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FOSTERING PERCEIVED SAFETY IN NEIGHBOURHOOD PARKS: EXPLORING THE INFLUENCE OF PLANTING DESIGN, SCENIC VISTAS AND MAINTENANCE FACTORS

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Abstract

Neighbourhood parks serve as essential recreational infrastructure, offering opportunities for captivating natural experiences near residential zones, thereby delivering social, physical, and cultural amenities that enhance the well-being of the community. Nevertheless, numerous studies have shown that a decrease in perceived safety significantly impacts individuals' ability to derive enjoyment and comfort from their outdoor green spaces. This, in turn, influence the perceived quality of life among Malaysians, as documented by the Malaysian Economic Planning Unit (EPU). There is a lack of research investigating the relationship between well-maintained landscape and the perception of personal safety, with the majority of existing studies originating from foreign sources. Therefore, this study was undertaken to collect evidence addressing these gaps within the context of Malaysia. This endeavour is vital to assimilating valuable knowledge to enhance the ongoing processes of both place-making as well as place-keeping within Malaysian park management.

Keywords: Neighbourhood Park, personal safety, perception of personal safety, community engagement.

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INTRODUCTION

The neighborhood park serves as essential green space infrastructure, located in close proximity to residential areas, significantly contributing to the enhancement of community quality of life through diverse nature experiences (Kimic & Polko, 2021; Moulay et al., 2017). In contemporary society, public safety has become a crucial factor for achieving an improved quality of life, with growing attention to heightened security levels, particularly in urban green spaces (Abdul Rahman and Abdul Razak, 2021). Despite a decrease in the crime index, the perceived quality of life in Malaysia remains a serious concern (Ros Mahadi et al., 2023; Mulok et al., 2018). The fears and threats resulting from crime news and incidents impact the perception of green spaces and personal security (Kimic & Polko, 2021). In fact, crime itself is a serious social problem that directly impacts overall quality of life (Abdul Rahman and Abdul Razak, 2021).

Studies on the perception of personal safety concluded that fear of crime can have more complex reasons beyond the occurrence of crime incidences (Khan, 2015; P. Sundramoorthy, 2014). Consequently, a perceived lack of safety can restrict the use of outdoor spaces (Banchiero et al., 2020; Jenks & Dempsey, 2007; Nam & Dempsey, 2020). Public outdoor spaces must meet three criteria—protection, comfort, and enjoyment—to ensure their optimal utilization (Suhaila et al., 2017; Soholt, 2004). These criteria contribute significantly to the sense of feeling safe (Suhaila et al., 2017). Nevertheless, numerous studies have shown that a decrease in perceived safety significantly impacts individuals' ability to derive enjoyment and comfort from their outdoor green spaces. Previous studies have emphasized the importance of a well-maintained, high-quality environment in influencing positive perceptions of outdoor surroundings. This finding aligns with prior research conducted in Malaysia (Suhaila et al., 2017; Aldrin et al., 2012; Maruthaveeran & Van den Bosh, 2015; Siti Rasidah & Aldrin, 2012; Sreetheran & van den Bosch, 2014). However, these studies have primarily focused on the general environmental aspects and have not delved into the specific elements of physical recreation and their associated maintenance cues, which are integral components contributing to the overall quality of a park.

Bedimo-Rung et al. (2005) categorized park landscapes into two states: those amenable to change over time and those that remain fixed based on their initial planning. This dual state nature implies that maintenance processes must accommodate both conditions, and this duality has long-term implications for their appearance, in line with similar findings from various parts of the world (Bedimo-Rung et al., 2005; CABE Space, 2007). Given that maintenance processes are continuous and routine work, they are considered integral components of the urban environment. Ultimately, these processes play a crucial role in ensuring the sustainability and quality of life in urban areas (Paramita, 2019).

