Article

Spatio And Temporal Dimensions For The Public Usage of Urban Green Parks In Colombo, Sri Lanka

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ABSTRACT

Use and accessibility to green parks in urban environments by public is an indicator to measure the psychological and physiological sustainability of dwellers. Identifying the driving forces in selecting a park for leisure and discover the pattern of park usage in Colombo city, Sri Lanka were the main objectives of this study. A structured questionnaire was used to collect data from three types of respondents: regular park users who use the nearest park from residence, regular park users who don't use the nearest park to the residence and non regular park users. Initially, it was selected 2879 participants for this survey representing village administration of Colombo city limits and the questionnaire was returned by 2328 respondents. However, 12 forms were incomplete status, only 2311 responses were selected for further analysis. These respondents were selected randomly to represent each administrative division by considering the total population of them. Statistical Package for Social Sciences (SPSS) application was to analyze the characteristics of park users. It was revealed that nearly a half of the respondents do not use parks regularly and identified a number of characteristics of respondents and reasons for usage and non-usage of green parks regularly. Education, employment, age, civil status and accommodation type were identified as driving forces for the use of parks by general public. Safety and environmental factors were identified as the main issues on selecting parks. Study recommends to policy makers to identify these demerits to take immediate actions to popularize parks among public as an urgent requirement in the urban development and planning processes.

Keywords: *Green Parks; Urban; Use and Accessibility.*

1. Introduction

Green spaces, generally known as green parks, in urban environments perform a vital role in mitigating the environmental, social and cultural stresses of residents in urban areas which are created by the impact of unplanned urban expansion which is mostly known as urban sprawl and

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its related consequences (Kuang, et al., 2016; Cui and Shi, 2012). Generally, the extents of urban green parks are decreasing day by day in order to cater the basic needs of the urban population such as constructions for dwellings and providing infra structure facilities such as transportation, electricity, sanitation and water (Zhao et al., 2013). This situation is similar everywhere in the world and it is extremely critical in metropolitan cities of developing countries.

However, the main problem associated with these infra structure developments is the lack of proper planning (Jagoon et al., 2009). Specially, in the case of developing countries, urban planning and design systems have not been implemented or practiced properly due to social, economical, cultural and political influences and pressures (Hosseini et al., 2015). Even though there are city plans which have been prepared by the well experienced experts in the field, implementing them on the real ground and real situation is the main problem faced by the administrators. As a result, most of the cities have been converted into un-livable cities. And also, environmental factors such as surface temperature, pollution and noise in the cities are increasing day by day due to various human related activities (Kong and Nakagoshi, 2006; Bao et al., 2016; Byomkesh et al. 2012).

In addition to that, the mental fitness of urban dwellers is converting into a bad situation under these circumstances. Most of the public in urban areas are suffering from mental stresses due to overcrowding, unplanned urban sprawl, traffic congestion associated with higher noise levels, air pollution, higher surface temperature events due to global warming scenario and bad smells due to poor sanitation processes (Tzoulas et al, 2007; Hemakumara, 2016). Further, drastic land use and land cover changes have being influenced to increase the number of occurrences of disasters and their frequencies (Byomkesh et al., 2012). This would impact badly on the human well-being and their economical, social and cultural behaviors (Bogar and Beyer (2016). In order to mitigate these bad consequences of urban expansion processes, the concept of urban green spaces or urban green parks have been introduced by the most of urban planners around the world (Hosseini et al., 2015). Generally, green spaces perform a number of ecological functions such as reducing the spread of noise as a barrier, reducing the air pollution, mitigating the air temperature problem and conserving water and soil (Liu and Shen, 2014). Socially, they provide the space for recreation and cultural exchanges. And also, their role on reducing the mental stress is very important on the health of the communities (Liu and Shen, 2014).

This approach is well suited and successfully practiced as a sustainable solution to overcome the bad consequences of urbanization by many cities in the developed countries and regions such as USA, UK, Europe and Australia (Konijnendijk, 2003). Further, a number of standards and guidelines on urban green spaces have been introduced by various countries and institutions in order to maintain a sufficient extent as green spaces within the city premises on the concepts of availability, accessibility to green spaces, distance and extent giving the focus on the extent of the green space, population density of the area, access requirements and limitations, distances to them from the residential places (Hosseini et al., 2015). Generally, according to guidelines on green spaces or urban parks, they should give the facilities such as public parks, children's playgrounds, gardens, cycling paths, sports facilities, jogging tracks, open spaces, community gathering spaces and bare lands to get the maximum attraction of the general public (Hemakumara, 2016). However, the use of urban parks is still in the primary stage in the developing countries due to several economical, cultural and social barriers and behaviors of the general public. The use of urban green parks by the public is depend on several factors such as distance to the nearest park, travel time to reach to the park, facilities in the park, entrance limitations and restrictions, availability of natural environments in the park premises and type of the park (Schipperijn, et al., 2009).

