

## The Importance of Well-Designed Children's Play-Environments in Reducing Parental Concerns

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**Abstract:** The aim of this study is to examine the relationship between the design of children's outdoor play environments and parent's concern with regard to the safety of the play environments. The safety factors investigated in this study are related to both crime and personal injuries and the focus is on parents with children under 15 years old. The survey includes 173 participants from one of the biggest residential neighborhood park in Pulau Pinang, Malaysia. The data was analyzed through the use of descriptive statistics and principal component analysis. The findings indicate that parents, regardless of age, gender, ethnic background and education level are concerned about the safety of their children. In relation to parent's perception on the effectiveness of well-designed children's play-environments, the study found that parents perceived some elements of landscape design such as appropriate sign board, separation between cycling route from walkway and physical barriers in the form of fences and hedges between the playground and football field are effective in protecting children from accidents and injuries in the park. They also believed that redesigning the Sri Nibong neighborhood park and its facilities for better surveillance with adequate lighting to facilitate observation during night-time can make the park safer from criminal activities.

**Key words:** Children % Safety % Play-environments and Principal components analysis

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### INTRODUCTION

Park and playgrounds are important areas designed for children to play freely and to participate in recreation and physical activity. Well-designed playgrounds not only help develop quick problem solving ability in children, but also increase their social interaction. Neighborhood parks and playgrounds can also help to promote children's play in the urban environment, if children have easy access to them and those who are entrusted the responsibility of children, be assured of the safety of these places both physically and socially. According to Fan and Jin [1], the existence of park or playground in a neighborhood can help fight the childhood obesity epidemic and assist children establish a physically active lifestyle by providing activity-enhancing community facilities.

One reason for the low level of children's physical activity is due to the lack of perceived neighborhood safety and that parents' views strongly influence their children's physical activity pattern in their neighborhood [2].

Parental concerns about a child's safety have been recognized as one of the major reasons why parents restrict their child's independent mobility [3, 4]. Safety concern is more in parents with younger children than parents with older children.

The results reported in the study by Jago *et al.* [5] show that traffic, crime or attack threat, perceived lack of proper space, threat from older children and the lack of friends near the home were among the main factors of parental concern in letting their children participate in physical activities independently.

In the past few decades, social fears have been pervasive and this explains the restriction of movement of children by their parents [6]. Because of the exposure to anti-social behavior, such as fear of drug addiction, kidnapping and rape and also concern about strangers, parents would not permit their children to go alone to the local playground or to a friend's house [7]. "A plausible explanation for the finding that children whose parents perceive a high crime rate play more in the yard, may be that these parents consider the yard a relatively safe environment and encourage playing in the yard at home instead of other outdoor locations such as the street or park" [8]. Valentine and McKendrick [9] state that 70% of parents who have eight to eleven years old children, were worried about social problem and road traffic as major restrictions for children's active free-play. Blakely [7] also reported that many parents in New York believed that social qualities of their neighborhoods affect children's safety or well-being. Weir *et al.* [10] used a 20-item questionnaire completed by parents of children aged between 5-10 years old, to identify what they were worried about. The findings showed that traffic, crime and personal safety of their children in their neighborhood were major concern.

The results of a study conducted by Scarborough *et al.* [11] showed that perceived disorder of a neighborhood structure was significantly related to citizens' fear of crime. The ideology of fear affects parents' concern of public safety of children and use of public spaces [7, 12]. Forni [13] finds that fear of crime and parental concerns for children are both expressions of a more generalized sense of insecurity that pervades modern post-capitalist societies (cited by Prezza *et al.* [6]). One of the problems that we face today is that people's fear of crime is often much greater than the actual probability of crime happening. Publicized crimes such as childhood abductions, although rarely occur, scare many parents and cause them to experience a great deal of anxiety and fear.

