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Park-Based Physical Activity, Users' Socioeconomic Profiles, and Parks' Characteristics: Empirical Evidence from Bangkok

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Abstract: It is beneficial to a person's physical and mental health to engage in regular physical activity, while public parks are a critical infrastructure for encouraging physical activity. However, little research has examined how parks' and users' characteristics affect activity intensity. Using primary data collected from 432 users of six public parks of different sizes in Bangkok, this study examined the relationship between park and user characteristics and moderate-to-vigorous physical activity (MVPA). Descriptive and inferential statistics were used to understand the user profile and usage of the parks. Logistic regression was employed to determine the association between MVPA and the characteristics of parks and park users. The results show that MVPA was positively influenced by gender (being male with MVPA of 29.0%), time spent in the parks (MVPA of 22.7%), weekend evenings by 21.6%, large park size by 18.9%, and availability of park facilities by 233.0%. However, age, marital status, and occupation did not influence MVPA. Our findings indicate that the improvement of park facilities and enlargement of park size can increase MVPA for various ages and genders. Furthermore, improving facilities in small parks, raising local awareness, and disseminating information about parks can boost MVPA.

Keywords: green spaces; moderate-to-vigorous physical activity; public parks; sustainable cities; urbanization

Citation: Miao, S.; Sasaki, N.; Tsusaka, T.W.; Winijkul, E. Park-Based Physical Activity, Users' Socioeconomic Profiles, and Parks' Characteristics: Empirical Evidence from Bangkok. *Sustainability* **2023**, *15*, 2007. https://doi.org/10.3390/su15032007

Academic Editor: Giuseppe Battaglia

Received: 8 December 2022
Revised: 16 January 2023
Accepted: 17 January 2023
Published: 20 January 2023

1. Introduction

Participation in routine physical activity is critical for preserving one's current level of health and reducing the risk of developing chronic health disorders such as diabetes and cardiovascular diseases [1]. The fourth most important risk factor for mortality worldwide is inactivity. The Sustainable Development Goals of the United Nations prioritize the value of healthy living at all ages [2]. On the other hand, physical inactivity is a global pandemic, causing five million deaths each year through its effects on various non-communicable diseases [3]. Until recently, more than 100 epidemiologic studies together looked into the linkage between physical exercise and mortality risk around the world [4]. Previous studies found that physical inactivity is a major reason behind the rise of global obesity, and these people are more likely to suffer cardiovascular diseases, high blood pressure, type 2 diabetes, stroke, colon cancer, and early death [5,6]. According to the World Health Organization (WHO) [7], a low level of physical activity is the fourth largest cause of death, resulting in an estimated 3.2 million fatalities and a loss of 32.1 million disability-adjusted life years (DALYs) (or approximately 2.1% of global DALYs). Consequently, an estimated USD 68 billion was lost to the global economy as a result of inactivity, which led to direct healthcare expenditures (USD 54 billion) and a loss of work productivity of USD 14 billion annually [8].

There is evidence that engaging in physical education, exercise, and sport promotes psychological and social well-being and aids in the detection and treatment of drug de-

pendence (Sustainable Development Goals-3.5), which is "premature mortality from non-communicable diseases" [2]. Unfortunately, more than 80% of the world's teenagers do not meet the required levels of physical exercise, and 25% of people do not satisfy these standards [9]. Over the week, people who have at least 30 min of moderate-intensity exercise are 20–30% less likely to die than those who do not [7]. Moreover, the situation in the urban areas needs more attention, where a larger population resides. For instance, Moniruzzaman et al. [10] and Padrão et al. [11] revealed that the rural population is more physically active than the urban population. Likewise, Mengesha et al. [12] and Kavanagh et al. [13] found that the prevalence of ischaemic stroke, non-insulin-dependent diabetes, and coronary heart disease is higher in urban areas due to physical inactivity [14]. The lack of access to nature, a sedentary lifestyle, obesity, different chronic diseases, and social issues are features of urban living [15]. Urban parks are frequently neglected despite significant government expenditure in their development and maintenance; e.g., 40% of people in Victoria, Australia, have never visited parks [15].

The literature shows that moderate-to-vigorous physical activity (MVPA) correlates with individual characteristics and parks' basic facilities as well as environmental aspects [12]. Another study found that access to recreation facilities and locations, transportation quality, and aesthetic aspects environmentally correlate with adults' overall physical activity [16]. Therefore, environmental aspects may influence the total amount of time spent participating in physical activities [17,18]. Besides, people living close to public parks and other types of green spaces in urban areas tend to have higher levels of MVPA [19–21]. Therefore, city parks are essential for engaging urban residents to be physically active. Apart from being a public infrastructure, public parks provide a setting that offers more opportunities to engage in physical activity, appreciate the beauty of nature, and mingle with one another [22]. It was thus suggested that increasing the availability of public parks is an effective strategy for the government to raise the physical activity of the population, especially in urban areas [23].