The metropolitan area of Colombo, Sri Lanka plays a vital role as the main economical center of the country. Many people live in the city and the suburbs due to the abundance of facilities within it and in the closed proximity. Colombo is considered as the city with the highest

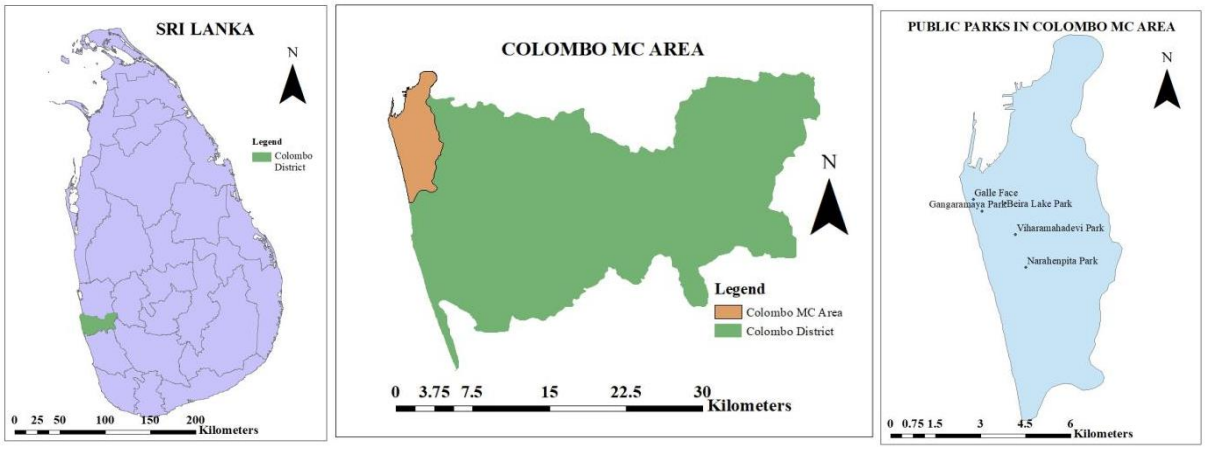
population density in the country. The main city covers an extent of 37 km^2 approximately and according to the Department of Census and Statistics (2012), the living population in Colombo is 555, 152 which is 2.7% from the total population of the country. Further, the daily floating population of Colombo is nearly 400,000 (Department of Census and Statistics, 2016). The main city area has been divided into 47 *Grama Niladhari* Divisions with 15 main administrative divisions.

According to Lin and Pussella (2017), the extent of green spaces in Colombo city has been dropped remarkably with the urbanization. Unplanned urbanization has been created a number of problems environmentally and socially. The bio-diversity of the city has been changed at an alarming rate. As a result, the health condition of the urban dwellers has been converted into bad. With the intention to overcome these issues sustainably, the government of Sri Lanka has taken some initiations to recover the green areas within the city and suburbs. As a result, the Urban Development Authority, the governing body for all activities in the urban areas in the country, implemented Colombo city development plan which was prepared by the experts in the city planning and administration field. They attempted several approaches with uplifting the quality of available urban parks and build up new urban parks within the closed proximity. And also, with the intention to make the city more green, city planners have been tried to enhance the green coverage by creating street tree layouts, green corridors, private green parks, public parks within governmental and private organizations and institutions.

However, in countries such as Sri Lanka, there is no trend to use green parks regularly. Generally, urban public maintains private gardens within their land parcels. However, the land management system of the city has been changed dramatically with the urbanization and its consequences. As a result of this, general public has no spaces within the land parcel to maintain a home garden in their lands. Therefore, currently, there is a trend to use green parks by them. Hence, it is a timely requirement to assess the use of urban parks by the general public. The main objective of this paper was to evaluate the pattern of use of green parks which are situated in Colombo city limits by the public (Figure 1). In addition to that, the study attempts to answer following research questions as well.

- What are the demographic factors affect on choosing a park for leisure activities?
- Is there any relationship between the factors and characteristics of parks?