Physical disorder serves as an indicator of deficient or insufficient maintenance and simultaneously signifies neglect, which can potentially evoke feelings of vulnerability to crime (Sreetheran & van den Bosch, 2014). This feeling of vulnerability according to Paramita (2019) suggests that the process of maintenance reveals hidden issues that causes discomfort and deterioration of a space. Therefore, this study delves into the physical factors associated with maintenance that serve as cues influencing individuals' perceptions of personal safety. Notably, the research gap underscores the scarcity of literature addressing perceived safety in Malaysia in this present moment.

METHODOLOGY

The national concern regarding quality of life has included crime and public safety as major issues since 2000. It began with the national report on the Malaysian Quality of Life Index (MQLI 2004-2011), followed by the Malaysian Well-being Index (MWI) in 2013, and currently, the Malaysian Liveability Index (iDAM), introduced in 2021. These initiatives aim to assess the community's quality of life, well-being, and liveability to provide a high standard of living environment.

The government has undertaken various initiatives to address the issue of crime incidences, implementing measures to enhance the public safety component and target crime prevention at the national, local, and community levels. The National Key Result Area (NKRA), initiated in 2009, focused on reducing crime as a key developmental goal, beginning with the four states leading in crime statistics. According to the latest data from 2022, Selangor is ranked fourth highest in recorded crimes among these identified hotspots, compared to being second highest between 2010 and 2017 (Economic Planning Unit, 2023; Dass & Ananthan, 2019; P. Sundramoorthy, 2014).

Former Minister of Home Affairs, Dato' Seri Dr. Ahmad Zahid Hamidi, emphasized the importance of addressing crime incidences with consideration for the perception of crime and fear as well. He stressed, *"It is now about tackling perception, sentiments, and the reality. As long as the rakyat feel unsafe, we will continue to look at crimes which were not given much attention before, such as break-ins and crimes at shopping malls,"* (The Editor, 2021).

Nevertheless, further exploration is required to address the conceptual uncertainties surrounding 'fear of crime' and 'fear of becoming a victim' (Abdul Rahman and Abdul Razak, 2021). To fill these gaps, this paper focuses on distinguishing physical cues of fear and safety perception in community green spaces in dwelling areas.

Table 1: Malaysian Crime Index Ratio by States

State	**Crime index ratio**		
	2022	2021	2020
Malaysia	**146**	**153**	**194**
W.P. Kuala Lumpur	241	303	414
Kedah	200	163	182
Pulau Pinang	188	208	213
Selangor	188	216	257
Negeri Sembilan	151	155	209
Perlis	149	161	186
Melaka	132	133	187
Sarawak	130	144	201
Perak	123	110	130
Johor	111	108	187
Terengganu	110	119	162
Kelantan	108	99	129
Pahang	105	114	133
Sabah	96	80	92

Source: Economic Planning Unit (2023)

When discussing feelings unsafe and the fear of crime, one significant outdoor environment that encourages a misperception of safety is public green spaces. This misperception leads to discomfort and, consequently, causes a deterioration of these spaces (Dempsey and Burton, 2012). In Malaysia, a neighborhood park is a recreational area that provides activities such as sports and social events for the local community (PLANMalaysia, 2013), managed by the local authority. Neighborhood parks significantly contribute to the mental health and well-being of surrounding communities by offering social, physical, and cultural services derived from the nature experience within the residential areas.

In the district under the jurisdiction of Majlis Bandaraya Subang Jaya, there are only four public neighborhood parks under their supervision. However, for this study, only three parks were selected due to their location in built-up urban areas. The chosen parks are Taman Tasik Seri Serdang, Taman Puchong Perdana, and Taman Wawasan Recreational Park (Figure 1). Additionally, this study focuses on only one local government without comparing it with any other authorities.