The design of the urban environment has the potential to increase physical activity significantly. Findings from 14 cities worldwide suggested a promising result, which involves urban planning, transportation, and the park sector in efforts to reduce the health burden from the physical inactivity pandemic [3]. Cities are appealing economic hubs due to the jobs, social connections, events, and other opportunities they provide [24]. A previous study indicated that improving urban environments, such as green spaces and public parks, can lead to the improvement of human health in urban areas [3]. For example, Nieuwenhuijsen [24] showed that in Barcelona city, 500 superblocks were planned to reduce motorized traffic, thereby providing green spaces for active travel as part of the strategies to improve human health by designating a large area of roughly three-by-three blocks as shared-use space with bicyclists, pedestrians, and people who wanted to sit at street picnic tables, while providing equal priority to cars [25]. As a result, nearly 700 premature deaths in Barcelona were avoided each year [26]. Hence, public parks may be a catalyst for the improvement of the quality of life in urban areas and a solution to ecological problems [27].

Due to the rapid economic growth occurring in Thailand, the rate of urbanization has increased over time, and the number of urban parks with moderate size has increased significantly [28]. As Bangkok accounts for over half of the Thai urban population and almost two-thirds of all urban growth [29], more people are being exposed to air pollution and health damage. Therefore, it is critically important that effective urban planning with the increased availability of green spaces and public parks is needed to minimize health damage in urban areas by improving the city's aesthetics, conformability, health, and agility. [28]. A recent study indicates that while neighborhood services need to be increased in the urban areas, this may also necessitate a fairly radical rethinking of modern cities that can accommodate a mixing of different population groups in Thailand [30].

Previous research on MVPA focused on developed countries such as South Korea and Japan [28], while there are limited studies from Southeast Asia, especially in Thailand [31]. Until recently, a few studies explored the factors influencing MVPA among the Thai popu-

lation. For example, Kitreerawutiwong et al. [32] examined the individual, interpersonal, and environmental aspects related to older persons' physical activity in Wangthong District, Phitsanulok, Thailand. Katewongsa et al. [33] studied the prevalence of MVPA among adult Thais by incorporating pooled panel data from 2012 to 2019 and revealed that the proportion of Thai adults who met WHO recommendations for adequate physical activity increased over time during the study period, indicating that more Thai people began to take part in MVPA. As a result of the high density of buildings in Bangkok, public parks, green spaces, and open spaces are becoming increasingly important for improving public health [34]. Nevertheless, not only parks and green spaces are important, but park facilities and users' individual characteristics play important roles in determining people's MVPA level [35]. Worse yet, limited knowledge is available to uncover the relationship between park users' characteristics and MVPA to facilitate effective urban planning in Bangkok. Our study aims to investigate park users' and parks' characteristics that influence MVPA in Bangkok, using primary data collected from the users of various parks in the city.

2. Reviews of Moderate-to-Vigorous Physical Activity and Park Characteristics

Park-based physical characteristics play important roles in determining people's MVPA levels [35]. People can exercise more in parks because of the variety of amenities and attractions [28]. For instance, athletic fields and courts, exercise stations, and jogging and cycling tracks are typically intended to encourage physical activity. A high correlation between the presence of these facilities and increased levels of physical activity in the park was also found [36]. A study indicates that barriers to park use, such as lack of access, safety concerns, and poor facility upkeep, are linked with increased insufficient physical activity [37]. Playgrounds, basketball courts, paved trails, water features, shelters, and picnic spaces have all been highlighted as amenities that promote park use and physical activity [38]. It was found in the USA that each additional acre of park property was related to a nine percent increase in park usage in the USA [37]. In England, researchers discovered a significant drop in park usage as physical proximity increased [39]. In addition, it was also found that park users' socioeconomic characteristics, such as age, marital status, income level, and occupation, play an essential role in park usage for physical activities [38]. Aliyas and Jafari [40] revealed that the involvement of MVPA in large parks is 1.4 times more than in small parks. Likewise, males were more engaged in MVPA than females [32]. Kitreerawutiwong et al. [32] reported that the young were 1.5 times more involved in MVPA than older park users. Likewise, higher income users were 1.8 times more involved than low-income users.

Parks are associated with various social, psychological, physical, economic, and environmental benefits [41]. Previous research among both adults and children indicated that exercise facilities, including parks, that are conveniently situated (as assessed by self-reports) are connected with MVPA [42], while physical activity is linked to psychological well-being and exercise can reduce depressive symptoms among those who have been diagnosed with depression [43] (Figure 1). Parks also have social benefits for the users. For instance, additionally, parks may encourage social interactions that are vital for preserving social capital and community cohesion [41]. Parks for outdoor recreation may also provide their communities with various direct and indirect economic benefits [44]. Parks may also help to preserve and purify the environment because urban trees can help to reduce air pollution by absorbing and storing gaseous contaminants, removing them from the environment [45]. Because parks are often densely forested places, their potential environmental contribution must be considered when undertaking urban planning [41].

