

Examination of Parks in Terms of Cleanliness: A Case Study from Efeler, Aydın (Türkiye)

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Abstract

Study has indicated that urban green spaces close to people's homes that are large and visible, as well as well-maintained and clean, can be an effective strategy to increase physical activity and improve people's health. The study results indicate a positive relationship between cleanliness and maintenance, among the quality criteria of urban green spaces, and increased frequency of physical activity. Accordingly, cleanliness and maintenance may increase the use of urban green spaces and the frequency of physical activity. A low level of cleanliness causes the space to be used less.

In the study, 30 parks in the city of Efeler, Aydın (Türkiye), were examined, and the parks' cleanliness levels were determined. Observations were performed for eight days, for two weeks, on weekdays and weekends. The highest average daily litter number was detected in Nevzat Biçer Park (91 pieces of litter), Cumhuriyet Neighborhood, whereas the lowest average daily litter number was found in Tataristan–Bugulma Park (0.5 pieces of litter), Güzelhisar Neighborhood, and Yedi Eylül Park (0.5 pieces of litter), Yedi Eylül Neighborhood. The average daily litter number in all parks examined in the city of Aydın was found to be 10.19. Concerning the average daily litter number, Nevzat Biçer Park was revealed to be "Very dirty," and Tataristan–Bugulma park and Yedi Eylül Park were determined to be "Very clean." Except for Şehit Nedip Cengiz Eker Park in Meşrutiyet Neighborhood and Şehit Selim Kerim Çeri Park in Kurtuluş Neighborhood, which were "Clean," all parks examined in the city of Aydın were revealed to be "Very clean" in terms of the average daily litter number. Sunday (16.01.2022) was the day with the highest average litter number of 12.10 pieces of litter, followed by Wednesday (05.01.2022) with 11.50 pieces of litter. The lowest average litter number was determined on Wednesday (12.01.2022) with 8.03 pieces. The parks were found to be "Very clean" in terms of average litter numbers. While no litter was observed on certain days in 18 of the 30 parks examined, litter was observed every day in 10 parks. The highest number of parks with no litter observation was identified on weekdays (Monday, Wednesday, and Friday). Only in two parks, no litter was observed at the weekend (Sunday). While there was a statistically significant relationship between the litter number identified in the parks on weekdays, at the weekend, and throughout the week, the bin numbers in the parks and park sizes, there was no statistically significant relationship between the litter number and the distance of the parks from the city center. There should be more bins in large parks that will be planned and used intensively. Parks in neighborhoods where individuals with lower and/or middle socio-economic levels live should be cleaned frequently, as parks in neighborhoods where individuals with higher socio-economic levels live are cleaned.

Keywords: Maintenance, cleanliness, quality, park use and physical activity, Efeler, Aydın, Türkiye.

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I. INTRODUCTION

High-quality, well-designed, and well-managed urban public spaces and parks play an extremely important role in promoting individual welfare and add social, economic, and environmental values to cities [1]. Safe, clean areas also offer significant health benefits by encouraging people to walk more [2,3]. Successful, quality spaces attract people to live, visit, work, and invest in a certain area [4]. Hence, quality public spaces can increase the quality of life. Neglected, unmaintained, and poorly managed areas cause vandalism, anti-social behaviors, graffiti, and litter [5].

The quality standards of urban open green spaces are among the international standards [6]. Quality standards of open spaces and parks are studied in four groups, such as green flag standard [1,7,8,9], adoption standard [10], building with nature [11], and the place standard [10,12]. One criterion of the green flag standard

is being clean and well-maintained [1,7,9,10,13,14,15,16]. The concept of being clean and well-maintained includes litter and waste management and grounds and/or horticultural maintenance [7,13,15]. Quality standards ensure the sustainability of urban open green spaces [6]. The perceived quality of Public Open Spaces (POS) varies significantly according to cleanliness (dog fouling, litter, and graffiti) and maintenance status in particular [17]. Low levels of litter, adequate bins, cleanliness and maintenance are among the key quality criteria of open spaces [18] and parks [19]. One characteristic of the low quality of the open space is the low level of cleanliness [20].

One point advocated by the World Health Organization (WHO) is a beautiful and clean environment [21]. Cleanliness and a well-maintained appearance of the landscape are desired [22, 23], whereas waste dumps and litter, lack of cleanliness and maintenance are not desirable [22]. Open green spaces and urban parks should be clean, litter-free [6, 24,25], well-maintained, safe, culturally sensitive, and aesthetically pleasing [6].

According to a report on Environmental Justice and Race Equity in the European Union, environmental justice is defined as "... equal access to a clean environment and equal protection from possible environmental damage, regardless of any other distinguishing characteristics of race, income, class, or socio-economic status" [26].

Social environment, aesthetics, and perceived security in an area play a key role in people who want to use it [27]. Studies have indicated that litter and uncleanness adversely affect the aesthetics of parks [28,29,30,31,32, 33]. Studies have found that the perception of security is negatively affected by neglected buildings, graffiti, vandalism, and litter [34; 35; 36].

