table 8). According to the findings, no statistically significant difference was detected in terms of activity levels across parks. In all 3 parks, inactivity prevails and the level of vigorous is very low.

Table 8 Comparison of Users' Activity Levels According to Parks

	Activity Levels	Pearson Chi-Square	P Value
PARKS	**Sedentary**	180,647	0,126
	Walking	116,353	0,473
	Vigorous	57,463	0,165

****P<0,01, *P<0,05**

Observations and determinations were made regarding the activity levels of park users in the target areas of the three parks covered in the study. A Pearson Chi-Square analysis was conducted to investigate whether there was a difference in activity levels across parks (Table 9). According to the findings, there were statistically significant differences (p=0.000) in the activity levels of target areas and park users. The activity level in the picnic area is generally sedentary while walking and vigorous activity levels dominate in other areas.

Table 9 Comparison of Users' Activity Levels According to Target Areas

	Activity Levels	Pearson Chi-Square	P Value
TARGET AREAS	**Sedentary**	390,847	**0,000****
	Walking	417,269	**0,000****
	Vigorous	191,540	**0,000****

****P<0,01, *P<0,05**

Pearson Chi-Square analysis was performed according to the activity levels of park users observed and determined in the periods in the 3 parks within the scope of the research, and it was determined whether there was a difference in the activity levels between the parks (Table 10). According to the findings, no statistically significant difference was detected between activity levels and periods.

Table 10 Comparison of Users' Activity Levels According to Target Areas

	Activity Levels	Pearson Chi-Square	P Value
PERIODS	**Sedentary**	250,138	0,313
	Walking	201,730	0,074
	Vigorous	84,630	0,147

****P<0,01, *P<0,05**

4. Discussion

The research on physical activity has expanded in recent years to examine the environmental influences that either enhance or restrict opportunities for individuals to be active (Kaczynski & Henderson, 2007). Environmental determinants of health have received increasing attention in the literature, but there is little empirical research in this area (Giles-Corti & Donovan, 2002). Parks have long served to provide the community with spaces for entertainment and relaxation. They are designed to enhance community livability and offer recreational opportunities for individual health benefits (Hamilton, 2011). Parks contribute to physical activity, but it is difficult to measure activities and the variables associated with them. Because the field contexts change, and the number and characteristics of users are quite variable. SOPARC is a reliable and applicable tool for evaluating physical activity and related contextual data in a community setting (McKenzie et al., 2006). Parks are valuable community resources that can play an important role in the fight against rising rates of obesity and chronic disease in youth across the country. A better understanding of the ways in which these environments are associated with physical activity among children can inform future research and environmental and policy changes that can improve the health and well-being of future generations (Besenyi, 2011).

Although observations regarding many public parks suggest that men visit parks more frequently than female (Shores & West, 2008), our study reveals the opposite. Our research results show that females' interest in parks is higher than males', offering a new perspective that contradicts previous observations. When analyzed in terms of age group, it shows that it is not sufficiently used by adults and the elderly and that most people using the park are sedentary (Cohen et al., 2013; Cohen et al., 2010; Cohen et al., 2007; Cohen et al., 2006; Floyd et al., 2011; Floyd et al., 2008a; Kaczynski & Mowen, 2011). The elderly was the age group that used the park the least (Shores & West, 2008), which was also supported in our study. However, adults and children were observed more frequently than youth or the elderly. These findings provide significant clues into the park usage habits of different age groups. The low park usage rates among elderly individuals highlight the necessity of designing accessible and appealing spaces specifically tailored to this demographic. According to findings, the higher frequency of park usage observed among adults and children underscores the importance of planning spaces and activities that cater to the needs of these groups. The observed disparities between youth and the elderly further emphasize the need for more inclusive approaches in the design and management of parks. In a nutshell, the equitable development of parks to support all segments of society can play a critical role in promoting individual and public health.

Increased physical activity levels in adults and the elderly have positive effects on different aspects of quality of life. An increase is observed in areas such as physical functions, ability to assume roles, pain perception and social interaction (Vatansever et al., 2015). In a study by Cohen et al. (2007), the presence of senior centers in park facilities was associated with an increase in the number of elderly people observed in the park. This suggests that senior people may need customized programs or incentives to use park spaces.

