

Influence of Interpersonal Barrier and Fear of Crime on Walking Behavior

Zeinab Aliyas

Faculty of Design and Architecture
Department of Landscape Architecture
Universiti Putra Malaysia, Malaysia
znb.aliyas@gmail.com

Norsidah Ujang

Faculty of Design and Architecture
Department of Landscape Architecture
Universiti Putra Malaysia, Malaysia
Norsidah21@gmail.com

Abstract: *Walking is a popular form of leisure activity and a convenient option to prevent diseases through a personal control of physical activities. However, little is discussed on walking pattern and its association with social, personal, and physical factors in less developed nations as compared to the developed ones. Previous studies have identified that the most basic factor that influences the individual behavior has been found to occur at the intrapersonal level. In practice the intrapersonal factors influence the people's behaviors and attributes of their surroundings; while the fear of crime was found to have the most association with walking behavior. On the other hand, the findings for decision and frequency of walking are still ambiguous. This paper elaborates on the influence of the fear of crime and interpersonal factor on the residents' decisions and regularity of walking leisurely around the neighborhood. A questionnaire survey was used to collect the data. The questionnaire survey was conducted by recruiting 424 representative samples of adults (18-65 years of age). The respondents were the residents of Bandar Baru Bangi, a residential area in Malaysia, as the sample area of the study. Leisure walking was measured for both intention and regularity of walking. The fear of crime was measured by four items and the interpersonal factor was measured by 7 items in terms of the personal barrier. Leisure-time walking was measured for both walking categories-recreational and exercise. A Smart-PLS model was run to analyze the data. The results indicate significant correlation between the interpersonal barrier and the fear of crime with recreational and exercise walking. The fear of crime was found to be more associated with recreational and exercise walking rather than the interpersonal factors.*

Keywords: *Walking, Leisure walking, Fear of crime, Individual barrier, Health.*

1. INTRODUCTION

Consistent with the latest studies, it is well agreed that in Malaysia, particularly in the larger cities such as Kuala Lumpur, there has been an alarming upward trend in the levels of obesity commonly attributable to the sedentary lifestyles [1], [2]. As pronounced by the World Health Survey [3], physical inactivity ranked the premier (16.5%) in Malaysia among all the Western Pacific Region countries [2]. Moreover, a national survey (1993) dealing with the incidence of obesity among Malaysians (aged 18 years and above) approved that roughly a fifth (20.1%) of the urban inhabitants suffered from overweight [4]. It is essential to remind that by reason of physical inactivity the researchers have explored the ways which can embolden the inhabitants to increase walking. Indeed, walking is an activity easily accessible to the majority of the folks while being inexpensive to elevate the individuals' physical activities.

However, as documented by the latest research in Malaysia, the individuals do not accomplish the suggested walking level which is necessary to be done. One research, for example, proved that just below three thirds (65.1%) failed to even accomplish the commended standards for walking (at least 30 minutes walking) and merely 1% of the population being studied reported that they were frequently engaged in neighborhood walking [5]. Such judgments have warned the government of Malaysia to delve the problem plus adopting efficient strategies to promote the people's walking behaviors with the aim of attaining the needed health benefits. We should be cognized that such unhealthy lifestyle would exert a negative chain impact on the population of the Malaysian cities and its economy if no useful health promotion interventions are adopted. To increase the level of walking, previously conducted studies have suggested that the individual attitude and the social factor influence residents' decision to walk. These factors are very much relevant to leisure walking; an activity that is completely optional.

Nonetheless, both attitude and social factors could possibly prevent or motivate the humans to walk. In order to identify the factors that influence leisure walking, this study aimed to find out the relevant factors in terms of individual and social elements that affect leisure walking. so in order to find these factors, these study aims to find out the link of individual and social barrier on intention and frequency of leisure walking. On the other hands, it needs to be asserted that the findings reported in this study are a small part of a larger research.