There is a positive relationship between the cleanliness of urban green spaces and the level of physical activity [27, 37]. Problems related to cleanliness, such as inadequate maintenance and litter, have been shown to adversely affect the use of parks [27]. The presence of unclean washrooms, vandalism, and litter can be a deterrent in using urban parks [38].

According to the results of a study on public open spaces and quality of life, the participants agreed that public open spaces contributed to the quality of life by providing a "healthy and clean living environment" (68.6%). According to the survey results of the same study, the participants mostly associated the quality of life with the physical characteristics of the environment, such as being accessible, well-maintained, and clean [39].

Surveys have been carried out to get households' opinions about the accessibility, quantity, and quality of outdoor areas, sports and recreation facilities in the settlement. In the surveys, being clean and litter-free are stated by respondents as the most desirable characteristics for all outdoor area types [40].

Studies on Royal parks in London [41] have indicated appearing clean and well-kept among the characteristics of parks considered prestigious by users [42].

In a survey study in which participants were requested to state why parks and open spaces were important to them, 39% of the participants answered, "being clean and well-maintained" [43].

In a study, residents mentioned the reason for the popularity of parks as having good facilities for children, providing open green spaces, and being clean. When asked how important it was to keep green spaces clean, most respondents (85%) stated that it was very important. The most important issue was security, which was followed by cleanliness and maintenance. Many comments have been made about the need to clean parks and have adequate bins [16].

A Citizen's Panel Survey (Oct 2012) was conducted to research the quantity and quality of open spaces. Among the most important problems in this survey, litter problems (42% in 2007) were determined by 13% [44].

With the online stakeholder survey, people's opinions about parks were investigated. According to the survey results, dog fouling, litter, vandalism, and poor maintenance are the most common complaints [14].

In a study investigating the relationship between park use, physical activity, and the characteristics of urban parks, especially the cleanliness of parks was defined as an important factor affecting the use of parks by both adults and children. Dirty or neglected areas, litter, and overfilled bins are among the issues that affect the cleanliness of parks [27].

The aim of this study is to examine the parks in Efeler, Aydın (Türkiye) in terms of cleanliness. In the study, the cleanliness levels of the parks were identified, and suggestions were made regarding the cleaning activities.

II. MATERIALS AND METHODS

Thirty parks in 13 neighborhoods in Efeler, Aydın (Türkiye) constitute the research material (Figure 1). The parks were selected by the random sampling method. The parks were visited between 03-16.01.2022, on weekdays (Monday, Wednesday, and Friday) and weekends (Sunday), between 17.00-19.30. The parks were visited in the evening to see how usage affects them. Litter numbers within a radius of 3 m of the bins in the parks were counted, and the cleanliness levels of the parks were found by classifying the values according to a 5-point Likert method (Table 1). The bin number in the parks, the litter number, the average litter number per

bin, and the average daily litter number on weekdays, at the weekend, and throughout the week were determined (Tables 2, 3). The area sizes of the parks and their distances to the city center were identified (Table 3). The data in the tables were interpreted, and correlation analysis was conducted to indicate the relationship between the data (Table 4). SPSS (Statistical Package for Social Sciences) software was used to analyze the data.