Figure 1. (a) Sri Lanka Map, (b) Colombo MC Area, and (c) Public Parks in Colombo MC Area



(a) (b) (c)

Source Map: Survey Department of Sri Lanka

2. Literature Review

In Urban Green Parks perform different functions such as recreational and social functions, health activities of general public, protection of soils, managing disasters such as flood,

environmental education, improving the climate conditions, and providing a scenic environment in the urban area (Rahmanov et al., 2019). Further they provide some direct and indirect economical benefits to the general public and local municipalities. In order to maintain these positive remarks of urban green parks, most of these parks situated every where in the world are managed and controlled by the local authorities and provide easy accesses to the general public (Dharmawan and Rachmanıyah, 2020). These parks not only improve the quality of the urban life, but also provide a platform to engage urban dwellers with the nature (Fasihi, 2019; Torabi et al., 2020). As a result of these interactions with the natural environment, public can release their mental and physical stress (Yfantidou and Anthopoulos, 2017).

In locating and designing a park in an urban environment for the leisure activities of general public, urban planners need to consider a number of factors and parameters in order to get the maximum usage of it. Lam et al. (2005) identified walking distance from the city center (within 2-4 km) and easy accessibility to public transport (within 30-60 minutes walking distance)as important factors. Further, Liu et al. (2020) emphasized the importance of having spaces and facilities for recreational activities such as walking paths, sporting areas, picnic areas, playground for children and adults, refreshment area seating arrangements for observers in a park. Jo and Jeon (2020) stated that urban parks should be located in a pleasant environment as well as it needs to maintain a balanced urban ecosystem within it.

In order to maintain a good park specially in an urban area, Ozturk Kurtaslan (2017) listed a number of requirements. According to the conclusions of this research, a legal directive should be established with a clear purpose of declaration and implemented a master plan with the participatory approach. In addition to these basic requirements, further, urban parks require suitable activities for the general public with sufficient staff officers and equipment in order to provide a pleasant and rich environment for the users (Ozturk Kurtaslan, 2017). Also, they emphasized to have time to time assessments to analyze the behaviors and satisfaction levels of regular park users as well as ensuring the safety, security and well-being of users (Ozturk Kurtaslan, 2017). Also, they emphasized to have time to time assessments to analyze the behaviors and satisfaction levels of regular park users. Jahani and Saffariha (2020) stressed the importance of conducting periodic assessments on the satisfaction of general park users about the perticular park in order to ensure whether the park is paying special attention on the safety, security and well-being matters gently or not.

In the literature, it can be noticed that a number of preferences are there in order to select and use a park by an urban resident (Taylor et al., 2020). These include the size of the park, distance to the park from the residence, type and density of green, facilities, behavior of other users, noise and maintenance. Larson et al. (2016) also studied about the factors considered by the urban park users in selecting a park and identified quality of the surrounding environment, temperature, number of sunny days, topography of the park area, and proximity to water as main factors. Van Vliet et al. (2020) concluded that elements such as number of trees, cleanliness availability of side paths and playgrounds are crucial factors for urban park users.

Taylor et al. (2018) tested and confirmed that there is a positive relationship between the biodiversity of the urban park and the number of regular visitors. Further Taylor et al. (2018) identified natural setup of the park as the main requirement. They additionally concluded that there is a considerable amount of park users who use the park for shade while walking in transit and a limited number of users are there for letting their children to play in the playground while they sit and watch. These special types of users require only a seating arrangement and transiting users do not need any facility rather than security and tree coverage for shade. However, Jorgensen et al. (2002) mentioned that the park should cover by a medium vegetation leading to have some open spaces while not covering dense vegetated areas within. Kaplan et al. (1961) explains that the landscape of the park should easily be understandable for the general public which allow the users for exploration.

3. Data Requirements And Methodology

The purpose of this study was to assess and analyze the pattern of the usage of green parks by the general public. Data were collected through interviews and a questionnaire survey. This method is a very common method which can be implemented to collect the data for studies to get the consent of general public (Wimmer and Dominick, 2011). It allows to collect a larger amount of data in a very short time period. However, there is a possibility to not to answer to important questions which can be more crucial for the evaluation. And also, sometimes, they do not return the questionnaire on time. Therefore, in this study, the questionnaires were distributed among the respondents and collected from them personally.