2. BACKGROUND OF STUDY

Because of turning into a principal risk factor for health, it is indispensable to urgently tackle with the disquieting rise in the rate of being overweight among Malaysians. As approved by the research findings, physical inactivity is universally associated with the rise in 17 diverse ailments as a minimum [6], among which cardiovascular disease, diabetes, plus colon and breast cancers [2]. As a consequence, Malaysia is recognized as a country capable of undergoing an elevated level of chronic diseases attributable to very high levels of physical inactivity. In accordance with the upsurge in being overweight, one research declared that there has been a 15 fold rise in the cardiovascular mortality in Malaysia from 1950 to 1989 which now explains around 30% of the total deaths among the adults [7]. As mentioned earlier, such a life style would adversely affect the population of Malaysian cities and its economy if proposer health promotion interventions are not devised. Omar et al. [8] found that it is possible to alleviate such worrying issues by the ample profits of the walking behavior. The fact is that walking is considered as a practical form of exercise, having the possibility of being incorporated into people's daily grinds while being appropriate for all socio-demographic groups if they intend to partake [9]–[11]. Besides, the current research was executed in response to an avalanche of calls for interventions aimed at boosting the levels of physical activity through a promoted walking behavior [2], [7]. Bearing this in mind, in order to devise strategies to lower the major illnesses, it would be indispensable then to perceive the reason why individuals are physically inactive.

There is a common census that walking is a somewhat easy method to remain active physically while it is easily accessed by the folks as it does not urge any financial means and remains a lifelong activity lasting into old age. Although majority of the individuals consider walking to be useful for their health, only a small number tends do adequate regular walking to descend maximum health benefits.

It is known that a decline in walking rates would concern the social scientists, architects, and planners because it is asserted such a diminishment might influence the quality of life and sense of community. With the intention of recognizing the factors influencing the individuals' physical activity levels, numerous surveys have been executed by the experts in the fields of public health, community medicine, transportation, and urban planning. To be laconic, a disciplinary approach has been broadly implemented by the researchers to scrutinize the mentioned alarming issues. It is crystal clear that a thorough perception of the correlates of walking would allow the researchers to invent efficient interventions.

Diverse factors have been demonstrated by the previous studies, the factors which were attributed to physical activities in both younger and older adults, among which the built environment features like neighbourhood walkability and proximity of parks and recreation facilities [12],[13], in addition to the neighbourhood social environment factors like aesthetics and incivilities [14], [15]. In fact, barriers to physical activity are existent on manifold levels namely individual, social, and environmental.

To the best of our knowledge, only a scarce bunch of research has elaborated on social–individual interactions for walking which has majorly concentrated on built environmental factors including connectivity of streets, availability of shopping and sports facilities and neighborhood aesthetics [16], [17]. Other significant factors recommended for the walking behavior include social environmental factors [18], [19] and safety concerns [20], [21]. Rhodes et al. [22] examined the associations between safety and psychosocial cognitions in regard to the walking behavior, revealing that low levels of perceived crime contributed to a greater effect of attitude on the intention to walk in comparison with the individuals who perceived high levels of crime. Up to the present time, there is a lack of research to take into consideration the interactions of psychosocial cognitions with social neighborhood factors such as fear of crime for leisure walking separately for exercise and recreation. Leisure walking is known as a kind of walking performed without a particular destination commonly in the neighbourhood area, parks, plazas, and public open spaces. Leisure walking is executed for

recreation or health purpose. While jogging and brisk walking are regarded as exercise walking, walking with friends or family, pet, and neighbours is known as recreational walking. In practice, it is done by the folks with the purpose of relaxing or having fun. A majority of research works have scrutinized the factors related to general walking or travel walking. Having this said, the present paper endeavored to examine the interactions of neighborhood perceptions (fear of crime) with the individual barrier for the intention and frequency of leisure-time walking.

2.1. Individual Barrier and Walking

In the literature walking behaviour, there is a scarcity of attention to the role of individual attitudes in governing the travel behaviour as a consequence of methodological complications in evaluating the personal attitudes. Nonetheless, such a gap has been recently addressed by the researchers and a quantity of contemporary empirical studies have attempted to integrate the attitudinal factors while analysing the walking behaviour [23].