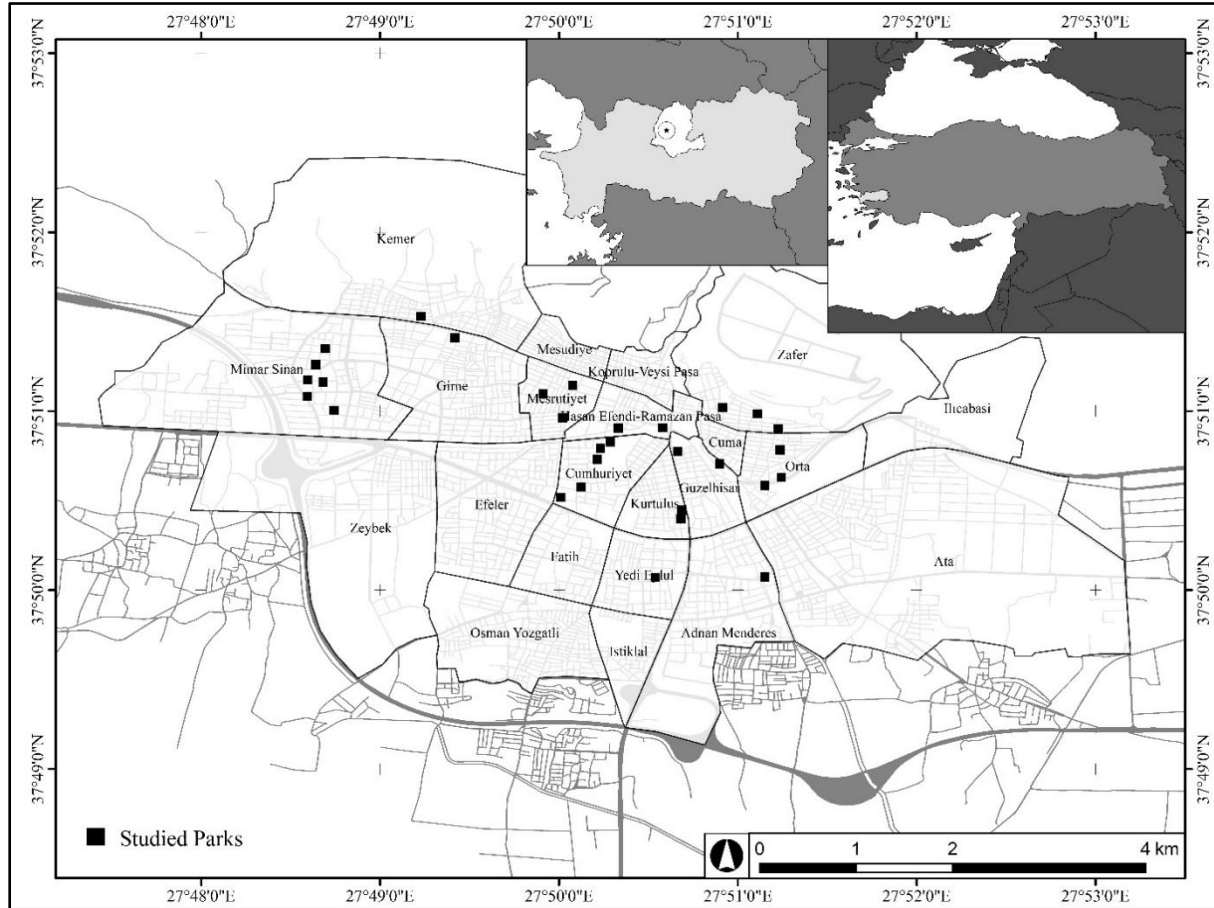


Figure 1: Study area.

Table 1. Cleanliness levels of the parks according to the litter number and the average litter number.

	Very clean (pieces)	Clean(pieces)	Moderately clean (pieces)	Dirty(pieces)	Very dirty (pieces)
Litter number	0-25	26-50	51-75	76-100	101-
Average litter number per bin	0-4	4.1-8	8.1-12	12.1-16	16.1-
Average daily litter number on weekdays	0-19	19.1-38	38.1-57	57.1-76	76.1-
Average daily litter number at weekend	0-16	16.1-32	32.1-48	48.1-64	64.1-
Average daily litter number throughout the week	0-18	18.1-36	36.1-54	54.1-72	72.1-

III. RESULT AND DISCUSSION

One park in each of Adnan Menderes, Cuma, Girne, Güzelhisar, Kemer, and YediEylül Neighborhoods, two parks in each of Hasan Efendi and Kurtuluş Neighborhoods, three parks in each of Meşrutiyet, Orta and Zafer Neighborhoods, five parks in Cumhuriyet Neighborhood, and 6 parks in Mimar Sinan Neighborhood were examined. In the parks, areas around 106 bins were examined. The highest bin numbers (14 bins) were found in İsmet Sezgin Park in Meşrutiyet Neighborhood, and it was followed by NevzatBiçer Park in Cumhuriyet Neighborhood (12 bins), Tataristan-Bugulma Park in Güzelhisar Neighborhood (7 bins), and Gençlik Park in Meşrutiyet Neighborhood (7 bins). The lowest bin numbers were found in Can Dostlar Park in Cumhuriyet Neighborhood, BarışSelçuk Park and FuatŞahinErlaçin Park in Hasan Efendi Neighborhood, and MaksutDoğan Park in Orta Neighborhood (one in each). In all parks, the average bin number is 3.53 (Table 2).

Except for January 12 and 16, 2022, the highest litter number (116, 125, 92, 90, 121, and 68 pieces, by date) in the examined parks was observed in NevzatBiçer Park in Cumhuriyet Neighborhood. On January 12

and 16, 2022, the highest litter number (67 and 71 pieces, respectively) was found in Adnan Menderes Park in Kurtuluş Neighborhood. On other dates, Adnan Menderes Park ranks second among the parks where the highest litter number was identified (57, 80, 58, 70, 63, and 66 pieces, by date). Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood was the third park where the highest litter number (28, 20, 22, 23, and 38 pieces, by date) was found on January 7, 9, 10, 14, and 16, 2022. On the dates when the highest litter number was detected, NevzatBiçer Park was found to be "Very dirty" for 3 days, "Dirty" for 2 days, and "Moderately clean" for 1 day. Adnan Menderes Park was found to be "Dirty" for 1 day and "Moderately clean" for 7 days. Şehit Selim KerimÇeri Park was found to be "Very clean" for 3 days and "Clean" for 2 days (Table 2).