While increasing and developing park areas are likely to increase their use, the greatest gains in serving more people may come from increasing the number of events and activities planned and organized in parks. The presence of events in the park, including sporting competitions and other attractions, appears to be the strongest association between park use and community-level physical activity. Achieving this goal will require the recruitment and training of more staff, including coaches, activity supervisors and event planners (Cohen et al., 2010; Cohen et al., 2007). Adult supervision provided during times of organized park activities can have a meaningful impact on children's activities in the park throughout their educational process (Leek et al., 2011). However, some studies report that there are negative relationships between organized park activities and the activity levels of adults and children (Floyd et al., 2008b). This indicates the importance of the structure of the events and their alignment with the needs of the participants.

Increased proximity to parkland is associated with physical activity (Kaczynski & Mowen, 2011). The park area made the increase in physical activity among young people reasonable (Epstein et al., 2006). Social factors and design features should be considered to encourage higher levels of park-based physical activity among children and young people (Floyd et al., 2011). Nearness alone is not enough; accessibility and safety of parks are also key to promoting physical activity, especially among young people. Well-designed parks with diverse recreational opportunities can encourage higher levels of engagement, while social factors such as community support can encourage long-term participation in physical activity.

The most influential relationships in the number of park users are found between the size of the park and the number of organized activities observed. However, neighborhood population density, neighborhood poverty levels, perceptions of park safety, and the existence of a park advisory board were not associated with park use. While low perceptions of safety are seen as a factor that restricts parking use, there is no trend that high perceptions of safety facilitate parking use (Cohen et al., 2010). Perceptions of safety can influence the use of recreation areas (McKenzie et al., 2006). It shows that perceiving a park as safe may not facilitate its use (Cohen et al., 2010). Although it is neutral in this respect in some studies, it has been found to affect parking usage, especially in the morning hours in the study (Cohen et al., 2016; Cohen et al., 2007; Cohen et al., 2006).

The number of people observed in the morning periods is lower than in other periods (Shores & West, 2008). As in the studies of Shores and West (2008), more people were observed in the afternoon period in the two parks. However, at Muhsin Yazıcıoğlu Park, in line with the study by (Cohen et al., 2006), a greater number of individuals were observed during the evening period.

While children were more in the playground and females were more in the walking path (Cohen et al., 2006), in our study females were more in the picnic area. This finding suggests that females' preferences for park usage may vary depending on the design and amenities provided in different areas. Additionally, it is plausible that picnic areas have become more attractive to females due to their capacity to fulfill social interaction and recreational needs.

The majority of activities in the park consist of sitting. In both males and females, the predominant activity level is sedentary. These findings are similar to the reports obtained from previous studies (Cohen et al., 2006) utilizing observational methods.

Energy expenditure also varied according to activity areas. Sedentary behavior and lower levels of energy expenditure were associated with picnic areas (Floyd et al., 2008a). The target areas with playgrounds are the areas with the highest activity levels among park visitors (Shores & West, 2008). While many types of park use, both active and passive, combine to provide a range of social, economic, and psychological benefits through leisure experiences, the prevalence of sedentary activity in park settings suggests that there may be more opportunities to promote physically active park use (Bedimo-Rung et al., 2005; Floyd et al., 2008a). This highlights the need for park designs that encourage more active engagement, particularly in areas like picnic spaces where sedentary behaviors are more common. By incorporating more dynamic features and structured activities, parks could better support physical activity and enhance overall health outcomes for visitors.

5. Conclusion

Parks play a critical role in facilitating physical activity in communities, they not only provide facilities with planned and supervised activities, but also provide places for people to carry out recreational activities, even if they are sedentary after arriving there.

The sustainable increase in the quality of life through physical activity, which has positive effects on health, necessitates investment in these areas. Understanding the current situation can assist in directing investments in a more informed manner. For this reason, the scientific studies carried out on this issue will have a guiding quality.