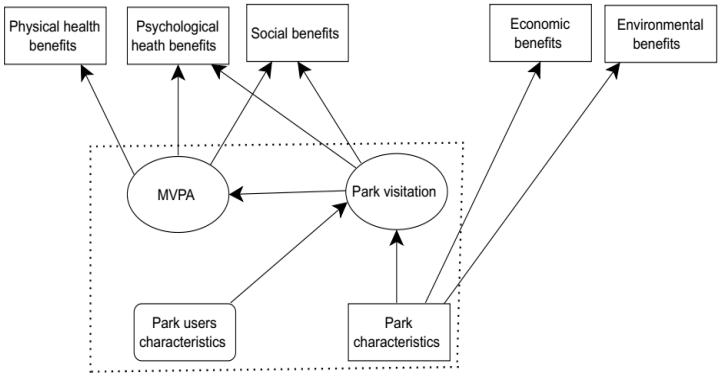

Figure 1. Conceptual diagram indicating the relationship of MVPA with parks' and park users' characteristics. Source: [41]. The dashed line rectangle shows the scope of this study.

3. Materials and Methods

3.1. Study Sites

According to the data synthesis of Bangkok's geographic information, Bangkok consists of 50 administrative districts, 2,234,581 buildings, and 74,002 primary and secondary streets. Bangkok is selected as a study site because of its highest rate of urbanization [46]. In Bangkok, there are 13 large parks, 17 medium-sized parks, and 68 small parks [47]. Bangkok has the largest and densest population [48] with the largest number of parks available in the city [28]. A total of six parks were selected and grouped into different size categories [28,49]. These parks have the same climatic conditions, service area, and population as they are all located in Bangkok. In accordance with the definition used in previous studies, these parks were selected based on the physical setting and location covering the nearly equal surrounding populations [47]. However, when two parks were in close proximity, we opted for the larger park or the one with more amenities because users' perceptions could be captured for detailed analysis [28]. Our study defines parks as large, medium, and small when their sizes are greater than 100,000 m^2, 40,000–100,000 m^2, and smaller than 40,000 m^2, respectively (Figure 2). With these definitions, the two large parks are Chatuchak Park, Suan Luang Rama 9 Park; the two medium parks are Rommaninat Park, Nong Chok Park; and the two small parks are Suan Luang Rama 8 Park, Sai Mai Park [28].

Figure 2. Map showing locations of the six selected parks for this study in Bangkok, Thailand.

3.2. Sampling

In 2021, Bangkok's entire adult population (>15 years of age) was 4.6 million [50]. Those younger than 15 years old were excluded from our target population. There-

fore, the sample size was calculated by employing the Yamane [51] formula following Yaseen et al. [52] (Equation (1)).

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

where n is the minimum suggested sample size, N is the adult population, and e is the margin of error. With a 5% margin of error and applying the Central Limit Theorem [53], the minimum suggested sample size was found to be 432 people. The sample size was equally distributed among the six parks for comparison. That is, 72 park users were interviewed in each park.

3.3. Data Collection

Due to time consumption, five assistants were trained to understand the criteria for selecting the responders, the questions to be asked, and the questions' intentions before collecting the data. The respondents' selection was based on: (i) their willingness to participate in the interview, (ii) their knowledge about the park and being a regular user of the park at least once a week, (iii) their age being above 15, and an ability to answer and understand the questions. The data collection was undertaken from February to May 2022 in the six chosen parks. These are normal routine months in Thailand except for the festival of 13–15 April 2022, when a new year celebration was held. The respondents were asked about the park's quality, level of physical activity, and socioeconomic profile. Interviews were conducted in the mornings (6.00 am to 9.00 am) and evenings (4.00 pm to 7.00 pm) on weekends and weekdays.

3.4. Questionnaire Development and Testing

To reduce biases and capture the responses as much as possible, we divided the questionnaire into three sections. The first section was about the demographic profile of the respondents; the second section contained respondents' characteristics related to park use, such as distance from the park, travel modes, job status, and income level; and the third section contained park physical characteristics. The questionnaire was written in English and translated into Thai, a local language, so that our assistants could communicate well with the respondents. For the face and content validity, the questionnaire was translated and back-translated by the experts (our assistants) who are fluent in both languages and understand the local culture. For variability and reliability, the questionnaire was pre-tested on 30 respondents, who were not part of the sample, and changes in the questions were incorporated accordingly. All suggestions and recommendations were incorporated as per [54] during the testing period to finalize the questionnaire. The statistical reliability needed for the facilities in the park was checked and found to be >80%.

3.5. Data Analysis

3.5.1. Variables for Measuring the MVPA

In the questionnaire, physical activity levels ranged from sedentary to light, moderate, and vigorous [28]. Sedentary activities included sitting, reading, eating a picnic, and standing [55]. Walking was classified as light physical activity (LPA), whereas physically tougher activities were recorded as MVPA [28,56]. This was based on the talk-test method [57] and subjective in the way in which the user was involved and then further categorized. In this study, the data were collected based on the size of the park, the number of features [50] in the park, and how close the park was to their residence [58].