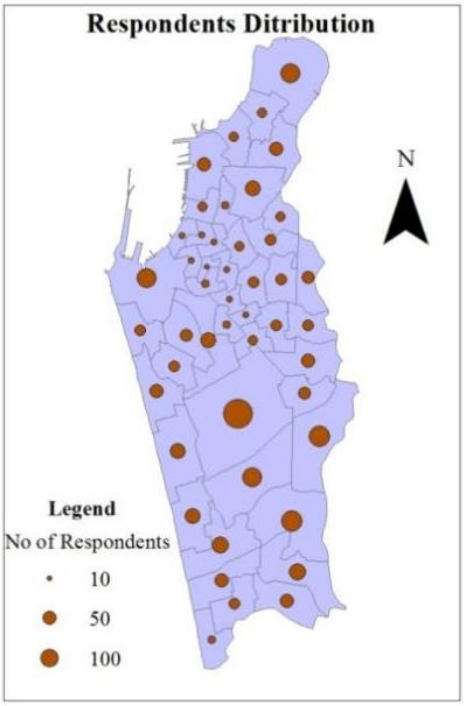
This questionnaire was designed with the aim to identify the driving forces affected to use green parks in Colombo. It was consisted with 2 sections: Section I covered the general background of the respondents and Section II covered the questions related to use of urban green parks. In this, it was used 05 point Likert Scale 1-5 (1- Strongly Disagree, 2- Disagree, 3- Neither Agree nor Disagree, 4- Agree and 5- Strongly Agree.) in order to introduce ranks. After designing the draft of the questionnaire, it was distributed among 10 students in order to get to know about the quality of it. It is needed to check the reliability of the questionnaire, before distributing it. Current study used the Cronbach's alpha test in SPSS background, which is commonly used measuring tool (Tavakol and Dennick, 2011). For this, the value (α) is ranged in between 0 and 1, generally. The questionnaire can be tested from these values: "Excellent: $\alpha \geq 0.9$", "Good: $0.7 \leq \alpha < 0.9$", "Acceptable: $0.6 \leq \alpha < 0.7$", "Poor: $0.5 \leq \alpha < 0.6$", "Unacceptable: $\alpha < 0.5$" (George and Mallery, 2013). Since the overall test value for this questionnaire was 0.862, it can be concluded that this approach as a good method to collect the consent of the general public. Then, the questionnaire was distributed among ten undergraduate students in order to check whether the participants are able to understand the questionnaire easily or not. Based on the results and observations, minor modifications were done to the questionnaire and some questions were deleted after the reliability test. Also some wordings in the questionnaire were changed.

At the initial stage of the study, it was identified that there are three types of respondents among the general public on the usage of green parks: 1. Regular park users who select the nearest green park from the own residence, 2. Regular park users who do not select the nearest green park and 3. Respondents who do not use green parks normally. Accordingly, three questionnaires were used in the study. The questionnaires were consisted with the questions to collect the data such as general background of the respondents, the pattern of use of urban parks, reasons for use them, reasons for not to use them, type of the nearest green park and normal health situation of the respondents.

In the process of selecting the respondents to the questionnaire survey, they were selected from all the Village Administrative (Grama Niladhari) divisions of Colombo city of Sri Lanka according to the extent of each division. In Sri Lanka, these divisions are known as the smallest administrative unit and, sometimes, consisted with two or three villages. The number of participants from each division is shown on the Figure 2.

In the process of distributing the questionnaires, the research team which was consisted with the main researcher and 20 undergraduate students met each and every respondent personally. Firstly, it was checked whether the respondent uses green parks or not. According to the answer of the respondent, the relevant questionnaire was distributed among them. In the study, initially, a total number of 2879 permanent residents of the city of Colombo were interviewed who were selected randomly. In selecting the respondents, they were taken from different administrative zones according to the physical size of the zone. Further, it was taken only one member from a family or a group. And they were asked to complete the questionnaire within one week.

Figure 2: Spatial distribution of respondents



However, the questionnaire was returned by only 2328 respondents with a success rate of 81%. Further, there were 12 in-completed forms and they were excluded from the further analysis process. Finally, the study was analyzed only 2316 responses from 2879 total number of initial participants. Since the questionnaire was distributed and collected from the respondents personally by the research team, it was able to get a higher success rate. In the questionnaire, initially, it was asked from the selected respondents whether they visit to urban green parks regularly or not. According to Figure 3, out of 2316 successful respondents, there were only 1174 respondents who use green parks regularly. From them, 327 respondents use the nearest green park from their dwelling as their favorite park location. However, 847 respondents do not use the nearest green park to regular visits. Further, a considerable number of questionnaire participants (1142 respondents) do not visit urban parks regularly due to personal and other reasons.

In the section I of the questionnaire survey, it was collected the data regarding the general background of the respondents such as the residential region, gender, age, civil status, number of children, employment profile, highest education background, type of accommodation, and ethnicity (Table 1). From the park users who uses the nearest park,159 participants were males and 168 were female participants. There were 526 male and 321 female park users who use the park which is not the nearest park. Also, 420 males and 722 females had been responded to the questionnaire. Totally, 1105 males and 1211 female participants were responded to this survey.

It was considered the age of the respondents as a very important factor to analyze the pattern of use of urban green parks by the general public. The use of green parks is totally depended on the age. Generally, young and elder generations like to use the green parks and middle aged people are reluctant to go out due to their personal and official commitments. The demographic data of the participants, clearly, show that most of respondents from the younger generation select the parks which are situated far from their native place (Table 1). Middle aged respondents and elders use the nearest park. Further it can be noticed that most of the non park users are coming from the middle aged group.