In this study, the relationship between physical activity and park for 3 parks was investigated by the SOPARC method in the case of Konya City (Karatay), Turkey. During the 21 days of observations, a total of 28 observations were made in 12 target areas. The observations consisted of 4 periods on 1 day (morning, noon, afternoon, evening). A total of 21255 people were observed in 3 parks. The park target area conditions, demographic characteristics of park users, activity status, and energy levels were recorded in the SOPARC forms. In the final part of the study, the collected data was organized, and the energy expenditure and METs spent in the parks were calculated. The data were compared statistically with Pearson Chi-Square analysis.

- When the demographic characteristics of park users are considered, it is seen that female users are relatively more than male users. While the majority of park users are in the adult age group, the elderly age group prefers parks less. When viewed according to the parks, the situation is the same in Aşkar Höyüğü Park and Adalet Park. However, the majority of park users in Muhsin Yazıcıoğlu Park are children's age group.
- In terms of target area conditions, access was generally achieved. Although sometimes there are problems with usability due to wind and wetness, it is generally usable. While Adalet Park is supervised, Aşkar Höyüğü Park and Muhsin Yazıcıoğlu Park are not supervised in the morning and evening periods. While Aşkar Höyüğü Park and Muhsin Yazıcıoğlu Park are sufficient in terms of equipment, the lack of fountains and garbage cans in Adalet Park creates a lack of equipment. Too few organized events were held. In all 3 parks, it is dark

during the evening periods due to whether the lighting element is not used or due to lack of lighting elements. The number of users in the walking path and sports areas was low, especially in the mornings and at noon.

- The number of people in periods was observed most often in the afternoon. Few people were observed during the morning periods and could not be observed from time to time. However, the highest number of people in Muhsin Yazıcıoğlu Park was observed in the evenings. In total 3 parks have more users on average on the weekend. When looked at by park, the average number of people coming to Muhsin Yazıcıoğlu Park on weekdays and weekends is almost equal and even more on weekdays.
- There are large differences in the number of people in target areas. While picnic areas are usually observed intensively by people, sports fields and walking paths are observed very little compared to the picnic area.
- Picnic, sitting and climbing/sliding are the top 3 activities, while reading is the least common activity. The situation is the same in 3 parks.
- When the parks are analyzed in general and the 3 parks are analyzed separately, inactivity is dominant in the activity levels of the people. The level of vigorous activity is very low.
- METs were calculated according to parks, target areas, and periods. According to the parks, Muhsin Yazıcıoğlu Park has the highest MET value. METs per unit m^2 area were calculated based on parking areas. The highest METs per m^2 are in Aşkar Höyüğü Park and the lowest in Muhsin Yazıcıoğlu Park. The reason for the low MET per m^2 in Muhsin Yazıcıoğlu Park is the low number of users compared to the size of the park. When looking at the target areas, the area where the MET is the lowest is the picnic area. According to the target areas in Aşkar Höyüğü Park, the most effective place of MET is the children's playground, the most effective place in Muhsin Yazıcıoğlu Park is the sports area, and the most effective place in Adalet Park is the walking path. In terms of periods, the lowest MET is at noon in all 3 parks, but the effective periods are different. The most effective period in Aşkar Höyüğü Park is in the morning, while the most effective period in Muhsin Yazıcıoğlu Park and Adalet Park is in the evening.
- Using Pearson Chi-Square analysis, differences between the park, target areas and periods, and park users were examined. When looking at the park and demographic characteristics, no difference was detected, but a significant difference was detected in the child age group ($p = 0.038$). There are few children in the Adalet Park. Within the scope of the research, statistically significant differences were found in the number of users, gender, and age ($p=0.000$) in the target areas. When demographic characteristics were analyzed according to periods, no difference was detected in the number of users, but a significant difference was detected in male users ($p = 0.001$). When looked at by age group, significant differences were detected in the younger age group ($p = 0.032$). Male users and younger age group users were observed in very small numbers in the morning period.
- Using Pearson Chi-Square analysis, differences between parks, target areas, periods, and activity levels were examined. No difference could be detected between parks and activity levels. The three parks are dominated by sedentary, walking, and vigorous activity levels, respectively. When looking at the target areas, statistically significant differences ($p = 0.000$) were detected. The picnic target area is dominated by inactivity, while the other target areas are dominated by walking and vigorous activity levels. According to the findings, no difference was detected in the activity levels in the periods.