In 18 of the 30 parks examined, no litter was observed on certain days (Very clean). No litter was seen in 8 and 9 parks on Mondays, 8 and 6 parks on Wednesdays, 5 and 3 parks on Fridays, and only in 2 parks on a Sunday. No litter was observed for four days in Tataristan–Bugulma Park in Güzelhisar Neighborhood (January 3, 5, 7, and 10, 2022), SabihaGökçen Park in Mimar Sinan Neighborhood (January 3, 7, 10, and 12, 2022) and YediEylül Park in YediEylül Neighborhood (January 5, 7, 10, and 12, 2022), for three days in GülizBosnalı Park in Adnan Menderes Neighborhood (January 3, 9, and 12, 2022), GazeteciBarışSelçuk Park in Hasan Efendi Neighborhood (January 5, 9, and 12, 2022), Ahmet EminArkayın Park in Orta Neighborhood (January 5, 10, and 14, 2022), for two days in Şehit Mehmet Erdem Park (January 3 and 12, 2022), Kemal Ünlü Park (January 7 and 10, 2022) and Kara Tren Park (January 3 and 12, 2022) in Cumhuriyet Neighborhood, ŞehitAbdurrahimÇakır Park in Girne Neighborhood (January 3 and 10, 2022), Prof. Dr. Necmettin Erbakan Park in Kemer Neighborhood (January 5 and 14, 2022), Ismet Sezgin Park in Meşrutiyet Neighborhood (January 3 and 10, 2022), AvrupaBirliği Park (January 5 and 10, 2022) and ErdalInönü Park (January 3 and 7, 2022) in Mimar Sinan Neighborhood, and for one day in Can Dostlar Park in Cumhuriyet Neighborhood (January 10, 2022), Ali Narin Park (January 5, 2022) and Muhsin Yazıcıoğlu Park (January 14, 2022) in Mimar Sinan Neighborhood, and ŞehitCemilGider Park in Zafer Neighborhood (January 5, 2022). Litter was seen every day in 10 parks where observations were made, including Özgecan Aslan Park in Cuma Neighborhood, FuatŞahinErlaçın Park in Hasan Efendi Neighborhood, Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood, Gençlik Park and ŞehitNedip Cengiz Eker Park in Meşrutiyet Neighborhood, Şehit Mustafa Korkmaz Park in Mimar Sinan Neighborhood, MaksutDoğanPark and Aliya Izzetbegovic Park in Orta Neighborhood, and Orhan Çiftçi Park and Aytepe Park in Zafer Neighborhood (Table 2).

According to the days, the park with the highest average litter number per bin is Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood. On five of the eight days (January 3, 7, 10, 14, and 16, 2022) when the parks were visited, the average litter number per bin in the park was the highest (10, 14, 11, 11.50, and 19 pieces, by date). On January 5, 9, and 12, 2022, the highest average litter number per bin (13.33, 11.67, and 11.17 pieces, by date) was determined in Adnan Menderes Park in Kurtuluş Neighborhood. On January 7, 10, 14, and 16, 2022, Adnan Menderes Park ranked second among the parks where the highest average litter number per bin (9.67, 10.5, 11, and 11.83 pieces, by date) was found. NevzatBiçer Park in Cumhuriyet Neighborhood is the third park where the highest average litter number per bin (10.42, 7.67, 7.5, and 10.08 pieces, by date) was determined on January 5, 7, 9, and 10, 2022. In terms of the average litter number per bin according to days, Şehit Selim KerimÇeri Park was found to be "Moderately clean" for 3 days, "Dirty" for 1 day, and "Very dirty" for 1 day. While Adnan Menderes Park was found to be "Moderately clean" for 2 days and "Dirty" for 1 day on the dates when the highest average litter number per bin was determined, it was found to be "Moderately clean" on the dates when it ranked second in terms of the highest average litter number per bin (four days). NevzatBiçer Park was found to be "Clean" for 2 days and "Moderately clean" for 2 days on the relevant dates (Table 2).

On the weekdays (Monday, Wednesday, and Friday) when observations were performed, the park with the highest litter number was NevzatBiçer Park in Cumhuriyet Neighborhood with 94.83 pieces, whereas it was followed by Adnan Menderes Park in Kurtuluş Neighborhood with 65.17 pieces and ŞehitNedip Cengiz Eker Park in Meşrutiyet Neighborhood with 24.33 pieces. The parks with the lowest average litter number on weekdays are Tataristan-Bugulma Park in Güzelhisar Neighborhood and YediEylül Park in YediEylül Neighborhood with 0.33 pieces of litter. The average litter number in the parks on weekdays is 9.78. NevzatBiçer Park in Cumhuriyet Neighborhood was the park with the highest average litter number, 79.50, on two Sundays when observations were made. Adnan Menderes Park in Kurtuluş Neighborhood ranked second with 70.50 pieces of litter, and Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood ranked third with 29.00 pieces of litter among the parks with the highest average litter number at the weekend. The park with the lowest average litter number at the weekend was GülizBosnalı Park in Adnan Menderes Neighborhood with 0.50 pieces of litter. At the weekend, the parks have an average litter number of 11.43. The highest average daily litter number throughout the week was determined in NevzatBiçer Park in Cumhuriyet Neighborhood (91 pieces), Adnan Menderes Park in Kurtuluş Neighborhood (66.50 pieces), and ŞehitNedip Cengiz Eker Park in Meşrutiyet Neighborhood (24 pieces). The lowest average daily litter number throughout the week was determined in Tataristan-Bugulma Park (0.5 pieces) in Güzelhisar Neighborhood, YediEylül Park (0.5 pieces) in

YediEylül Neighborhood and Ahmet EminArkayın Park (0.75 pieces) in Orta Neighborhood. The average daily litter number throughout the week in all parks examined in the city of Aydın was found to be 10.19 (Table 3).