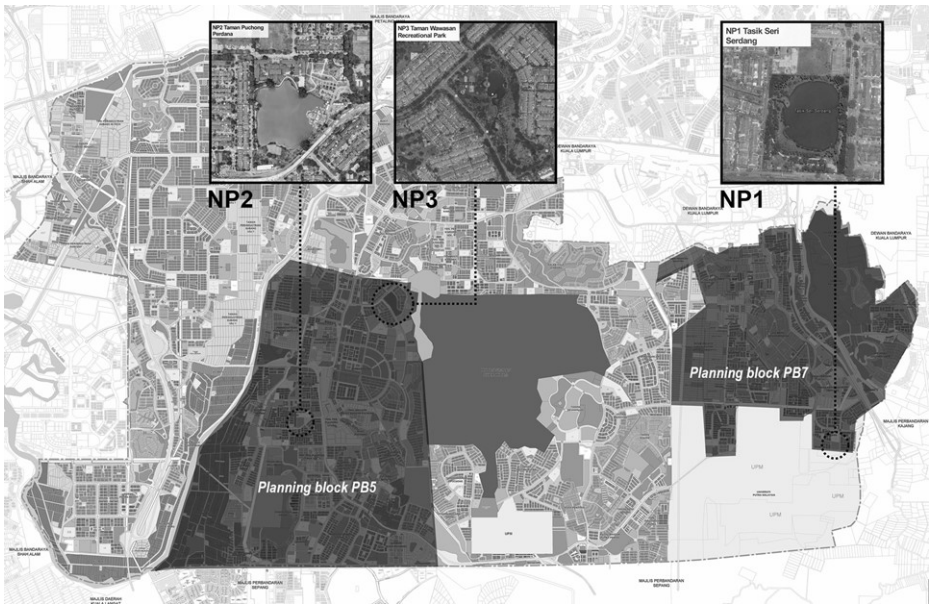

Figure 1: The three selected neighbourhood parks - Taman Tasik Seri Serdang (NP1), Taman Tasik Puchong Perdana (NP2), and Taman Wawasan Recreational Park (NP3)
Source: Rancangan Tempatan Majlis Bandaraya Subang Jaya

Survey Questionnaire Methods

1. Layers of planting and view distance *(Jenis-jenis tanaman dan jarak pemandangan)*

1. A layer of trees with long-distance view *(Satu lapisan tanaman dengan jarak penglihatan yang jauh)*

		LOW ◄									► HIGH
a)	Practice	1	2	3	4	5	6	7	8	9	10
b)	Preference	1	2	3	4	5	6	7	8	9	10
c)	Perceived safe	1	2	3	4	5	6	7	8	9	10

Figure 2: The place's image-based questions with 1 to 10 scores of Likert-scale
Source: Author

Statistical analysis methods were used to identify the effect of maintenance on users' acceptance of park design and conditions, and how they impact their perception of personal safety. To obtain more accurate answers, 10-point Likert scale questions on twelve (12) items based on images of the actual site conditions, plus two questions on general perceptions and perceived care were used (refer Figure 2). The images were taken during an earlier site verification process in order to obtain likely similar responses to the respondents actually being at the park, especially among the residents of the surrounding neighbourhood.

The twelve (12) items that are measured are divided into four main attributes that were generated through the literature studies. The attributes and items measured are as follows (Table 2).

Table 2: Twelve (12) measures on users' acceptance and perception of personal safety

Attributes	Items
Types of planting and views	1. Single layer planting with long-distance view 2. Multi-layer planting with wide view 3. Multi-layer and overlaid with limited visibility
Planting structure	4. Organised planting 5. Naturalistic planting effect
Facilities and maintenance	6. Trees and plant maintenance/presence of bushes 7. Defective and faulty equipment 8. Broken walkway/track
Cleanliness and waste management	9. Near the building and structures 10. General waste and trash 11. Standing water 12. Tipping and illegal waste dump

Source: Author

One-way ANOVA

One-way ANOVA was carried out to analyse the statistical significance of these maintenance variables to perception of safety. Initial exploration found an association between physical factors and conditions and perception of safety.

Assuming the probability that the correlation alone would be insufficient to indicate that the perceptual judgment can be predicted by measuring the place conditions and/or from the independent effects of individual measures, further analysis was undertaken, such as regressions for predictive relationship tests or ANOVA to compare more than two groups of safety factors, i.e., gender, age, location, and time.