We assigned a score of 1 for moderate-to-vigorous exercise and 0 otherwise (Table 1). Park features were scored on a five-point Likert scale and then converted into low and high levels of facilities [59]. Also, gender (1 = male, 0 = otherwise) [38] and marital status (1 = Married, 0 = otherwise) [28] were measured as binary variables, age in categories, and monthly income as categorical variables [38]. Likewise, the distance between park and home was measured in meters and was converted into a categorical variable [58]. Time of visit and travel mode were also categorical variables [60].

Table 1. Variables used for measurement of the MVPA in the study.

Variables Used in the Study	Measurement	Type	Relevant Literature
Physical activity	1 = Moderate to vigorous, 0 = otherwise	Binary	[28]
Age (years)	1 = 15–30 Years, 2 = 31–45, 3 = 46–60, and 4 = > 60	Ordinal	[61–63]
Gender	1 = Male, 0 = Otherwise	Binary	[38,64–66]
Marital status	1 = Married, 0 = Otherwise	Binary	[28]
Income level (THB per month)	1 = <5000, 2 = 5000–10,000, 3 = 10,000–20,000, 4 = 20,000–30,000, and 5 = >30,000	Ordinal	[38]
Job status	1 = Full time, 2 = Part-time, 3 = Retired, 4 = Jobless	Categorical	[28]
Distance from residence (meters)	1 = 0.0–805, 2 = 805–1609, 3 = 1609–3219, 4 = > 3219	Ordinal	[39,58,67]
Travel mode	1 = Walking, 2 = Bicycle, 3 = Motorbike, 4 = Public transport, 5 = Taxi, 6 = Private car	Categorical	[28,60]
Duration of stay at the park (minutes)	1 = 1–10, 2 = 10–30, 3 = 30–60, 4 = 60–120, 5 = > 120	Ordinal	[68]
Visiting time	1 = Weekday morning, 2 = Weekday evening, 3 = Weekend morning, 4 = Weekend evening	Categorical	[28,69]
Park category	1 = Small, 2 = Medium-sized, 3 = Large	Ordinal	[28,37,39]
Park facilities	1 = High-end facilities, 0 = otherwise	Binary	[36,38,59]

3.5.2. Statistical Analysis

Descriptive statistics such as frequencies and mean were used to understand each variable. Inferential statistics such as the chi-squared test and Fisher's exact test were used to understand the relations between the variables.

To examine the relationship between physical activity level and parks' and park users' characteristics, logistic regression was employed [28,70] (Equation (2)).

$$Y = f(X_1,\ X_2 \ldots\ldots\ldots X_n) \tag{2}$$

where Y is 1 if the physical activity level is above the threshold and 0 otherwise.

Xi represents the socioeconomic characteristics (age, gender, income, etc.) of park users and the parks' characteristics.

The logistic function is of the form (Equation (3)):

$$\Pr(Y = 1|X) = \phi\ (\mathrm{X}'\beta) \tag{3}$$

where ϕ is the logistic cumulative distribution function, X is a vector (1 × K) of independent variables, and β is a vector (K × 1) of the estimated coefficients.

4. Results

4.1. Facilities of the Parks

Of the six parks, Suan Luang Rama-9 Park had the highest availability of facilities, followed by Chatuchak Park and Nong Chok Park (Table 2). The large parks had most of the facilities, while the small ones had limited facilities, which were smaller in size.

Table 2. Available facilities inside the six studied parks in Bangkok.

Park Name	Park Level	Total Area (m^2)	Public Transport	Available Facilities †
Chatuchak Park	Large 1	248,228	Bus, BTS, MRT	1, 3, 5, 9, 10, 11, 12, 13
SSuan Luang Rama 9 Park	Large 2	800,000	Bus	11, 2, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13
Rommaninat Park	Medium 1	47,888	Bus, MRT	1, 3, 4, 5, 7, 9, 12, 13
Nong Chok Park	Medium 2	56,800	Bus	1, 3, 4, 5, 9, 10, 12, 13
SSuan Luang Rama 8 Park	Small 1	38,400	Bus, MRT	1, 3, 5, 9, 12, 13
Sai Mai Park	Small 2	14,344	Bus	1, 3, 4, 5, 9, 12, 13

Notes: † Different numbers denote different facilities. 1 represents a walking/jogging track; 2 represents a bicycle track; 3 represents children's playground; 4 represents ball sport area; 5 represents a plaza or multifunctional open space; 6 represents a swimming pool; 7 represents a skating rink; 8 represents an indoor gym; 9 represents a fitness area; 10 represents a bridge; 11 represents a greenhouse; 12 a pavilion; 13 a toilet.