Concerning the walking behaviour, the attitudinal factors have been proposed to be a stronger determinant of walking than the built and social environment factors [24], [25]. Handy [26] confirmed that the quality of the walking environment were not found to influence the choice to walk; on the other hand, Moudon et al. [27] reported high walking trip rates in the neighbourhoods that had been rated low in view of pedestrian accessibility. Although these two studies fail to take account of attitudinal variables in their analyses, their reported findings tend to recommend that the built environment factors might not be as significant for the entities who are intensely motivated to walk. Such research lines accentuate the urge for the factor in the individual attitudes to govern the decisions to walk. As a result, Alfonzo [28] recommended the feasibility to be as the most rudimentary level of need within the hierarchy of walking needs. The need for feasibility might affect the decision-making process for leisure walking trips. As stated by Alfonzo [28], in case the need for feasibility is not fulfilled, walking will not normally ensue, no matter how satisfied an individual is with the other levels of built and social environment. It is of note that the factors which are connected with the need for feasibility encompass considerations of mobility, time, or negative attitude. Mobility factors may be affected by a person's age, or physical condition. Inadequate mobility might cause a walking trip unfeasible. Correspondingly, inadequate time might restrict the feasibility, finally influencing an individual's decision to walk. Moreover, negative attitude might be influenced by tiredness, shyness or feeling awkwardly. Feasibility might be also diminished by the responsibility for children, elderly, or other commitments. Numerous factors associated with the feasibility influence the choice between walking and driving. For instance, the house chores or working exerts an effect on the household's mode of travel [29]. Such factors might associate with a person's level of responsibility or with the sum of time he or she has to walk, and this per se influences the feasibility for walking for an individual. Furthermore, the time limitations are associated with walking levels [30]. Times, motivation and child care responsibilities would hinder physical activity for younger people [30]. In one study, Omar et al.[5] reported that negative attitude towards walking (feel awkward/embarrassed, no appropriate outfit, lazy, and tired) influenced the regularity of walking in Kuala Lumpur while factors such as rainy, cold or hot weather were reported as the barriers for decision of walking [5].

2.2. Fear of Crime and Walking

Having a very broad range from theft to street violence, crime is associated with particular situations or materials while fear of crime is claimed to be dependent on the perception of the environment. Fear of crime is demarcated as a response to the attributes of the space and is more prevalent than the crime itself [31]. Indeed, it is a chief social issue that can ruin social relations as well as influencing the quality of life. Silent isolated streets, subways, and park areas are referred to as the urban spaces in which the fear of crime is highly perceived [32].

It needs to be accentuated that the urban parks, whose positive psychological impacts on humans have been substantiated by lots of researches, are referred to as not-to-go places owing to the fear of crime. The urge for safety might chiefly influence leisure walking because this trip is said to be optional. Having said this, an individual might relinquish the stroll if he is unsatisfied with his or her need for safety. In order to reduce the fear of crime, many studies have recommended factors influencing the

fear of crime, among which patrolling police in the area, lighting and maintained overgrown trees and shrubs.

Suminski et al. [33] observed that the perceived safety as an aggregate measure of participants' ratings for lighting and crime significantly correlated with female walking, but remained insignificant for their counterparts. Moreover, improved lighting was found to be correlated with less crime and promoted pedestrian activity after dark; thus promoting the surveillance [34]. Likewise, enhanced lighting has been reported to be able to mitigate the fear of crime [35] and elevate the respondents' belief, posing that the other pedestrians may intervene if needed [36]. As stated earlier, the house and garden maintenance can also affect the crime and perceived safety. Indeed, well-preserved housing signals the resident's proprietary, indicating a symbolic distinction between public and private space. Many studies have agreed on the association between dishevelled lawns as well as litter and crime vulnerability in the suburbs [37]. Furthermore, the condition and maintenance of suburban neighbourhoods is linked with the perceived safety [38], [39]. Besides, Kuo et al. [40] reported that tree planting and grass maintenance exerted an effect on the inner-city residents' sense of safety.

3. METHODOLOGY

Bandar Baru Bangi is a township, recently crowned as "Knowledge City", is situated in the district of Hulu Langat, in Selangor, Malaysia. The questionnaires intended for this study were distributed in the most visited place during the whole weekdays at different times. The respondents were chosen randomly based on their convenience and willingness. 464 residents of Bandar Baru Bangi agreed to participate in this study and finally 424 questionnaires were qualified to be used for the research. The fact is that the questionnaires were collected from residents of all residential sections of the study area.