Exploratory Factor Analysis (EFA)

An exploratory factor analysis (EFA) was conducted to specify the potential correlation between 12 measures of landscape design and views, and maintenance

factors. EFA has been used in the past to classify factors in smaller sets especially for a large set of variables by testing it in a different context (Hur & Nasar, 2014). Principal component analysis (PCA) was utilized, and for the purposes of rotation, it was assumed that the factors were correlated, employing Oblimin with Kaiser Normalization (Hinton et al., 2014). The recommended sample size for EFA in this study was 187 (N = 187).

The results indicated the KMO value was .877, exceeding the recommended value of .6, which suggested an adequate sampling for factor analysis. The PCM revealed the presence of three components with eigenvalues exceeding 1, explaining 44.7%, 15.7% and 11.2% of the variance, respectively. The two-component solution explained a total of 71.6% of the variance, with Component 1 contributing 44.7%, Component 2 contributing 15.7% and 11.2% contributed by Component 3.

RESULTS AND DISCUSSION

The study analysed the physical factors that affected users' perception of personal safety and caused them to perceive those cues as threats. To the author's knowledge, this study is the first to examine people's perception of personal safety, particularly in terms of maintenance factors in Malaysia, specifically in Subang Jaya, Selangor.

Acceptance of and preferences for park design and maintenance: demographic characteristics

The initial findings from the descriptive analysis illustrate the similarities and differences between the background and character of each demographic grouping in relation to each of the three neighbourhood parks.

The gender balance of all respondents in the survey is fairly even at 50.8% male and 49.2% female. However, when broken down to individual parks, there are differences in gender percentages for the three neighbourhood parks. Two parks recorded a majority of male respondents, NP1 (52.5%), and NP3 (60.7%), while NP2 only has 39.3% male respondents.

No neighbourhood park shows any significant differences in ethnic composition. There is a higher proportion of respondents from a Malay ethnic background in Taman Tasik Seri Serdang, (NP1, 55.9%) and Taman Tasik Puchong Perdana (NP2, 69.4%), while Taman Wawasan Recreational Park, NP3, recorded the least number of Malays (20%).

Table 3: Respondent demographics for the three neighbourhood parks

Respondent's characteristics	**Percentage**		
	Taman Tasik Seri Serdang (NP1)	**Taman Tasik Puchong Perdana (NP2)**	**Taman Wawasan Recreational Park (NP3)**
Sex			
Male	53%	40%	60%
Female	47%	60%	40%
Ethnicity			
Malay	56%	69%	20
Chinese	10%	11%	20
Indian	25%	16%	5
Other *Bumiputera**	3%	2%	4
Others	5%	2%	11
Age			
18-29 yo	33%	47%	28%
30-39 yo	41%	23%	26%
40-49 yo	17%	13%	30%
50-59 yo	7%	11%	5%
60-69 yo	2%	4%	10%
70 and above	-	2%	2%
Education			
Primary school	4%	3%	12%
Secondary school	22%	53%	35%
Certificate & equivalent	10%	10%	10%
Diploma & equivalent	24%	23%	17%
Degree holder	34%	8%	25%
Master & PhD	7%	3%	2%

* *Bumiputera* stands for ethnicity groups including Malays, aboriginal, and the indigenous people of Sabah and Sarawak states.

Results for respondents' acceptance of the twelve (12) practices of planting design, views and maintenance show that the most favoured planting compositions are those that offer long-distance and wide views, either in single layer (m=7.45) or multi-layer planting (m = 7.14). The least accepted planting design and views is the design that offers limited visibility (m = 7.14).

The significant differences in acceptance are illustrated across gender and ethnic backgrounds. The mean rating among the Indian respondents range from 8 (moderately preferred) to 9 (very preferred), except for multi-layer planting with closed visibility and organised and structured planting with ratings lower than 7 (slightly preferred). Chinese and respondents of other ethnic backgrounds rate the multi-layer planting design differently (refer to Figure 1). It is believed that the respondents do not have a significant concern about the

planting design itself; rather, their views are of great importance to them. In this regard respondents generally show a significant lack of comfort in enclosed spaces

Interestingly, naturalistic planting is liked the most by a majority of respondents (m = 7.28) compared to an organised and structured planting in all three neighbourhood parks (refer Table 3).