Children's safety is also potentially at risk in play environments due to accidents and injuries that may occur during play-time. Statistics by the U.S Consumer Product Safety Commission from 2001-2008 showed an estimated 1,786,008 injuries were associated with playground equipment in the United States. Fifty seven percent of these injuries occurred at schools or parks and more than half (53%) occurred in the 5 to 9 years of age

category. The annual average number of these injuries is estimated to be 218,851 from 2006-2008 [14]. Several studies have identified inappropriate playground equipments as the cause of injury or even death [15-17]. Height of falls and the type of undersurface have been identified as important risk factors for severe playground injuries [18]. According to Berger [19] "major dangers posed by playground equipments include too much height, hard ground surfaces, entangling ropes and chains, rough edges, protruding bolts and loose moving equipment (such as swings)". Equipment condition is likely to play a factor in parents' decisions for letting their children play in certain parks [20].

Thus, parents should feel safe so that they can take their children to parks and open spaces without worrying over safety issues. Cunningham and Jones [21] state that parents thought that having good quality public open spaces has an important influence on their children's free-play and activities in this environment. Parents also reported that if a park with good quality was nearby, it is more likely that they would take their children to the park. That being so, a safe environment is essential to enhance opportunities for physical activity of children [10].

The design of play environments is usually a compromise between providing play opportunities for children and satisfying parents' concerns of their children's safety when monitoring their activities. Mott *et al.* [22] state that "playground design should balance play value with safety issues". Safety issues are the foundation of designing a play area and its environment should be examined carefully. With good design and management of the natural environment, fears and anxieties may be reduced. For example, lighting cannot be used only as ornaments, but it is a requirement in the design of the environment, both for leading people safely through the circulation ways and providing security for the ground [23] and also when the natural areas were made thinner and clearer, trees and bushes cannot be used as hiding places for vandals and offenders [24]. Moreover, regular maintenance and updating of park facilities and features can reduce the risk of injury; while at the same time increase the aesthetics and functionality of the park environments [25]. While poor conditions and substandard maintenance of parks can discourage people from using them, poor maintenance probably also has a negative impact on aesthetics, perception of safety, functionality and overall

understanding of the quality of the park as well. Unsafe or poorly maintained parks might prevent their use even if they are located within easy walking distance from home [26]. Furthermore, the reduction in public use may reduce the informal monitoring of park activities and subsequently increase the risk of encountering undesirable behaviors (e.g., vandalism, graffiti, drug dealing and drug use) [25].

Playground safety should focus on playground equipment and play environment to reduce dangers that threaten children in terms of harm, injury and crime. This research examines parents' perception of the safety aspects of design in a neighborhood park in Penang, Malaysia.

The current study focuses on two aspects of safety for children while using the playground: safety from crime and criminal activities and also safety from accidents and injuries. The social crimes considered in this study involve danger from strangers, kidnapping, vandalism and assault which affect the perception of safety. More specifically this study tries to address the following questions:

- C What is the current level of safety for children in outdoor play environments?
- C How do children's play environments affect parents' concern regarding their children's safety in neighborhood parks and playgrounds?

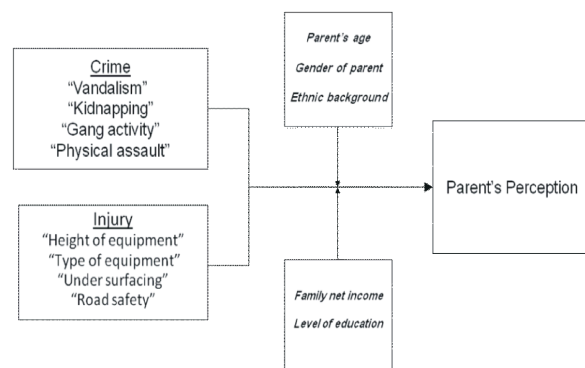
## MATERIALS AND METHODS

**Study Area:** This study focuses on a medium density residential neighborhood located in an urban area in Penang, Malaysia. The study area, Taman Sri Nibong has one of the biggest residential neighborhood parks in Pulau Pinang with a good representative of the ethnic composition in Penang. The park is located at the southern part of the housing area and it is accessible from all directions. It is equipped with various recreational facilities such as jogging track, football field, multipurpose court, *sepak takraw* (a local Malaysian game which uses a rattan ball) court, a playground and also gymnasium equipments, thus making the park suitable for use by various levels of the community. The park has active, semi active and passive activities that were developed so that this area can be used effectively by each visitor. The neighborhood on the north, east and south-east side of the park are predominantly upper

middle class and ethnically mixed. On the south-west of this park are two apartments occupied by the lower-middle class.