4.2. Park Users' Socioeconomic Profile and Parks' Characteristics

Table 3 shows that 63% of the visitors were involved in sedentary activities and LPA, while 37% were engaged in MVPA. This binary variable was taken as the dependent variable in the regression analysis. Many of the visitors (41.9 percent) were between the ages of 31 and 45. Females were marginally fewer than their male counterparts. About 73.6 percent of the total visitors were married. One-third of the visitors (36.3 percent) had a monthly income in the range of THB 10,000–20,000, while 55.3 percent had full-time jobs. Approximately 34.3 percent came from a long distance (>2 miles), and 27.8 percent drove their own vehicle to reach the park. The evening was the preferred time for them to visit the park. Out of the total visitors, 61.1 percent rated the parks as high quality.

Table 3. Socioeconomic characteristics of the users interviewed in the six selected parks in Bangkok.

Characteristics	Number of Respondents (Persons)	Percentage (%)
Physical activity		
Sedentary and LPA	274	63.4
Moderate to Vigorous	158	36.6
Age (years)		
15–30	99	22.9
31–45	181	41.9
46–60	97	22.5
>60	55	12.7
Gender		
Female	210	48.6
Male	222	51.4
Marital status		
Single	114	26.4
Married	318	73.6
Income level (THB per month)		
<5000	47	10.9
5000–10,000	148	34.3
10,000–20,000	157	36.3
20,000–30,000	69	16.0
>30,000	11	2.6
Occupation		
Full-time work	239	55.3
Part-time work	96	22.2
Retired	51	11.8
Jobless	46	10.7
Distance from residence (meters)		
0.0–805	65	15.1
805–1609	70	16.2
1609–3219	149	34.5
>3219	148	34.3
Travel Mode		
Walking	73	16.9
Bicycle	37	8.6
Motorbike	94	21.8
Public transportation	88	20.4
Taxi	20	4.6
Private car	120	27.8
Duration of stay at the park (minutes)		
1–10	56	13.0
10–30	114	26.4
30–60	145	33.6
60–120	84	19.4
>120	33	7.6
Visiting time		
Weekday morning	107	24.8
Weekday evening	108	25.0
Weekend morning	105	24.3
Weekend evening	112	25.9
Park Size Category		
Small	144	33.3
Medium	144	33.3
Large	144	33.3
Park Facilities		
Low	168	38.9
High	264	61.1

4.3. Park Users' Socioeconomic Profile and Park-Related Factors Associated with MVPA

The relationship between parks and park users' characteristics/park-based physical activities is summarized in Table 4. In the age range 31–45, the percentage of those with MVPA was the largest (60.8 percent). The percentage of park visitors in the other age groups

was minimal. The chi-squared test shows a statistically significant difference ($p < 0.01$) between the various age groups and the varying degrees of physical activity. Likewise, for gender, the results show a difference in the physical activity levels between males and females, where males were more involved in MVPA than their female counterparts. As far as marital status is concerned, 59.6% of the single people visited the park for MVPA, while among the married, it was 28.3%. This suggests that singles participated more in MVPA than married ones. The park users were uniformly distributed in physical activity levels across different income levels, and the difference was statistically insignificant among the income group users.

Table 4. Association between MVPA and park users' and parks' characteristics.

Characteristics	LPA n (%)	MVPA n (%)	*p*-Value
Age (years)			
15–30	56 (56.6)	43 (43.4)	† 0.000 ***
31–45	71 (39.2)	110 (60.8)	
46–60	94 (96.9)	3 (3.1)	
>60	53 (96.4)	2 (3.6)	
Gender			
Female	147 (70.0)	63 (30.0)	0.007 ***
Male	127 (57.2)	95 (42.8)	
Marital status			
Single	46 (40.4)	68 (59.6)	0.000 ***
Married	228 (71.7)	90 (28.3)	
Income level (THB/month)			
0–5000	32 (68.1)	15 (31.9)	† 0.896
5000—10,000	94 (63.5)	54 (36.5)	
10,000–20,000	96 (61.1)	61 (38.9)	
20,000–30,000	44 (63.8)	25 (36.2)	
>30,000	8 (72.7)	3 (27.3)	
Occupation			
Full-time work	129 (54.0)	110 (46.0)	† 0.000 ***
Part-time work	55 (57.3)	41 (42.7)	
Retired	48 (94.1)	3 (5.9)	
Jobless	42 (91.3)	4 (8.7)	
Distance from residence (meters)			
0.0–805	45 (69.2)	20 (30.8)	0.398
805–1609	48 (68.6)	22 (31.4)	
1609–3219	88 (59.1)	61 (40.9)	
>3219	93 (62.8)	55 (37.2)	
Travel Mode			
Walking	62 (84.9)	11 (15.1)	0.000 ***
Bike	26 (70.3)	11 (29.7)	
Motorbike	58 (61.7)	36 (38.3)	
Public Transport	55 (62.5)	33 (37.5)	
Taxi	9 (45.0)	11 (55.0)	
Private car	64 (53.3)	56 (46.7)	
Duration of stay at the park (minutes)			
1–10	51 (91.1)	5 (8.9)	0.000 ***
10–30	80 (70.2)	34 (29.8)	
30–60	84 (57.9)	61 (42.1)	
60–120	41 (48.8)	43 (51.2)	
>120	18 (54.5)	15 (45.5)	
Visiting timing			
Weekday morning	89 (83.2)	18 (16.8)	0.000 ***
Weekday afternoon	68 (63.0)	40 (37.0)	
Weekend morning	69 (65.7)	36 (34.3)	
Weekend evening	48 (42.9)	64 (57.1)	
Park size			
Small	130 (90.3)	14 (9.7)	0.000 ***
Medium	90 (62.5)	54 (37.5)	
Large	54 (37.5)	90 (62.5)	
Park facilities			
Low	123 (73.2)	45 (26.8)	0.001 ***
High	151 (57.2)	113 (42.8)	

Notes: † shows Fisher exact test, while the rest are the chi-squared (χ^2) test *** indicates $p < 0.01$.