Table 4: Mean rating for acceptance of and preferences for 12 practices in planting design, views, and maintenance conditions

	NP1	**NP2**	**NP3**
	Mean	**Mean**	**Mean**
Planting design & views			
Single layer of trees with long distance view	7.96	6.85	7.64
Multi-layer planting with wide view	7.78	6.43	7.19
Multi-layer planting and overlaid with closed/limited visibility	7.79	5.90	6.09
Organised and structured planting	6.75	5.08	5.36
Naturalistic planting	7.72	6.64	7.53
Maintenance variables			
Tree and plant maintenance	6.96	5.05	6.03
Defective and faulty equipment	7.34	5.72	6.20
Broken path and track	5.65	4.72	4.05
Cleanliness near building and structures	6.16	4.62	5.16
General waste and trash	5.26	4.20	5.00
Standing water with waste	4.74	3.82	3.92
Tipping and illegal waste dump	4.54	3.66	4.15

Table 5: Acceptance of 12 practices in planting design, views and maintenance conditions

Result between subjects	**Significant to demographic background**		
	Neighbourhood parks	**Gender**	**Ethnic group**
12 awareness of practices			
F(11, 1881) = 76.8, p<.001	F(22,1859) = 1.7, p = .01	F(11,1859) = 2.5, p = .004	F(44,1837) = 1.8, p = .001
Planting design & views			
F(4,688) = 35.7, p<.001	n/r	F(4,680) = 2.51, p = .04	F(16,672) = 1.93, p = .02
Maintenance variables			
F(6,1044) = 43.8, p<.001	F)12,1032) = 2.05, p = .02	n/r	F(24,1020) = 2.1. p = .001
Neighbourhood parks			
F(11,1859) = 77.6, p<.001			

The results use the Greenhouse-Geisser correction for the significant results.
**there are significant differences between subjects, p< .005*
***there is significance relationship within subjects for p < .05*

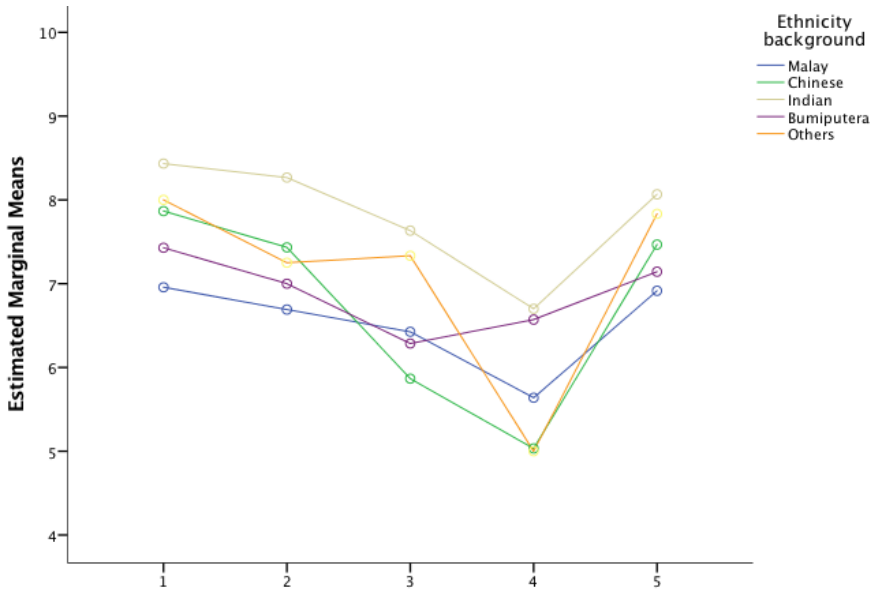

Figure 3: Preference scores between ethnic backgrounds

Regarding maintenance, two specific concerns are raised by the respondents: the presence of standing water with waste (mean = 4.08) and incidents of fly-tipping and illegal dumping of waste (mean = 4.06), especially in Neighbourhood Park 2 (mean = 3.66). These findings imply that a significant number of respondents are dissatisfied with the visible aspects of the park's appearance. In contrast, many respondents express moderate satisfaction with the presence of defective and faulty equipment (mean = 6.37).