**Variables:** Parent's perception is the dependent variable in this study and the independent variables are crime, injury and their respective components. There are four components under the crime category: vandalism, kidnapping, physical assault, gang activity; and another four components are under injury category consisting of type of equipment, under surfacing, height of equipment and being near road traffic. The five moderator variables are age and gender of parents, ethnic background, family net income and level of parent education. The research framework for the current study is depicted below:

### Research Framework



**Data Collection:** A sample of 300 respondents with children under 15 years old was selected from a total population of 3750. They were asked to respond to a questionnaire that was designed in three parts. In the first part, the demographics of the respondents include gender, age, ethnic background, income and education level were measured. The second part includes questions related to crime and injury. The most common type of crime in this neighborhood and parent's perceptions related to the problem caused by different types of crime were also measured in the last part of the questionnaire. The sample of this study was drawn from a sampling frame of residents living in the neighborhood and the systematic sampling method was adopted. One in every 3 houses was chosen as a sample. Figure 1 shows the layout plan of Taman Sri Nibong housing area and the survey route taken. In total, 173 questionnaires (57.6%) were collected from the total of 300 questionnaires distributed. The data was analyzed through the use of descriptive statistics and principal component analysis.

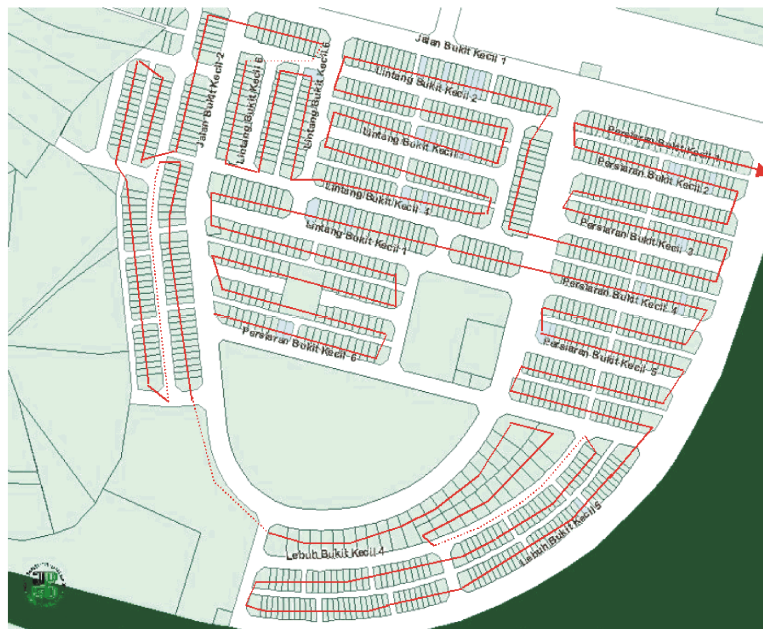


Fig. 1: The layout plan and survey route

## RESULTS AND DISCUSSION

The study found that the respondents (N=173), who are parents to children under 15 years were quite balanced with the number of males (50%) and females (44.8%) fairly equal. In terms of ethnicity, the majority of parents (59.3%) were Chinese followed by Malay (29.7%), while the remaining were Indians (7.5%) and others (3.5%). Most of the respondents have completed a degree level of education and are employed. The sample of this study includes low, middle and high income groups (Table 1).