According to the average litter number on weekdays, NevzatBiçer Park is "Very dirty," Adnan Menderes Park is "Dirty," and ŞehitNedip Cengiz Eker Park is "Clean." According to the average litter number on weekdays, all parks other than Şehit Selim KerimÇeri Park, which is "Clean," are "Very clean." In accordance with the average litter number at the weekend, NevzatBiçer Park and Adnan Menderes Park are "Very dirty," and Şehit Selim KerimÇeri Park is "Clean." According to the average litter number at the weekend, all parks other than ŞehitNedip Cengiz Eker Park, which is "Clean," are "Very clean." In accordance with the average daily litter number throughout the week, NevzatBiçer Park was determined as "Very dirty," Adnan Menderes Park as "Dirty," and ŞehitNedip Cengiz Eker Park as "Clean." All parks examined in the city of Aydın other than Şehit Selim KerimÇeri Park, which was "Clean," were found to be "Very Clean" in terms of the average daily litter number throughout the week (Table 3).

The highest average litter number in all parks in the city of Aydın was found to be 12.10 pieces on Sunday (16.01.2022), followed by 11.50 pieces on Wednesday (05.01.2022), 10.77 pieces on Monday (03.01.2022) and Sunday (09.01.2022). The lowest average litter number was determined as 8.03 pieces on Wednesday (12.01.2022). On all visiting days, the parks were observed to be "Very clean" in terms of the average litter number (Table 2).

Table 2. The bin numbers, the litter numbers, and the average litter numbers per bin in the parks.

Neighbor	Parks	B	3.01.2022		5.01.2022		7.01.202		9.01.2022		10.01.20		12.01.20		14.01.20		16.01.2022	
			LN	AL	LN	AL	L	AL	LN	AL	L	AL	L	AL	L	AL	LN	AL
Adnan	GülizBosnalı	2	0	0.0	1	0.5	4	2.0	0	0.0	3	1.5	0	0.0	3	1.5	1	0.5
Cuma	Özgecan Aslan	5	13	2.6	20	4.0	11	2.2	10	2.0	6	1.2	5	1.0	10	2.0	18	3.6
Cumhuriyet	Şehit Mehmet	2	0	0.0	1	0.5	3	1.5	3	1.5	3	1.5	0	0.0	3	1.5	3	1.5
	Can Dostlar	1	1	1.0	3	3.0	3	3.0	4	4.0	0	0.0	3	3.0	3	3.0	3	3.0
	NevzatBiçer	1	11	9.6	12	10.	92	7.6	90	7.5	12	10.	47	3.9	68	5.6	69	5.7
	Kemal Ünlü	2	3	1.5	1	0.5	0	0.0	3	1.5	0	0.0	1	0.5	3	1.5	3	1.5
	Kara Tren	2	0	0.0	2	1.0	2	1.0	2	1.0	1	0.5	0	0.0	1	0.5	2	1.0
Girne	ŞehitAbdurrahi	2	0	0.0	3	1.5	1	0.5	4	2.0	0	0.0	1	0.5	3	1.5	3	1.5
Güzelhisa	Tataristan-	7	0	0.0	0	0.0	0	0.0	1	0.1	0	0.0	1	0.1	1	0.1	1	0.1
Hasanefe	GazeteciBarışSel	1	1	1.0	0	0.0	3	3.0	0	0.0	1	1.0	0	0.0	4	4.0	3	3.0
ndi	FuatŞahinErlaçı	1	10	10.	10	10.	2	2.0	5	5.0	3	3.0	10	10.	3	3.0	10	10.
Kemer	Prof. Dr.	2	4	2.0	0	0.0	3	1.5	4	2.0	3	1.5	1	0.5	0	0.0	3	1.5
Kurtuluş	Adnan Menderes	6	57	9.5	80	13.	58	9.6	70	11.	63	10.	67	11.	66	11.	71	11.
	Şehit Selim	2	20	10.	22	11.	28	14.	20	10.	22	11.	10	5.0	23	11.	38	19.
Meşrutiyet	Gençlik	7	10	1.4	3	0.4	6	0.8	8	1.1	4	0.5	6	0.8	6	0.8	15	2.1
	ŞehitNedip	5	30	6.0	24	4.8	28	5.6	18	3.6	17	3.4	30	6.0	17	3.4	28	5.6
	İsmet Sezgin	1	0	0.0	2	0.1	5	0.3	14	1.0	0	0.0	2	0.1	1	0.0	15	1.0
Mimar Sinan	Şehit Mustafa	5	5	1.0	3	0.6	4	0.8	5	1.0	3	0.6	5	1.0	4	0.8	4	0.8
	Ali Narin	3	2	0.6	0	0.0	5	1.6	6	2.0	7	2.3	2	0.6	10	3.3	19	6.3
	AvrupaBirliği	3	4	1.3	0	0.0	2	0.6	6	2.0	0	0.0	5	1.6	5	1.6	16	5.3
	Erdalİnönü	2	0	0.0	2	1.0	0	0.0	3	1.5	4	2.0	6	3.0	4	2.0	3	1.5
Orta	SabihaGökçen	2	0	0.0	2	1.0	0	0.0	3	1.5	0	0.0	0	0.0	9	4.5	6	3.0
	Muhsin	3	4	1.3	1	0.3	1	0.3	5	1.6	3	1.0	1	0.3	0	0.0	1	0.3
	Ahmet	2	1	0.5	0	0.0	1	0.5	1	0.5	0	0.0	1	0.5	0	0.0	2	1.0
YediEylü	MaksutDoğanPa	1	3	3.0	7	7.0	3	3.0	7	7.0	3	3.0	1	1.0	4	4.0	3	3.0
	Aliya	2	12	6.0	14	7.0	9	4.5	15	7.5	10	5.0	14	7.0	12	6.0	11	5.5
Zafer	YediEylülParkı	4	1	0.2	0	0.0	0	0.0	1	0.2	0	0.0	0	0.0	1	0.2	1	0.2
	Orhan	2	11	5.5	6	3.0	3	1.5	7	3.5	5	2.5	9	4.5	7	3.5	3	1.5
	ŞehitCemilGider	2	3	1.5	0	0.0	5	2.5	1	0.5	1	0.5	1	0.5	3	1.5	3	1.5
LNavg	AytepeParkı	2	12	6.0	13	6.5	2	1.0	7	3.5	5	2.5	12	6.0	5	2.5	5	2.5
			10.		11.		9.		10.		9.		8.		9.		12.	