Table 1: Demographic Data about the Questionnaire Participants

		Park users (Nearest Park)	Park users (Not-Nearest Park)	Non Park Users
Total of Respondents		327	847	1142
Gender Type	Male	159	526	420
	Female	168	321	722
Age Category (in Years)	20-30	12	505	23
	31-40	73	152	438
	41-50	42	158	521
	51-60	78	23	123
	61 or above	122	09	37
Civil Status	Married	266	260	1017
	Single	58	583	121
	Divorced/ Separated	3	4	4
No. of Children	No	83	693	139
	Only 1	81	71	652
	Only 2	124	60	324
	3 or above	39	23	27
Employment Profile	Unemployed	39	142	34
	Government (General)	54	54	644
	Government (Executive)	19	34	78
	Private (General)	128	569	378
	Private (Executive)	87	48	8
Education Background	Degree/ above	12	23	10
	Dip./ Cert.	23	46	168
	GCE A/ Level	178	98	286
	GCE O/ Level	98	497	444
	Upto O/ Level	16	183	234
Accommodation Type	House with a courtyard	268	745	1115
	House without courtyard	36	74	7
	Apartment	11	9	3
	House with low facilities	12	19	17
Ethnic Group	Sinhalese	210	718	748
	Tamil	19	8	69
	Muslim	89	113	324
	Other	9	8	1

Further, study attempted to check whether there is a relationship between the civil status of the respondents and their usage of green parks (Table 1). It is clear that most of the non park users are married respondents. Most of single respondents, generally, do not select the nearest park to spend their leisure time. If the respondents have children, they really want to go out. The question on the number of children was asked from the respondents and the scenario was as shown in the Table 4. The results show that most of park users who are without children do not use the nearest park and a big amount of respondents who have children do not use urban parks regularly.

This study paid the attention on the economical stability of the respondent. General government servants and general private sector servants do not use parks regularly. Results

show that private sector general workers do not use the nearest urban park regularly for leisure activities (Table 1). The education background of the respondents also must be analyzed in any study on the finding the pattern of use of green parks. There is a trend among the educated people to use parks to spend their leisure time than lower the educated personal. The results also clearly show the difference of the level of education in using parks in Colombo, Sri Lanka. Low educated people do not use parks regularly.

Type of accommodation gives an idea about the economical strength of the respondents. The pattern of accommodation of the respondents can be illustrated in the Table 1. It is clear that respondents who have houses with courtyards do not use urban parks as a practice. Even though some of them use the park, majority of them do not select the nearest park. Use of green parks is depended on the ethnicity of the respondents. According to the results of this survey, it is clear that Sinhalese who represents the majority of the country do not use parks regularly (Table 1). The reason for this might be that they have their own home gardens.

These data were analyzed using the Statistical Package for Social Sciences (SPSS) Software. The quantitative data from respondents were analyzed by using the SPSS version of 22 using statistical analysis techniques and tools. Under this Cronbach's alpha tool was used to verify the reliability of items in the questionnaire and Pearson correlation coefficients test was used to check the content validity of the questionnaire. Further, descriptive statistics methods such as frequencies, percentages, mean and standard deviation were used to tabulate the data about respondents. Also, with the purpose of identifying the factors in order to use an urban park for the leisure activities and their influences, Factor Analysis tool in SPSS package was used. Multiple regression analysis statistical test was performed to predict the variability of the dependent variables based on their variances with all other independent variables of the study.

4. Result and Discussion

The responses of the questionnaire participants on use of green spaces were checked by using the 5 - point likert scale. In the scale, the highest value and the lowest values were 5 and 1 respectively. It means that the range is equal to 4 (5-1). Since the study worked with 5 classes, the class interval to be considered in the study is 0.8 [4 (range)/ 5 (number of classes)]. Hence, this was converted into the study as follows (Table 2).