The results showed that about 11 percent of children had experienced physical injuries in the playground (Table 2) and half of these injuries occurred while using the swings (Table 3). As Table 4 shows, 39 percent of injuries that were identified by parents occurred on sand that is used as undersurface beneath the playground equipment and 22.2 percent of injuries are related to protective matting (rubber) and concrete undersurfaces.

In relation to experiences of parents and their children with regard to crime, the findings showed that 12.2 percent of parents and 2.3 percent of children had been a victim of crime (Table 5).

The study also examined the pattern of usage according to time. While approximately half of the respondents used the park at daytime on a weekly basis, very few respondents use the park at night. For those who never use the park at night they stated reasons such

as “not safe” and “dangerous” for their decision. From this study and also the findings of Nasar and Fisher [27, 28], Painter [29] and Brantingham *et al.* [30] it should be noted that isolation, darkness and emptiness of a place could heighten the fear of one place. The observations showed that the peak hours for people to use the park was between 5:00 pm to 7:00 pm. This is not surprising taking into account the humid tropical climate of Malaysia. In addition, most people are at work and are only free for recreational activities during those times.

Assessments of park safety were obtained by asking parents whether they would feel safe for their child to be alone in the park during daytime and during night time. Excluding 3.5 percent of parents who did not answer this question, 37.7 percent reported fairly feeling safe and only 9.6 percent reported feeling safe during day time. The majority of parents (69.2 %) reported that they would not feel safe if their child was alone in the park at night and felt that the park and its neighborhood very unsafe during night time.

When parents were asked if they would allow any of their children to come to the playground without adult supervision, 72.2 percent answered “No” and citing that their children are still too small to go there alone. Others pointed that they should be sure about their safety and some mentioned that the park is not safe, pointing to some key concerns such as “dangerous”, “kidnapping”, “strangers”, “road safety” and “equipment injury”.

Table 1: Profile of the respondents

Variable	Description	No. (%)
Relationship	Father	86 (50)
	Mother	77 (44.8)
	Relatives	9 (5.2)
Age group	21-30	17 (10.0)
	31-40	58 (34.0)
	41-50	72 (42.5)
	51-60	23 (13.5)
Ethnic Background	Malay	51 (29.7)
	Chinese	102 (59.3)
	Indian	13 (7.5)
	Others	6 (3.5)
Level of Education	PMR (Lower Secondary Evaluation)	8 (4.7)
	SPM ('O' Level)	37 (21.6)
	STPM ('A' Level)	5 (2.9)
	Diploma	43 (25.1)
	Degree	65 (38.0)
	Master/PHD	13 (7.6)
Number of Children	1	58 (35.6)
	2	73 (45.4)
	3	23 (14.1)
	4	5 (3.1)
	5	3 (1.8)
Employed	Yes	145 (83.8)
	No	28 (16.2)
Family net income	Under RM 1500-\$ 479.00 (Lower class)	11 (8.9)
	RM 1500 – RM 6000 (Middle class)	77 (62.1)
	More than RM 6000= \$1916.00 ( Higher class)	36 (29)

Table 2: Respondents' experiences in playground related injuries

Experience	No. (%)
Physical injury	Yes 18 (10.7)
	No 150 (89.3)
Place of Injury	This neighborhood 8 (80)
	Other places 1 (10)
	Both 1 (10)
Medical attention	Yes 11 (61.1)
	No 6 (33.3)
	Don't know 1 (5.6)

Table 3: Type of equipment related to playground injury

Type of Equipment	No. (%)
Swing	9 (50)
Slide	4 (22.2)
Overhead ladder	2 (11.1)
Monkey bar	1 (5.5)
Seesaw	2 (11.1)
Other climbing equipment	3 (16.7)
Others	4 (22.2)
Don't know	2 (11.1)

Table 4: Type of undersurface related to playground injury

Type of Undersurface	No. (%)
Sand	7 (38.9)
Wood chips	1 (5.5)
Grass	0 (0.0)
Protective matting (rubber)	4 (22.2)
Concrete	4 (22.2)
Pea gravel	0 (0.0)
No protective material	2 (11.1)
Other	0 (0.0)
Don't know	2 (11.1)