BN: The bin numbers LN: The litter numbers ALN: The average litter numbers per bin LNavg: The average litter numbers.

While the highest difference between the litter number on weekdays was seen in NevzatBiçer Park in Cumhuriyet Neighborhood (± 31.81), it was followed by Adnan Menderes Park in Kurtuluş Neighborhood (± 8.33) and ŞehitNedip Cengiz Eker Park in Meşrutiyet Neighborhood (± 6.09). The highest difference between the litter numbers at the weekend was found in NevzatBiçer Park in Cumhuriyet Neighborhood (± 14.85). While the second park with the highest difference between the litter numbers at the weekend was Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood (± 12.73), the third park was Ali Narin Park in Mimar Sinan

Neighborhood (± 9.19). Considering the whole week, the highest difference between the litter numbers was found in NevzatBiçer Park in Cumhuriyet Neighborhood (± 28.37), whereas Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood (± 7.92) ranked second, and Adnan Menderes Park in Kurtuluş Neighborhood (± 7.46) ranked third in terms of the difference between the litter numbers throughout the week. Significant differences were observed between the litter numbers in the parks on weekdays (± 20.29), at the weekend (± 18.56), and throughout the week (± 19.77). No homogeneous distribution was seen between the litter numbers in the parks at the specified times. There was little difference between weekdays (± 20.29), weekend (± 18.56), and throughout the week (± 19.77) in terms of litter number (Table 3).

Table 3. The average litter numbers, the bin numbers in the parks, the park sizes, and their distances from the city center.

Neighborhoods	Parks	The average	The	The average litter	The bin	Area	Distance
		litter numbers on	average	number througho			
		weekdays (piece	litter	ut the	numbers	(m ²)	s from
							the city
Adnan	GülizBosnalı	1.83±1.72	0.50±0.71	1.50±1.60	2	1596.22	2185.68
Cuma	Özgecan Aslan	10.83±5.42	14.00±5.66	11.63±5.26	5	3443.41	1053.94
Cumhuriyet	Şehit Mehmet Erdem	1.67±1.51	3.00±0.00	2.00±1.41	2	1388.53	1359.1
	Can Dostlar	2.17±1.33	3.50±0.71	2.50±1.31	1	63.35	942.76
	NevzatBiçer	94.83±31.81	79.50±14.8	91.00±28.37	12	25797.7	856.17
	Kemal Ünlü	1.33±1.37	3.00±0.00	1.75±1.39	2	2661.24	1106.66
	Kara Tren	1.00±0.89	2.00±0.00	1.25±0.89	2	1213.52	1539.31
Girne	ŞehitAbdurrahimÇakır	1.33±1.37	3.50±0.71	1.88±1.55	2	702.56	1835.3
Güzelhisar	Tataristan-Bugulma	0.33±0.52	1.00±0.00	0.50±0.53	7	2710.03	758.27
Hasanefendi	GazeteciBarışSelçuk	1.50±1.64	1.50±2.12	1.50±1.60	1	996.17	521.64
	FuatŞahinErlaçın	6.33±4.03	7.50±3.54	6.63±3.70	1	1753.3	687.59
Kemer	Prof. Dr. Necmettin	1.83±1.72	3.50±0.71	2.25±1.67	2	908.74	2162.37
Kurtuluş	Adnan Menderes	65.17±8.33	70.50±0.71	66.50±7.46	6	2698.37	1362.32
	Şehit Selim KerimÇeri	20.83±5.95	29.00±12.7	22.88±7.92	2	1594.5	1269.19
Meşrutiyet	Gençlik	5.83±2.40	11.50±4.95	7.25±3.81	7	4118.26	1087.36
	ŞehitNedip Cengiz Eker	24.33±6.09	23.00±7.07	24.00±5.83	5	2875.19	1010.29
	İsmet Sezgin	1.67±1.86	14.50±0.71	4.88±6.15	14	8381.68	832.08
Mimar Sinan	Şehit Mustafa Korkmaz	4.00±0.89	4.50±0.71	4.13±0.83	5	2567.28	2867.86
	Ali Narin	4.33±3.72	12.50±9.19	6.38±6.02	3	2115.13	2866.09
	AvrupaBirliği	2.67±2.34	11.00±7.07	4.75±5.09	3	1883.26	2800.46
	Erdalİnönü	2.67±2.42	3.00±0.00	2.75±2.05	2	1562.35	2940.75
	SabihaGökçen	1.83±3.60	4.50±2.12	2.50±3.38	2	807.19	2995.13
	Muhsin Yazıcıoğlu	1.67±1.51	3.00±2.83	2.00±1.77	3	3111.87	3005.66
Orta	Ahmet EminArkayın	0.50±0.55	1.50±0.71	0.75±0.71	2	1738.77	1346.8
	MaksutDoğan	3.50±1.98	5.00±2.83	3.88±2.10	1	453.39	1144.84
	Aliya İzzetbegoviç	11.83±2.04	13.00±2.83	12.13±2.10	2	1375.04	1336.2
YediEylül	YediEylül	0.33±0.51	1.00±0.00	0.50±0.53	4	2950.78	2076.69
Zafer	Orhan Çiftçi	6.83±2.86	5.00±2.83	6.38±2.77	2	1658.55	780.78
	ŞehitCemilGider	2.17±1.84	2.00±1.41	2.13±1.64	2	702.36	1010.76
	Aytepe	8.17±4.71	6.00±1.41	7.63±4.14	2	2549.22	508.85
The average litter numbers		9.78±20.29	11.43±18.5	10.19±19.77	3.53±3.0		