Table 2: Likert Scale and its interpretation

Likert Value	Equivalent Mean Values	Likert Scale	Interpretation in the study
1	1-1.80	Strongly Disagree	Very Dissatisfied
2	1.81-2.60	Disagree	Dissatisfied
3	2.61-3.40	Neither Agree Nor Disagree	Not Decided
4	3.41-4.20	Agree	Fairly Satisfied
5	4.21-5	Strongly Agree	Very Satisfied

Table 3: Mean and Standard Deviations of participants – do not visit parks

Reason	Mean	SD
Don't have time	3.89	0.42
Green parks are too far from my house	3.98	0.68
It takes more time to reach to park due to road traffic	3.96	0.45
Green parks are dirty	2.45	0.89
Don't like to its' topography and vegetation pattern	2.67	0.73
Green parks are noisy	2.73	0.45
Green parks are busy with many people	3.56	0.79
Entrance restrictions are there	2.12	1.03

Homeless dogs are there	2.32	1.01
Street children are there	2.34	0.91
Robberies and thefts are there	3.46	1.00
No privacy is there	3.67	1.12
Not up to my standards	2.49	0.98
Unsafe	3.79	1.08
No/ Less facilities (parking, restaurants)	3.01	1.02

The quantitative data from respondents were analyzed by using SPSS. Firstly, responses of the participants who do not visit to green parks regularly were analyzed. The values obtained for the mean and standard deviations were as Table 3.

Table 4: Factors for participants – do not visit parks

Q.	Statements	Component					Factor
		1	2	3	4	5	
1	Don't have time	0.768					
7	Green parks are busy with many people	0.716					Personal
12	No privacy is there	0.672					
13	Not up to my standards	0.453					
8	Entrance restrictions are there		0.719				
15	No/ Less facilities (parking, restaurants)		0.703				Facilities
10	Street children are there		0.701				
9	Homeless dogs are there		0.692				
4	Green parks are dirty			0.783			
6	Green parks are noisy			0.710			Environmental
5	Don't like to its' topography and vegetation pattern			0.378			
2	Green parks are too far from my house				0.812		Accessibility
3	It takes more time to reach to park due to road traffic				0.741		
14	Unsafe					0.713	Safety
11	Robberies and thefts are there					0.571	
	Eigen values	4.347	3.236	2.476	2.004	1.092	
	Cumulative variance explained (%)	12.30	19.23	28.42	42.19	57.98	

Table 4 illustrates the results of the principal component analysis for the extracted 05 main factors on not to use the urban parks by the general public. It clearly shows that the total value do not exceed 57.98 % of the variance.

After that the Kaiser Normalization Rotation (KNR) was utilized to obtain the matrix on the factor pattern for these 15 factors. Kline (1994) stated that if the PCA indicator value is greater than 0.3, it can be accepted. In this, study, according to the Table 12, it is clearly noticed that all the loadings are greater than that value. Further, it can be noticed that loadings of Q1, Q7, Q8, Q15, Q10, Q4, Q6, Q2, Q3 and Q14 are having the value greater than 0.7. According to the results of this analysis, it can be extracted 5 factors: Personal, Environmental, Accessibility, Facilities and Safety.

In order to check the significance levels of each factor, it was used the Pearson's Correlation Co-efficient test in the study (Table 5). Basically, this value would be in between (-1) and (+1). Generally, (-1) indicates there is a perfect negative co-relationship between the factors, while +1 indicates that there is a perfect positive co-relation between the variables. The value of '0' indicates that no co-relationship among them.

Table 5: Pearson's Correlation Co-efficient test results

	Personal	**Facilities**	**Environmental**	**Accessibility**	**Safety**	**Significant Level**
Personal	1					0.128
Facilities	0.442	1				0.219
Environmental	0.351	0.372	1			0.324
Accessibility	0.278	0.326	0.228	1		0.110
Safety	0.278	0.219	0.425	0.324	1	0.573

According to these results, it can be concluded that safety is the most influential factor for not to selecting urban parks by the general public for their leisure activities. And accessibility and personal matters are the least influential factors for this. In the case of facilities, the respondents have been given a moderate weight. Further, in the case of the responses for the second question, the answers of the respondents who do not use green parks regularly are as follows (Table 6). When it is analyzed this scenario with the type of accommodation of this category, it is clear the reason for not to use parks. Most of them are having houses with a courtyard.

Table 6: Places of use of leisure time

The favorite place of visiting	**Number of respondents**
At home	556
At office	12
At a restaurant	323
Out of the city	248
Other	03

The second objective of this study was to analyze the pattern of use of green parks by the respondents who do not use the nearest park for their leisure activities. The questionnaire 2 was related to this part. In this part of the questionnaire, it was examined about the variables such as the distance to the nearest park, time taken to go there, type of the nearest park, reasons for not to use the nearest park, reasons for visiting parks, frequency of visiting the park and the time taken to go to their selected park. There were 847 respondents under this category.

Firstly, it was considered the distance from their houses to the nearest park (Table 7). The results were as follows. The results clearly show that most of the respondents are in a closed proximity to green parks, though they do not use the nearest park as their regular park due to various reasons.