Table 5: Respondents' experiences in crime

Experience	No. (%)
Victim of crime (Parent)	Yes 21 (12.2)
	No 151 (87.8)
Place of crime	This neighborhood 8 (53.3)
	Other places 7 (46.7)
Victim of crime (Children)	Yes 4 (2.3)
	No 167 (97.7)
Place of crime	This neighborhood 2 (66.7)
	Other places 1 (33.3)

Table 6: Safety perception of parents

		No. (%)
During day time	Very safe	160 (9.6)
	Fairly safe	63 (37.7)
	A bit unsafe	50 (29.9)
	Very unsafe	38 (22.8)
During night time	Very safe	4 (2.6)
	Fairly safe	9 (5.8)
	A bit unsafe	35 (22.4)
	Very unsafe	108 (69.2)
Parents allow children to come alone to playground	Yes	47 (27.8)
	No	122 (72.2)

Table 7: Principal component analysis

Component Loadings	Dimension	
	1	2
Level of worry about crime in parents		
Getting assault	.874	-.057
Robbed by other youth	.949	.030
Attacked or beaten up	.943	.045
Joining gang activity	.884	.115
Injured by equipment	-.115	1.087

Variable Principal Normalization

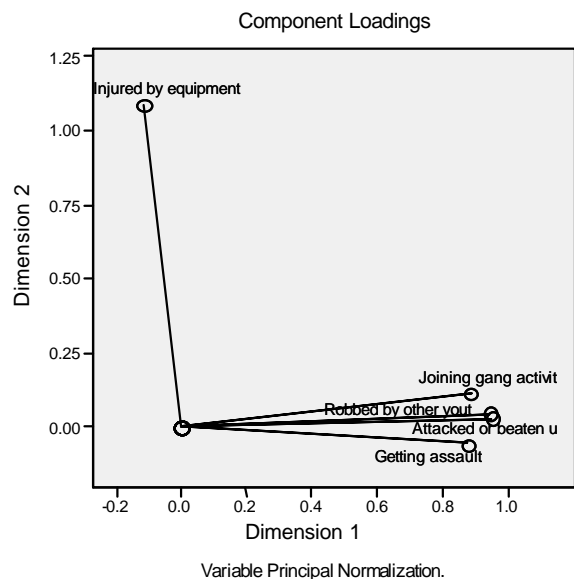


Fig. 2: Variable principal normalization of level of worry about crime in parents

The principal components analysis has been applied to identify the factors which explain the maximum variation in the responses. According to Table 7 and Figure 2, the most crucial factors identified were the level of parental concern about children being at risk of victimization by various situations of injury and crime was related to two situations, namely, first, “children being robbed by other youth” and second, “children being

Table 8: Principal component analysis

Component Loadings	Dimension	
	1	2
Parent's Perception of Crime		
Vandalism	.596	.891
Causing trouble by teenager	.863	.121
Kidnapping	.907	-.101
Gang activity	.960	-.318
Drug use	.924	-.258

Variable Principal Normalization

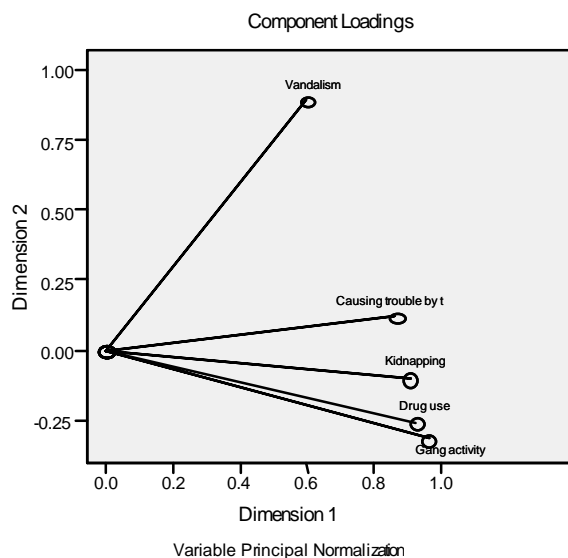


Fig. 3: Variable principal normalization of Parent's Perception of Crime

attacked or beaten up”. Besides, the variables such as “children getting assaulted” and “joining gang activity” are real concern of worry and are found to be statistically significant. Parental concern about “children being injured while using the playground equipment” is not significant.