While there was a statistically significant relationship (99%) between the litter numbers identified in the parks on weekdays, at the weekend, and throughout the week, the bin numbers in the parks and park sizes, there was no statistically significant relationship between the litter numbers and the distances of the parks from the city center (Table 4).

Table 4. The relationship between the litter numbers and the bin numbers, park sizes, and the distances of the parks from the city center.

Dependent Variables	Bin numbers		Park area		Distance of the parks from the city center	
	R	p	R	p	R	p
The litter numbers on weekdays	0.507	0.004**	0.767	0.000**	-0.221	0.241
The litter numbers at the weekend	0.554	0.001**	0.708	0.000**	-0.188	0.320

Mean litter number	0.521	0.003**	0.757	0.000**	-0.214	0.256
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** : Correlation is significant (P<0.01)

IV. CONCLUSION

Because of aesthetic, health, and safety reasons, cleanliness and maintenance issues should be addressed [1345, 46]. There should be a policy in practice on vandalism, litter, and maintenance, and it should be revised [13, 46].

While the highest bin numbers were determined in the large and intensively used urban parks in Aydin city center [Ismet Sezgin Park in Meşrutiyet Neighborhood (14 bins), NevzatBiçer Park in Cumhuriyet Neighborhood (12 bins), Tataristan-Bugulma Park in Güzelhisar Neighborhood (7 bins), Gençlik Park in Meşrutiyet Neighborhood (7 bins)], the lowest bin numbers (1 bin) were observed in small and less used neighborhood parks (Can Dostlar Park in Cumhuriyet Neighborhood, GazeteciBarışSelçuk Park and FuatŞahinErlaçin Park in Hasan Efendi Neighborhood, MaksutDoğan Park in Orta Neighborhood). The fact that Ismet Sezgin Park is in the school district, NevzatBiçer Park is located adjacent to one of the two biggest shopping malls of Aydin city, and Tataristan-Bugulma Park is located adjacent to Atatürk City Square in the city center ensures their intense use. The bin's differentiation number can be influenced by the sizes and intense uses of parks.

NevzatBiçer Park in Cumhuriyet Neighborhood and Adnan Menderes Park in Kurtuluş Neighborhood, where the highest litter numbers were detected, are urban parks, and Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood is a neighborhood park. All these parks are in the city center and are intensely used. The fact that NevzatBiçer Park is located adjacent to one of the biggest shopping malls of Aydin, Adnan Menderes Park is on the main artery of the city, Adnan Menderes Boulevard, and it houses a cafeteria used intensely all day and year round, and Şehit Selim KerimÇeri Park is located adjacent to Atatürk State Hospital can be stated as the reasons for observing the highest litter numbers in these parks.

No litter was observed in 18 of the 30 parks examined on certain days, and they were found to be "Very clean," which shows that cleaning activities are performed regularly in these parks. The fact that the highest number of parks with no litter observation was seen on Monday, followed by Wednesday and Friday, and litter was found in almost all the parks (except 2 parks) on Sundays shows that cleaning activities are mainly carried out in the parks on weekdays, and there are disruptions in weekend cleaning. The reason why no litter was observed in Tataristan-Bugulma Park in Güzelhisar Neighborhood on four of the eight observation days, despite its location adjacent to Atatürk City Square and its intense use, and only one piece of litter was encountered on other days is the regular cleaning activities performed there due to the park's location adjacent to Atatürk City Square. The reason why no litter was observed in SabihaGökçen Park in Mimar Sinan Neighborhood and YediEylül Park in YediEylül Neighborhood on four days and little litter was observed on other days (2, 3, 9, and 6 pieces in SabihaGökçen Park in Mimar Sinan Neighborhood, 1 piece in YediEylül Park in YediEylül Neighborhood) is that mostly individuals with higher socio-economic levels live in these two neighborhoods, and therefore the parks are cleaned during the day. The observation of litter in 5 of the 7 parks (Özgecan Aslan Park in Cuma Neighborhood, MaksutDoğan Park and Aliya Izzetbegoviç Park in Orta Neighborhood, Orhan Çiftçi Park and Aytepe Park in Zafer Neighborhood) examined in Cuma, Orta, and Zafer Neighborhoods, where mostly individuals with lower socio-economic levels live, on all observation days, and no litter observation in one park (ŞehitCemilGider Park in Zafer Neighborhood) only on one day show that these parks are not cleaned. Regular maintenance is required for end-users to perceive the urban green space as safe, clean, and well-maintained [47].