Those park users working full-time visited the parks for MVPA more than those working in other occupations. The second highest percentage of park users was observed in part-time employment. The retired and jobless were park users less involved in MVPA. The difference is significant ($p < 0.01$). Regarding the distance of residence from the park, although those living in the range of 1–2 miles seemed more involved in MVPA, the difference between the residence distance and physical activity level was statistically insignificant. On the other hand, the physical activity levels were different among the different travel modes ($p < 0.01$). Out of the total park users who walked, 84.9% were involved in LPA, while the percentage of MVPA increased when the park users used taxi cars and private cars as a mode of transportation. For the duration of stay in the parks, the more time spent in the park, the more users were engaged in MVPA. For instance, 55.0 and 46.7 percent of those staying 1–2 h and >2 h in the parks, respectively, reported MVPA ($p < 0.01$). Likewise, the highest percentage (57.1%) were involved in MVPA among those who visited the parks during the weekend evenings ($p < 0.01$). Furthermore, the results confirm that the MVPA incidence in large parks was more than in small and medium-sized parks. The availability of facilities in the large parks implies the high percentage of users being involved in MVPA.

4.4. Model Estimated Results of Factors Associated with MVPA

The variables are passed from collinearity diagnostics. The findings revealed no multicollinearity, as shown by the variance inflation factor (VIF) values < 2 for all the variables (Appendix A). A total of eleven independent variables were used to determine their association with the physical activity level (Table 5).

While setting 15–30 years of age as the reference category, the age range 31–45 years had a positive association with MVPA, However, it was found insignificant as shown by *p*-value = 0.113. In park visitors aged 46–60 years, the likelihood of engaging in MVPA decreased by 25.94 percentage points. On the other hand, the >60 age range had a negative effect on MVPA, suggesting that the park users in this age range were less likely to be engaged in MVPA (the marginal effect = −0.276) as compared to the reference group (15–30 years). For gender association with MVPA, compared to females, males were more likely (the marginal effect = 2.909) to be engaged in MVPA. Married people were less likely (the marginal effect = −0.184) to be involved in MVPA than singles.

The results of park distance showed that as compared to the reference category (0–0.5) miles, if the distance increased from 0.5–1 miles, the participation in MVPA was likely to decrease (the marginal effect = −0.166). Likewise, distances of 1–2 miles and >2 miles were negatively associated with MVPA, with marginal effects of −0.154 and −0.180, respectively. As for occupation, the people who were jobless were less likely (the marginal effect = −0.189) to participate in MVPA. Similar results were obtained for taxis and private cars as a mode of transportation. The mode of transport used to visit the parks showed that people who used public transportation were more likely (the marginal effect = 0.138) to be involved in MVPA. The length of time spent in the park was positively associated with the likelihood of engagement in MVPA. Specifically, stays of 10–30 min, 30 to 60 min, 1 to 2 h, and >2 h were positively associated with MVPA compared to the reference category with their marginal effects of 0.145, 0.215, 0.216, and 0.227, respectively. The results for visiting time show that compared to the weekday morning visitors, the likelihood of MVPA was higher among weekend visitors (weekend morning marginal effects = 0.11, weekend evening marginal effects = 0.22).

In terms of park size, MVPA occurred 15.2% more in medium-sized parks than in small parks. Likewise, MVPA was 18.9% more likely to occur in large parks than in small parks. Concerning the parks' facilities, the mean of all 40 indicators (facilities) was determined and split into low and high categories. With better facilities, MVPA increased 23.36% more than in parks with poor facilities.

Table 5. Factors associated with moderate-to-vigorous physical activity (MVPA): Logit regression.