Based on Table 8 and Figure 3, we infer that two major problems in this neighborhood area were “kidnapping” and “teenager hanging around and causing trouble”. This is consistent with the survey conducted by James and Gimson [31] that showed great concern of parents in England regarding crime and anti-social behavior particularly related to teenagers hanging around on the streets at night.

Interestingly, parents did not worry about kidnapping in the park, even though they perceive it is a problem in the neighborhood. The presence of “drug users” is also a big problem in the perceptions of parents and “gang activity” is a concern as well. However, the results reveal that parents did not consider vandalism a big problem and is not found to be significant.

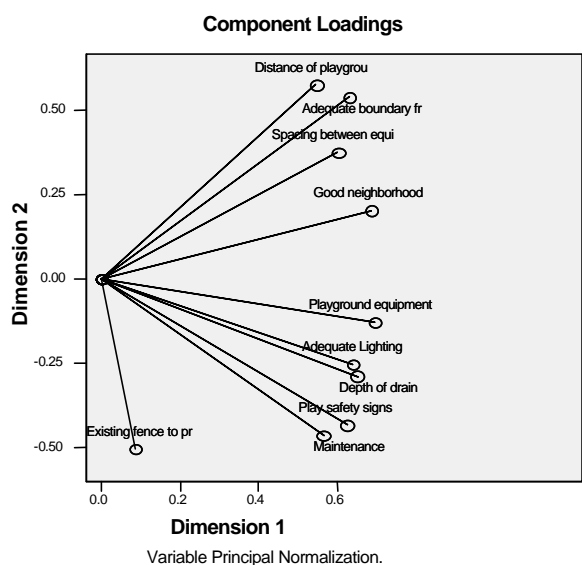


Fig. 4: Variable principal normalization of parent's perception about condition of Neighborhood Park

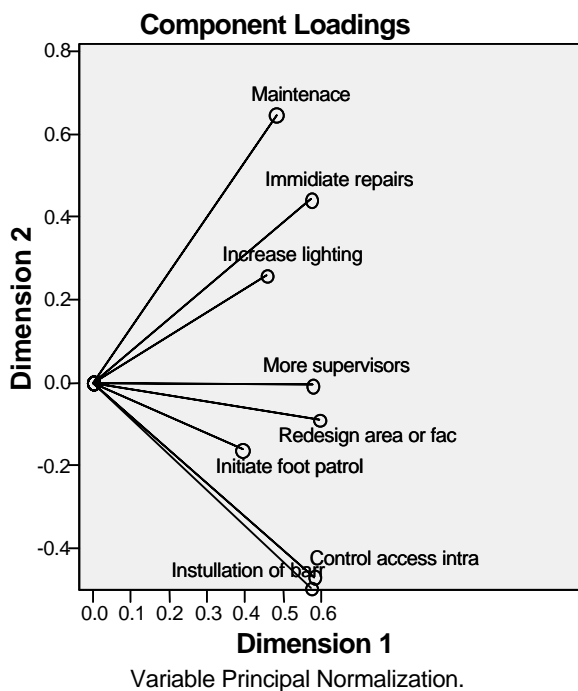


Fig. 5: Variable principal normalization of perception of parents related to make the park safer from crime and personal Injury

The level of agreement or disagreement of parents about the physical conditions of Taman Sri Nibong park are described as shown in Table 9 and Figure 4. Most of the parents agreed that in the park, playground equipments were suitable and that the neighborhood would be a good place for their kids to grow up and play