Today, society's lack of sufficient knowledge about physical activity, and inadequate perception of the importance of physical activity for health, and lack of sufficient physical activity have become one of the reasons for the increase in obesity, sedentary life, and many diseases in society. Parks provide opportunities for people in cities to get away from busy urban life, satisfy their longing for nature, and engage in recreational activities. As a result of the observations and analyses, suggestions have been made that will contribute to the creation of new recreational areas that will

support physical activity and increase the service level of physical activity areas by providing qualified and necessary data for the planning and design of existing and future parks.

- The accessibility of the parks allows people to carry out their physical activities. Situations that prevent access must be eliminated. Walkways and circulation paths should be designed by the standards and should be connected without interruption.
- Reinforcement elements should be added to areas where lighting elements and fountains are insufficient.
- Supervision should be increased in the morning and evening hours in Aşkar Höyüğü Park and Muhsin Yazıcıoğlu Park.
- Park irrigation should be done during the hours when park users are not present because the wetting of seating elements and grass due to irrigation makes that area unusable.
- Organized events that will allow physical activity should be organized by park management and municipalities. Encourage people to participate in organized activities such as cycling, collective walking, and outdoor fitness. Platforms for aerobics should be placed in certain areas. Fitness equipment should be in a certain area, designed in different sizes, and appeal to all age groups. Achieving this goal will require the recruitment and training of more staff, including coaches, activity controllers, and event planners.
- Sports fields should be designed by standards. Tribunes or seating areas should be created around the field for those who come to watch sports activities. Sports fields should be diversified by creating areas suitable for baseball and tetherball activities, which are not widely practiced in Turkey. It is forbidden to enter most parks with bicycles due to the risk of accidents. To prevent this, bicycle paths must be built by standards separate from pedestrian circulation in the park.
- Children are our future, the most suitable areas where they can be healthy individuals and perform physical activities are children's playgrounds. As a result of observations made in parks, children's play groups, especially climbing/sliding, should be developed. Children's playgrounds should be separated according to age groups. The area for young children should be designed to be more eye-catching, and colorful, with animal figures etc. Since sandboxes help children's mental development and develop their imagination, sandboxes of different shapes should be included in parks. Areas should be created where they can spend time with their parents. The age limit of 13 should be removed for playgroups in parks, and play groups not only for children but also for adults should be created and placed in parks. Larger slides, Ferris wheels, and swings should be built. Competitive game elements that increase arm, and leg movements and balance should also be used.
- To attract elderly users to the parks, special design areas of the parks need to be created. A short-distance, flat, non-slippery walking path supported by handrails and fitness equipment that requires light strength should be designed.
- Chess aimed at improving intelligence and play elements that require manipulative play skills should also be added to the parks. Seating areas should be provided for spectators for chess/checkers activities. Large grass areas should be created for picnic areas. Areas that can meet the needs of every person should be designed in parks. When designing areas, standards should be adhered to, and their surfaces and dimensions should be suitable for human ergonomics.
- To increase the reading rate in the parks, mini libraries should be created, mass reading days, and under-tree reading events should be held.

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Resume

Esra Sivri İçöz began her undergraduate studies at the Faculty of Agriculture, Department of Landscape Architecture, Selcuk University, in 2013, and graduated with the title of Landscape Architect in 2017. In the same year, she commenced her Master's program at Selcuk University, Department of Landscape Architecture. Between 2019-2020, her thesis work was supported by BAP and she worked as an intern at Selcuk University, Department of Landscape Architecture. She received the title of Master of Landscape Architect in 2020. In 2020, she started her doctoral studies at Selcuk University, Faculty of Science, Landscape Architecture Department. Her doctoral studies are still going on. She has publications on various topics related to the physical and psychological effects of landscape areas.

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