Characteristics	Coefficient	*p*-Value	Marginal Effects	*p*-Value
Age (years)				
15–30	Ref.		Ref.	
31–45	0.565	0.115	0.080	0.113
46–60	−2.347	0.001 ***	−0.259	0.000 ***
>60	−2.596	0.017 **	−0.276	0.000 ***
Gender				
Female	Ref.		Ref.	
Male	1.170	0.000 ***	2.909	0.000 ***
Marital status				
Single	Ref.		Ref.	
Married	−1.608	0.000 ***	−0.184	0.000 ***
Income level (THB/month)				
0–5000	Ref.		Ref.	
5000–10,000	0.056	0.917	0.006	0.914
10,000–20,000	−0.000	0.999	−0.000	0.999
20,000–30,000	0.234	0.694	0.027	0.694
>30,000	−1.647	0.157	−0.179	0.113
Distance from residence (meters)				
0.0–805	Ref.		Ref.	
805–1609	−1.543	0.022	−0.166	0.013 **
1609–32,019	−1.437	0.020	−0.154	0.009 ***
>32,019	−1.665	0.010	−0.180	0.003 ***
Occupation				
Full-time work	Ref.		Ref.	
Part-time work	−0.349	0.332	−0.041	0.329
Retired	−1.256	0.125	−0.146	0.106
Jobless	−1.654	0.024	−0.189	0.012 **
Travel mode				
Walking	Ref.		Ref.	
Bicycle	0.587	0.415	0.067	0.413
Motorbike	0.567	0.360	0.065	0.353
Public transport	1.180	0.073 *	0.138	0.065 *
Taxi	1.820	0.034 **	0.211	0.027 **
Private car	1.596	0.008 ***	0.186	0.006 ***
Duration of stay at the park (minutes)				
1–10	Ref.		Ref.	
10–30	1.339	0.082 *	0.145	0.053*
30–60	1.941	0.011 **	0.215	0.003 ***
60–120	1.952	0.014 **	0.216	0.005 ***
>120	2.041	0.021 **	0.227	0.011 **
Visiting time				
Weekday morning	Ref.		Ref.	
Weekday afternoon	0.732	0.146	0.086	0.143
Weekend morning	0.920	0.054 *	0.110	0.049 **
Weekend evening	1.818	0.000 ***	0.216	0.000 ***
Park size				
Small	Ref.		Ref.	
Medium	1.313	0.01 **	0.153	0.006 ***
Large	1.613	0.000 ***	0.189	0.000 ***
Park facilities				
Low	Ref.		Ref.	
High	0.086	0.023 **	2.336	0.023 **
Pseudo R^2 = 0.4630, chi^2 *p*-value = 0.0000, Log likelihood = −152.32113				

* $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

5. Discussion

This study explored how the characteristics of parks and park visitors influenced the level of their MVPA. The statistics indicate that a large number of park visitors were relatively young. It might be due to the pandemic of COVID-19 that many young people were more involved than their older counterparts [71]. These findings align with Arifwidodo and Chandrasiri [28], who found that most park visitors in Bangkok were young adults. However, some studies from other Asian countries revealed that park users were mostly elderly [63], but their involvement in MVPA was low. Moreover, our findings indicated comparatively fewer park users in Bangkok, and that their MVPA was low. Previous studies reported a higher percentage of physical activity than ours. For instance, Kitreerawutiwong et al. [32] revealed that 44 percent of park users were engaged in MVPA. These findings might be due to the pandemic, during which most people spent less time in parks involved in MVPA.

Regression analysis revealed the link between MVPA and the characteristics of the parks and park users. Users in the medium age group participated more in MVPA, while older park users were less involved in MVPA; decreases in physical and psychological functioning, including decreased functional performance and greater disability, are seen in the growing cohort of older persons [72]. This result slightly differs from Arifwidodo and Chandrasiri [28], who found that adults and the elderly were more engaged in MVPA than teenagers. This might be due to the times our data were collected. We used morning and evening, which are usually considered the busy hours for park use, as supported by Sanz-Martín et al. [73], who suggested that weekend evenings were the most suitable times for MVPA. Moreover, compared to other groups of visitors, older adults have different perspectives, requirements, and preferences when using urban parks, as stated in one Romanian study [74]. Males were more engaged in MVPA than females. This may be because females use the parks accompanied by their families and children [62]. Therefore, female users have less time to be engaged in MVPA. Our findings are consistent with Arifwidodo and Chandrasiri [28] from Thailand, Van Dyck et al. [64] from the USA, and Lindberg and Schipperijn [65] from Europe. They reported that males were more involved in MVPA than female users. For marital status, it was found that married people were less likely to be engaged in MVPA than singles. Married users tend to visit in groups and have fewer chances of involvement in MVPA. Married users have children and have less time to spend in MVPA. This finding is in line with Puciato and Rozpara [75], who found that single people have a 70 percent greater chance of meeting the physical activity recommendations/guidelines of the WHO than married people. In contrast, Peralta et al. [66] revealed that married women had a higher level of MVPA compared to single women. Regarding the occupations of the users, compared to full-time job users, jobless and retired users were less engaged in MVPA. This is probably because retired people are in older age groups. The longitudinal study by Feng et al. [61] in the USA discovered that retired people were among the least involved in MVPA.

The time spent in the park was another factor influencing MVPA. The users' likelihood of participation in MVPA increased with more time spent in the park [4]. Weekend evenings were the most favorable time for practicing MVPA, presumably because people were less busy. According to a BBC report, cramming all your required weekly exercise into one or two weekend sessions is enough to receive substantial health benefits [69]. Therefore, the users mostly came on weekend evenings and did MVPA. It must be noted, however, that Arifwidodo and Chandrasiri [28] reported the insignificant association between weekend visits and MVPA.