Table 9: Principal component analysis

Component Loadings	Dimension	
	1	2
Parent's perception about condition of Neighborhood Park		
Distance of playground from road	.546	.574
Adequate boundary from outside	.630	.537
Spacing between equipment	.602	.373
Playground equipment	.696	-.129
Play safety signs	.624	-.433
Maintenance	.564	-.464
Depth of drain	.650	-.289
Good neighborhood	.687	.202
Adequate Lighting	.638	-.254
Existing fence to prevent crime	.085	-.505

Table 10: Principal component analysis

Component Loadings	Dimension	
	1	2
Perception of parents related to make the park safer from crime and personal Injury		
Redesign area or facility	.598	-.090
Initiate foot patrol	.393	-.163
Increase lighting	.456	.259
Immediate repairs	.572	.441
Maintenance	.482	.646
More supervisors	.579	-.008
Installation of barriers, fences, restrainers	.584	-.470
Control access entrance/exists	.575	-.497

in. In addition, most parents thought that depth of drains around the park and lighting provision are appropriate in relation to the safety of children. Respondents also reported that they would like to see proper boundary to separate children from the area outside the playground, improvement of the maintenance quality, sufficient signage on safety in the playground and proper spacing between adjacent activity-settings are imperative at this juncture.

Table 10 and Figure 5 indicate that the majority of the respondents believed that having more supervisors is the first factor to reduce crime or injury in the park and they would still want to see "more supervision facilities" provided for children in the park to enhance the safety and security measures. Redesigning the Sri Nibong neighborhood park or its facility for better surveillance should be the second priority. The respondents perceive that increasing lighting and initiating foot patrol can make the park safer from criminal activity and all these factors were found to be statistically significant. In their opinion, maintenance, installation of barriers (fences, restrainers) and control access entrance/exists and immediate repairs respectively are much less effective ways of increasing safety.

The following points are outcomes from the parents' suggestions related to the importance of environmental design in achieving safer park and playground from personal injury and criminal activity. Parents pointed out the need to install appropriate sign boards to identify age-related equipment, maintain of playground equipment, change of undersurface of equipment, design separate routes for cyclists, redesign the pathway for joggers as important. In addition, it is also vital to install physical barriers in the form of fences and hedge between the playground and football field, rearrange trees, turf maintenance and remove bushes and shrubs with sharp leaves from the park to prevent injury to children. Further recommendation includes to install more bumpers to reduce speed of vehicles which will provide road safety for this neighborhood, increase lighting to provide natural surveillance during night time, install some safety elements such as CCTV, emergency buzzer press alarm to avoid crime and criminal activity and establish park committee for residents to contribute to make the area safer.

### **CONCLUSION**

Criminal activities and playground related injuries are two major concerns which threaten children while they are playing in parks and playgrounds and affect parents' perception relating to the safety of their children. If parents do not have a good perception regarding the safety of their neighborhood's play environments, they will not allow their children to play in the neighborhood without adult supervision and this will have a negative influence on the child independency, self-sufficiency, health and physical activity. This negative influence can affect the future of the society and its sustainability. In this study, parents identified safety as the most important factor when visiting a park or playground. The majority of the respondents suggested the need to focus on the safety of equipments including proper maintenance and providing age appropriate equipments. The safety of the environment related to criminal activities such as kidnapping and vandalism was also considered crucial to them. This study has found that if parents are not sure of their children's safety, they would not leave their children alone without supervision. In relation to the effectiveness of environmental design in decreasing parent's concern, this study has found that parents perceived some elements of environmental design like physical barriers in the form of fences and hedges between playground and football field and separate route for cycling from walkway

as effective in protecting children from accidents and injuries in the park. The current study is limited in its scope because of its case study approach. Since only one of the neighborhood areas from a city in Malaysia was evaluated, a more comprehensive study must be conducted before generalization can be made. As the study focuses on a heterogeneous community, future research should examine if perceptions differ among homogenous communities.

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