The low bin number (2, 6, and 12, respectively) compared to the high litter number observed in the parks is the reason why Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood, which ranks third among the parks where the highest litter number was detected, is the park with the highest average litter number per bin according to days, why Adnan Menderes Park in Kurtuluş Neighborhood, which ranks second among the parks with the most litter, ranks second among the parks where the highest litter number per bin was observed according to days, and why NevzatBiçer Park in Cumhuriyet Neighborhood, where the highest litter number was identified, is the third park where the highest average litter number per bin was found according to days.

The common characteristics of NevzatBiçer Park in Cumhuriyet Neighborhood (91 pieces of litter), Adnan Menderes Park in Kurtuluş Neighborhood (66.50 pieces of litter), and ŞehitNedip Cengiz Eker Park in Meşrutiyet Neighborhood (24 pieces of litter), where the highest average daily litter number was determined among all parks throughout the week, is that they are in the city center. Other reasons why they have the highest average daily litter numbers among all parks are that they are adjacent to a shopping mall (NevzatBiçer Park), they are on the main boulevard of the city (Adnan Menderes Park), and they are close to the Wednesday market (ŞehitNedip Cengiz Eker Park). Tataristan-Bugulma Park (0.5 pieces of litter) in Güzelhisar Neighborhood, YediEylül Park (0.5 pieces of litter) in YediEylül Neighborhood and Ahmet EminArkayın Park (0.75 pieces of litter) in Orta Neighborhood, where the least average daily litter numbers were observed throughout the week,

are cleaned during the day (Figure 2). The fact that Sunday ranks first and third among the days with the highest average litter number in all parks in the city of Aydın (first with 12.10 pieces of litter on 16.01.2022, third with 10.77 pieces of litter on 09.01.2022), demonstrates that the parks are used intensely on Sunday.



Figure 2: Aydın's dirtiest [NevzatBiçer park (a), Adnan Menderes park (b), ŞehitNedip Cengiz Eker park (c)] and the cleanest [Tataristan-Bugulmaparkı (d), YediEylülparkı(e), Ahmet EminArkayınparkı (f)] parks.

Cleaning activities should be increased at weekends, especially on Sundays when the most litter is observed because of the intense use of all parks. Cleaning activities should also be carried out during the day in Özgecan Aslan Park in Cuma Neighborhood, FuatŞahinErlaçın Park in Hasan Efendi Neighborhood, Şehit Selim KerimÇeri Park in Kurtuluş Neighborhood, Gençlik Park and ŞehitNedip Cengiz Eker Park in Meşrutiyet Neighborhood, Şehit Mustafa Korkmaz Park in Mimar Sinan Neighborhood, MaksutDoğan Park and Aliya İzzetbegoviç Park in Orta Neighborhood, Orhan Çiftçi Park and Aytepe Park in Zafer Neighborhood, where litter was observed on all observation days, in Can Dostlar Park in Cumhuriyet Neighborhood, Ali Narin Park and Muhsin Yazıcıoğlu Park in Mimar Sinan Neighborhood, and ŞehitCemilGider Park in Zafer Neighborhood, where litter was not seen only on one day, and in Nevzat Park in Cumhuriyet Neighborhood and Adnan Menderes Park in Kurtuluş Neighborhood, whose cleanliness levels were determined as "Very dirty" and "Dirty." In this way, the cleanliness levels of NevzatBiçer Park and Adnan Menderes Park can be increased to "Clean" and "Very clean" levels. All the parks where litter was observed every day, except Şehit Mustafa Korkmaz Park in Mimar Sinan Neighborhood, are in neighborhoods where individuals with lower and/or middle socio-economic levels live. For social justice, the parks in these neighborhoods, where individuals with lower and/or middle socio-economic levels live, should be cleaned frequently, as the parks in the neighborhoods in the city center, where no litter was found for three or four days, and where individuals with higher socio-economic levels live, except for one (Ahmet EminArkayın Park in Orta Neighborhood), are cleaned. Cleaning and maintenance should be carried out adequately and frequently in urban green spaces [47].

As bin numbers and park sizes increase, the litter number detected in the parks also increases. More litter was found in large parks and parks with more bins. In the parks near and/or far from the city center, a similar number of litter was observed. In all the parks examined, litter was homogeneously distributed on weekdays, at the weekend, and throughout the week. Large parks should have more bins.

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