Park size played an important role in influencing MVPA. Medium-sized and large parks were more attractive for people to engage in MVPA. As the park size increased, the likelihood of MVPA also increased. This implies that in the large parks the users were more involved in MVPA. This finding is consistent with Arifwidodo and Chandrasiri [28], Giles-Corti et al. [76], and Bai et al. [6], who reported that the size of parks influenced MVPA. On the other hand, some research did not observe a significant relationship between

park size and MVPA. For instance, Kaczynski et al. [77] stated that size and distance were not significant predictors of MVPA in Ontario, Canada. The effects of park size may differ from country to country. Kaczynski et al. [77] further suggested that park facilities were more important than park size. In our study, parks with better facilities encouraged people to participate more in MVPA than parks with poorer facilities. This is also consistent with other studies such as Aliyas and Jafari [40] from Iran, Arifwidodo and Chandrasiri [28] from Thailand, and Kaczynski et al. [77] from Canada.

A study in the USA found that several parks remained underutilized even after renovations, even though the facilities had been improved [78]. The top two qualities that encourage physical activity in parks are on-site marketing and supervised activities. Marketing activities are likely relevant in neighborhoods with low income. In our study, most of the visitors engaged in MVPA were young adults. Seniors were fewer in number in the use of parks for MVPA. As a result, few facilities were oriented toward seniors.

There are some limitations to our study and findings. The study was based on the users' perceptions. We selected the park users within the parks who were willing to be interviewed, thereby creating the possibility of biases because of the self-selection. Other biases may exist since our study site was in Bangkok's metropolitan area only. If the study had been undertaken in other regions of the country, particularly in the rural areas, it may have had different results. In addition, this investigation was undertaken during particular months of the year and MVPA is also influenced by seasonal changes. To cover the seasonal trends of MVPA, it would be preferable to conduct longitudinal research that spans all seasons. Nevertheless, the significance of our study findings cannot be disregarded. The study has substantial implications for policymakers on the influence of individual and park characteristics on physical activity in parks.

6. Conclusions

Engaging in physical activities promotes psychological and social well-being and is considered as a contribution toward targets set for SDGs. The data of 432 park users collected from six parks of different sizes in Bangkok were analyzed to investigate the users' profiles and their usage of the parks and the relationship between parks, parks' user characteristics, and moderate-to-vigorous physical activity (MVPA) as the measures of the regular physical activity of the park users for improving the urban health. We used descriptive and inferential statistics to assess the characteristics of the parks and their users. We used logistic regression to determine the association between MVPA and the characteristics of park users.

Users' characteristics, such as age, gender, marital status, occupation, and time spent in the parks, were found to have influenced MVPA at these parks. However, married people and females were less involved in MVPA. The sizes of the parks, available facilities, and the timing of visits influenced the MVPA levels. Large parks revealed higher MVPA levels than small and medium-sized parks. The findings revealed that better facilities enhanced the MVPA. Specifically, we found that male users' MVPA was 28.0% higher than that of females, MVPA time spent in the park was 22.7%, during weekend evenings it was 21.6%, large park size was 18.9%, and the availability of park facilities was 233.0%. To move forward and achieve the Sustainable Development Goals of the United Nations' "value of healthy living of all ages" (Sustainable Development Goals-3.5), there is the need for concrete steps to be taken to enhance MVPA. Our findings indicate that increasing MVPA would require facilities that are friendly to all genders and available in the evenings, and park sizes should be enlarged where possible. Raising awareness about the importance of urban parks for urban health and health improvement may also encourage more physical activities in parks. Nevertheless, our study findings may still contain biases because the data collection was performed only once. We suggest conducting seasonal surveys of the park users so that more accurate study results can be obtained, which would be useful for better-informed decision-making in urban park management for urban health.

Author Contributions: S.M. collected the data and prepared the first draft of the manuscript. N.S. supervised all the study and refined the manuscript. T.W.T. helped in the analysis of the data as well as editing the initial draft. E.W. proof-read the manuscript and refined discussion. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was approved by the Ethical Review Committee of the Asian Institute of Technology, Thailand.

Informed Consent Statement: All participants' consent to participate in the study was obtained before the interview.

Data Availability Statement: Data and other materials can be obtained from the corresponding author upon suitable request.

Acknowledgments: The authors are grateful to the China Scholarship Council (CSC) and the Asian Institute of Technology (AIT), Thailand for providing Ph.D. scholarship to the first author. The authors are also grateful to all study participants who spared their time for providing necessary data and information.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Multi-Collinearity Statistics

Characteristics	VIF
Age (years)	1.471
Gender	1.038
Marital Status	1.167
Income (THB/month)	1.124
Occupation	1.261
Distance from Residence (miles)	1.289
Travel Mode	1.400
Duration of stay at park (minutes)	1.148
Visiting time	1.150
Park size	1.343
Park facilities	1.084

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