Influential Determinants: Maintenance Cues and Perceptions of Personal Safety

Following the analysis of general feelings and overall park perceptions, the study further explored these findings using simple regression to predict the strength of the feeling of safety influenced by preference for and acceptance of 12 specific measures related to the physical environment and maintenance issues.

The largest Beta (β) coefficient indicating the strongest contribution in explaining the feeling of safety, is observed with regard to standing water with waste (0.944). This is followed by general waste and trash (0.922) and tree and plant maintenance (0.907). The proximity of the β values suggests that preferences for these three factors contribute similarly to the overall feeling of safety. This suggests that the higher the preference for the waste and trees-related measures in the neighbourhood park, the safer people feel within these specific contexts.

Further analysis was carried out through exploratory factor analysis (EFA) and led to the identification of new physical factors influencing the perception of personal safety, assuming that the factors are correlated. As a result, three factors were identified, collectively explaining 72% of the variance. The pattern matrix of the final solution is presented in Table 5.

Table 6: Development of physical Indicators of perception of safety

New Physical Factors	Item	Factor loading	E	%
Maintenance and appearance				
	Standing water with trapped waste	.883	6.701	44.67
	Fly-tipping and illegal waste dump	.832		
	Cleanliness near building and structures	.734		
	General waste and trash	.727		
	Tree and plant maintenance	.726		
	Broken path and track	.592		
	Organised and structured planting	.543		
Planting design and organisation				
	Multi-layer planting with wide view	-.939	2.356	15.71
	Naturalistic planting	-.850		
	Single layer of trees with long distance view	-.802		
	Defective and faulty equipment	-.534		
	Multi-layer planting and overlaid planting with closed visibility	-.500		
Environmental satisfaction				
	Feeling safe to have company (friends/ family) in the park	.991	1.684	11.23
	Feeling safe to be alone in the park	.892		
	Feeling comfortable in the park	.881		

The most significant factor, 'maintenance and appearance', contributes to 44.67% of the total variance, making it the primary influence on perceptions of personal safety. All indicators within this category pertain to the physical upkeep and aesthetic qualities of the landscape. The peak values pinpoint the factors exerting the most significant influence on individual perceptions of safety—specifically, standing water with trapped waste, tipping, and illegal waste dump. These findings imply that indicators of inadequate waste disposal practices in the parks significantly influence the perception of personal safety. The results illustrate that cues from poor maintenance and ineffective waste management in the neighbourhood park significantly shape individuals' perceptions of personal safety.

The second factor, explaining 15.71% of the total variance, is described as 'planting design and organisation'. This factor encompasses visual elements such as multi-layer planting with a wide view, naturalistic planting, single-layer trees with a distant view, defective and faulty furniture, and overlaid planting with closed visibility. Nevertheless, negative loadings indicate an inverse relationship with perceptions of personal safety. It is crucial to note that negative

loadings do not signify the strength of the factors (Asnawi et al., 2012). Therefore, this study suggests that these components are less prevalent in the park, yet the preference for and acceptance of wide and distant views and naturalistic elements are the highest.

The third factor, representing 11.23% of the variance, is 'environmental satisfaction'. This factor sums up the common feeling towards the outdoor environment. Despite being a less influential factor on the perception of safety in the park, it is noteworthy that a majority of park users report feeling safer in the company of others in the park.