The survey questionnaire consisted of four sections; the first section measured the walking behaviour by asking the respondents about the purpose and regularity of leisure walking. This included the self-reported recall of walking activity by asking the respondents to rate the reason of their walking to 6 items namely, jogging, brisk walking, stretch while walking (Exercise walking), to relax, to go to a playground or park, and finally to meet and socialize with people (recreational walking). All the 6 items were measured in the Likert scale format ranging from 1 (not at all) to 5 (very much). Subsequently, the respondents were asked how frequently they walk in the neighbourhood area in a week based on the exercise and recreational walking. In the next section, the respondents were asked to rate the items that prevent them to walk in the neighbourhood area in the Likert scale format including lack of time (2 items), weather, health condition, and negative attitude (3 items). In the third section, the respondents gave marks from 1 to 5 based on the current situation in their neighbourhood including criminals (CS1), presence of lighting (CS2), maintenance of overgrown trees and shrubs (CS3), and police to patrol streets (CS4). The last section dealt with several socio-demographic questions drawn from the previous research conducted by Lee and Moudon [41] and Giles-Corti et al. [42], which had been previously employed in the walking behaviour research. These socio-demographic variables included in the questionnaire were related to a person's ethnicity, gender, age, household income and education.

A pilot test was conducted to test reliability and validity of the items before collecting the data using the final survey questionnaire. A test-retest analysis on the measurement of the walking behaviour was found to exhibit excellent consistency between the items. After collecting the data, they were organized and analyzed. For the analysis of the questions, two computer programmes called Statistical Package for Social Sciences (SPSS) and SmartPLS were used to analyze the data. The data were analyzed by using descriptive and frequency statistics of SPSS. To conduct the needed correlation and regression analyses, SmartPLS was used.

4. RESULTS AND DISCUSSION

The results of the demographic variables are presented in Table 1. It was found that the majority of the respondents were male in this study. In addition, the result exhibited that most of the participants in the study were Malay. Moreover, the majority held Diplomas (39%). In addition, more than 34 % of the participants had income less than 1500 RM. On the other hand, the mean for the individual barrier (3.23) was more than that of the crime safety (2.93). It is of note that the respondents rated the weather and health condition problems as the most important barriers preventing them from walking,

Influence of Interpersonal Barrier and Fear of Crime on Walking Behavior

while the negative attitude received the lowest mean (2.75). Meanwhile, presence of lighting attained the highest score among the other items of the crime safety (3.39) while the respondents gave the lowest rate to criminals in terms of condition of the crime safety in the neighborhood (2.6).

Table1. Description of the demographic variables

Variable		Frequency (n)	Percentage
Gender	Female	120	28.3
	Male	304	71.7
Age*	18-20	76	18.8
	21-30	162	40
	31-40	45	11.1
	41-50	52	12.8
	51-60	40	9.9
	>61	30	7.4
Ethnicity*	Malay	405	96.9
	Chinese	3	0.7
	Indian	8	1.9
	Arab	1	0.2
	Indonesian	1	0.2
Education*	SPM & lower	75	18.2
	Cert/ Dip	162	39.2
	Bachelor	126	30.5
	Master and above	50	12.1
Marital status*	Single	200	48.1
	Married	211	50.7
	Separated	2	0.5
	Divorce	3	0.7
Income/month*	Below RM1500	126	34.8
	RM1500-3000	93	25.7
	RM3000-6000	82	22.7
	Above RM6000	61	16.9

Note: *Some participants did not respond to all the categories

Table2. Descriptive statistics of the Individual Barriers and the Crime Safety

IB	Mean	SD	CS	Mean	SD
Weather	3.8	1	CS-1	2.6	1.55
Health	3.62	1.1	CS-2	3.39	1.24
N.Attitude	2.75	0.87	CS-3	2.8	1.56
Time	3.46	0.76	CS-4	2.93	1.22
Total	3.23	0.62	Total	2.93	0.94

4.1. PLS Model

The PLS-SEM was used to examine the hypotheses formulated in this study. Afterwards, the structural model was specified as exactly as the proposed model based on our literature review and objective. In these instances, 6 variables were applied involving the individual barrier (IB) and the crime safety (CS) as the exogenous constructs and the frequency of recreational walking (REC-F), the frequency of exercise walking (EX-F), the intention of exercise walking (EX) and the intention of recreational walking (REC) as the endogenous constructs to test the relationship among the exogenous and endogenous constructs.