Table 7: Distance to the nearest park

Distance	**No. of Respondents**
Less than 300 m	346
300 m–1 km	204
1–5 km	247
More than 5 km	50

The approximate time taken to the nearest park was also examined in the study (Table 8). The results were as follows. According to the results of the survey, it is also clear that most of the respondents are living within less than 30 minutes distance to green park, though they do not use their nearest park.

Table 8: Time taken to go to the nearest park

Time taken	**No. of Respondents**
Less than 30 minutes	425
30 min –1 hour	189
1–2 hour	178
More than 2 hours	55

Further, the type of the nearest park was asked from the respondents (Table 9). Their responses have been illustrated in the table. According to the table, nearly 75% of respondents in Colombo city limits have an open nature park within their proximity.

Table 9: The type of the nearest park

Type	No. of Respondents
Beach	128
Leisure Park	58
Forest	10
Open nature park	639
Other	12

Finally, in this questionnaire, it was ask the reason/s from the respondents for not to use the nearest green park which is available in closer (Table 10). This situation was analyzed in SPSS environment to determine the most influential reason/s. The mean and standard deviations were determined firstly to understand the relative influences of each factor. From these values, it can be concluded that the respondents have some issues on cleanliness, pollution and safety of their nearest park venue than the facilities inside.

Table 10: Responses for not to use the nearest park

Reason	Mean	Standard Deviation
It is dirty	3.45	0.49
Don't like to its' topography and vegetation pattern	0.89	1.23
It is noisy	3.32	0.43
It is busy with many people	3.49	0.67
Entrance restrictions are there	0.78	1.29
Homeless dogs are there	4.03	0.43
Street children are there	3.82	0.78
Robberies and thefts are there	3.96	0.74
No privacy is there	2.43	1.09
Not up to my standards	0.48	0.78
Unsafe	3.97	1.01
No/ Less facilities (parking, restaurants etc.)	0.39	0.82

Table 11 illustrates the results of the principal component analysis for the extracted 05 main factors on the research question which were asked from park users but not the nearest one. It clearly shows that the total value do not exceed 52.19 % of the variance. Then, it was obtained the factor pattern for those 12 factors. All the values were acceptable. And also, this illustrates that loadings such as Q11, Q8, Q12, Q4, Q1 and Q9 are having the value greater than 0.7. Accordingly, it was extracted them into 5 main factors: Personal, Environmental, Accessibility, Facilities and Safety.

Table 11: Principal component analysis results

Q	Statements	Component					Factor
		1	2	3	4	5	
1	Unsafe	0.837					Safety
8	Robberies and thefts are there	0.783					
7	Street children are there	0.674					
6	Homeless dogs are there	0.657					
12	No/ Less facilities (parking, restaurants etc.)		0.839				Facility
4	It is busy with many people		0.748				
1	It is dirty		0.784				
2	Don't like to its' topography and vegetation pattern			0.645			Environmental

3	It is noisy			0.580			
9	No privacy is there				0.873		Personal
10	Not up to my standards				0.329		
5	Entrance restrictions are there					0.384	Accessibility
Eigen values		4.324	3.459	2.135	1.765	0.435	
Cumulative variance explained (%)		12.34	15.43	34.57	43.59	52.19	

Pearson's Correlation Co-efficient test was used to check the significance levels of each factor (Table 12)

Table 12: Pearson's Correlation Co-efficient test results

	Personal	**Facilities**	**Environmental**	**Accessibility**	**Safety**	**Significant Level**
Personal	1					0.028
Facilities	0.583	1				0.291
Environmental	0.449	0.314	1			0.439
Accessibility	0.382	0.249	0.294	1		0.130
Safety	0.249	0.139	0.280	0.319	1	0.573

According to these results, clearly it can be identified the most influential factor as safety issue which is very remarkable in Sri Lanka. Further, they have selected environmental factor is also as an influential factor in not selecting the nearest park for their leisure activities. And also, they have given moderate influences for facilities and accessibility factors.

Further, it was analyzed the reasons for visiting to green parks from this special category (Table 13). The mean and standard deviations were as follows. It is clear that most of the respondents use green parks to get together with family and friends and to do excises as the main reason. And also, their consent on to be in a peaceful and quiet environment is the least factor.

Table 13: Reasons for use of parks

Reason	**Mean**	**Standard Deviation**
To reduce stress or to relax	2.35	1.13
To meet family or friends and enjoy together	3.99	0.29
To do exercise	3.89	0.31
To enjoy the weather and get fresh air	1.53	0.57
To be in a peaceful and quiet environment	0.73	0.93
To play with my pet animals	1.24	1.54

Further, it was analyzed their pattern on usage of parks (Table 14). The results can be shown on the table as follows. It is clear that most of the respondents use the green parks weekly. It means in Sri Lanka, with their busy life, it is difficult to visit to green parks regularly.