Mediating Factors Impacting Perception of Personal Safety

Previous studies have suggested connections between demographic factors, experience of crime, and personal experience as mediating factors influencing perceptions of personal safety. Gender, age group, and ethnic minority status have been consistently identified as strong factors associated with personal safety perceptions (CABE, 2004; Mak & Jim, 2018; Siti Rasidah & Aldrin, 2012; Sreetheran, 2017; Sreetheran & van den Bosch, 2014; CABE Space, 2007). Beyond demographic factors, it has also been found that personal experiences of crime impact perceptions of safety (Mak & Jim, 2018).

The findings suggest that the first factor, 'maintenance and appearance' is less likely to be affected by the three measures: demographic factors, familiarity with the park, and experience of crime. The only relationships found were age ($p = .006$), and satisfaction with the facilities and recreational resources provided ($p < .001$), and preference for an overall design with big trees and shade ($p = .022$). Further analysis of the age indicator suggested that respondents aged between 60 and 69 years old are more likely to report dissatisfaction with the environmental condition and maintenance.

In contrast, the third factor, 'environmental satisfaction' was found to be affected by most of the measures. Socio-demographic background showed a strong association with perception of personal safety. Upon a more in-depth analysis of the data, it becomes evident that males, individuals of Indian descent, and other ethnic groups tend to report higher levels of comfort and safety when in the park alone. The Indian community exhibits a greater sense of safety in relation to the park's planting design and organisation, whereas the minority ethnic group, Bumiputera, conversely reports a diminished sense of safety concerning these aspects. Socioeconomic status and educational attainment also exert an impact on individuals' perceptions of personal safety.

Table 6: Mediating factors on perception of personal safety

	Environmental Satisfaction	**Planting design and organisation**	**Maintenance and appearance**
Demographic factors			
Sex	P = .001	X	X
Age	P< .001	P = .003	P = .006
Ethnic background	P< .001	P = .003	X
Homeownership status	X	X	X
Household composition	P = .025	X	X
Periods of dwelling	X	X	X
Length of residency	X	X	X
Working background	P< .001	P = .044	X
Level of education	P = .002	X	X
Frequency of visit to the park	P< .001	P = .006	X
Accompany during the visits to the park	P = .024	X	X
Location of the park from home	P = .036	X	X
Satisfied with the facilities provided and recreational resources	P < .001	P < .001	P < .001
Like the overall atmosphere with big trees and shades	P < .001	P < .001	P = .022
Enjoying the good scenery of the lake	P < .001	P < .001	X
Aware of any presence of patrol (park staff, police, guards)	P = .037	P = .036	X
Experience of crime anywhere/or witnessed a crime	X	X	X
Experience of crime/ or witnessed a crime in the neighbourhood park	X	P = .019	X

X= no relationship

CONCLUSIONS

One of the interesting findings concludes that the presence of water bodies such as a lake that was found in each of the three neighbourhood parks, play a crucial role in contributing to maintenance issues. Additionally, the location of the lake close to the residential areas (e.g. housing facing lake) contributing to the issues of fly-tipping and illegal dumping of waste. A noteworthy observation is that the sense of safety experiences a significant decline in areas plagued by this

maintenance problems. Users of the park tend to avoid spaces or designs that pose a physical security risk, threatening their well-being and diminishing the overall appeal of the park.

On the other hands, visual accessibility emerges as a pivotal factor influencing the perception of personal safety. The design and arrangement of plants play a vital role in determining visual accessibility, encompassing factors such as openness, closed visibility, or limited visibility, and spatial enclosure. The research underscores a heightened preference for open spaces, indicating that the concept of openness fosters comfort and a sense of safety in the outdoor environment, irrespective of the specific planting design (whether single or multi-layered).

The findings suggest that most park users experience a reduced sense of safety when alone in their neighborhood park. Interestingly, this study concluded the differences appeal and comfort in the park when alone between ethnic group. The ethnic minority tends to feel more unsafe in disorganised design and spaces. This finding supported the claimed that and minority groups from certain ethnic backgrounds can tend to feels more insecure and vulnerable (CABE Space, 2007). This underscores the importance of addressing maintenance issues and optimizing visual accessibility to enhance overall feelings of safety among park users.

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