Table 14: Frequency of use of parks

Frequency	**No. of Respondents**
Daily	29
Several times per week	219
Weekly	368
Monthly	231

As the final objective of this study, it was analyzed the pattern of usage of green parks by the general public who select the nearest green park for their caliber. There were only 327 respondents under this category. In this case it was asked their consent on the distance to the nearest park, time taken to go there, type of the nearest park, main reasons for visiting and frequency of visiting (Table 15). In the case of distance to the nearest green park, it is clear that most of respondents are in little bit distant to green parks.

Table 15: Distance for the residence

Distance	No. of Respondents
Less than 300 m	12
300 m–1 km	54
1–5 km	245
More than 5 km	16

For the research question on time taken to go to the park, the results can be categorized as follows (Table 16). It clearly, illustrates that almost all the respondents under this category are living within 1 hour distance from the green parks in Colombo. The question on the main reason to visit to green parks was checked in the survey and the mean and standard deviations were as shown in the Table 17. The results for the reasons for use of parks by the two categories were mixed and evaluated to get the most influential reason/s.

Table 16: Time taken to go to the park

Time taken	No. of Respondents
Less than 30 minutes	178
30 min –1 hour	145
1–2hour	3
More than 2 hours	1

Table 17: Reasons for use of parks

Reason	Mean	Standard Deviation	Significant level
To reduce stress or to relax	3.24	1.24	3.24
To meet family or friends and enjoy together	3.94	0.39	3.94
To do exercise	3.48	0.42	3.48
To enjoy the weather and get fresh air	1.62	0.63	1.62
To be in a peaceful and quiet environment	0.68	1.14	0.68
To play with my pet animals	1.47	1.12	1.47

5. Duscussion

Present study discusses about the Spatio and Temporal dimensions of general public impacted on selecting an urban green park. This study was a case study based on the views and responses collected through a semi structured questionnaire survey from a selected group of park users and non-park users residing in Colombo city limits, Sri Lanka. The set of group of people was selected randomly by the research team considering the total population of administrative divisions. The study identified, firstly, the demographic characteristics of the respondents in order to select a park for their leisure and other activities. This would help to understand the pattern of park users and non-park users. Also, the study analyzed about the reasons for not using the nearest park for their residences by the general public.

The study gives very good results over the pattern of use of green parks by the general public through a questionnaire survey. It has been analyzed the problem thoroughly with the consent of the permanent residents in Colombo municipal council area. It is firstly can be concluded that the rate of use of green parks by the residents is very low when it is compared with other countries. The main reason for this is that most of the residents have their own home gardens or courtyards attached to their residence.

Further, safety issue is the most influential issue in selecting the park for their leisure activities. In most of the urban parks, street children and homeless dogs are there. And also, a number of robberies have been recorded in these areas. Therefore, general public do not select these parks to enjoy. Another big issue is the maintenance of these parks. Since the local municipalities are struggling with money and they do not allocate sufficient staff for cleaning and maintenance. Due to these reasons, they do not use parks and, sometimes, they use the parks far away from their

houses. And also, the use of parks among the young generation is comparatively better than other age categories. It is very low in between 30 and 50 categories due to different reasons. However, the use of parks by elder category is in a satisfactory level..

6. Conclusions and Recommendations

As a whole, the study recommended that it has to take necessary actions to increase the use of parks in order to enhance the good life of urban public. It needs to build up a policy framework which is critically evaluated in this study. However, it can be argued that semi structured questionnaire survey would not, sometimes, interview and select the most appropriate person to cover the whole population. Therefore, it needs to build up this strategy with more number of questionnaire participants and it needs to cover participants from different backgrounds. Then only, it can build up a conceptual framework for this type of issue. Also, it needs to look from another background about this type of broader issues. Therefore, the study highly recommends to have debates with the relevant parties based on the results of this study.

Additionally, the results of the study suggested to introduce and implement a good legal directive system for the use of urban parks with the municipal level. It needs to be consisted with acts and regulations with the purpose to minimize bad impacts within a park area and, specially, to secure the users in a greater manner. Further, there is a necessity to prepare a master plan for urban parks with attractive facilities for leisure and other activities. In this, urban planners and administrative personal need to pay their attention about the size of the park, additional facilities such as children park, walking paths, lighting, cafeteria with different food selections at a low budget, sufficient staff and equipment. The study emphasizes greatly about the safety and security of users and it needs to make some precautions to maintain a calm and quite area within the space. These suggestions would create a better urban park for the general public.

7. Conflicts of Interest

Authors notified that there is no financial/personal interest or belief that could affect the objectivity.

8. Data Availability Statement

Authors notified that the data are available and can produce them according to a request.

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