To validate the path diagram, the convergent validity of the construct was primarily tested [43]. All the analyses yielded a path coefficient above the threshold of 0.80, supporting the formative construct's convergent validity, accordingly. After that multicollinearity among items in the same construct was tested that VIF values of all items were below the threshold value of 5, so there was no critical levels in the formative constructs. In addition, we analyzed the outer weights for their significance and relevance, this was done by bootstrapping. The result of bootstrapping for items revealed that all items significantly contribute to each construct.

Table 3 presents the path coefficient for the structural model using Smart-PLS 2.0. A total of eight path coefficients between exogenous and endogenous constructs have been shown dealing on how to specify the structural model. By addressing the original sample directly after running the bootstrapping technique, the result revealed different values indicating the role significant in a structural model. The bootstrapping test was run to significance of the path coefficient. According to Table 3, all the path coefficients were significant (above 1.96), except for IB -> REC, indicating that the null hypothesis was accepted. This implies that the IB did not have a significant impact on REC. The result showed that the crime safety is the most significant factor for both regularity and intention of leisure-time walking.

Table3. Result of PLS Algorithm and Bootstrapping

	Path	Mean	SD	T Value	P Value	f ²
	CS -> EX	0.32	0.04	6.71	0	0.1
	CS -> EX-F	0.34	0.04	7.56	0	0.13
	CS -> REC	0.15	0.05	2.64	0	0.03
	CS -> REC-F	0.32	0.04	7.1	0	0.62
	IB -> EX	-0.19	0.05	3.75	0	0.04
	IB -> EX-F	-0.18	0.04	4.1	0	0.03
	IB -> REC	-0.1	0.05	1.84	0.06	0.01
	IB -> REC-F	-0.16	0.04	3.77	0	0.53

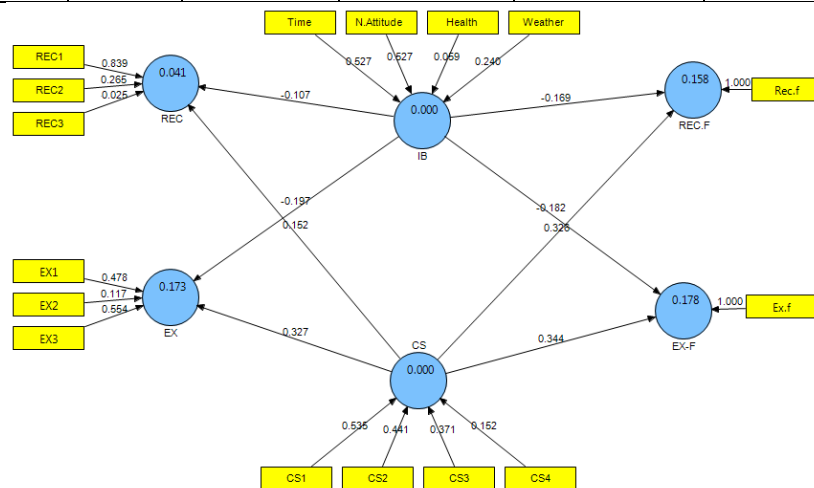


Fig1. PLS Algorithm of the model

Results of this study suggest that both the crime safety and the individual barrier are detriment to the outdoor leisure activity. This study found that the crime safety has a significant effect on the intention and regularity of the exercise and recreational walking. The effect size of the crime safety for the intention and regularity of the exercise walking was found to be medium ($f^2= 0.1, 0.13$ respectively) but it was large ($f^2=0.62$) for regularity of recreational walking (REC-F). This denotes the important role of the crime safety with regularity of recreational walking among the residents in the neighbourhood. The result of this study are congruent with the results reported by the other studies such as Rhodes et al.[22], reporting that low levels of perceived crime resulted in a larger influence of the attitude on the intention to walk compared with the people who perceived high levels of crime. Also, in another study conducted in Kuala Lumpur (Capital city of Malaysia), the researchers found that an association between “safety from crime” and “free from overgrown trees and tall shrubs” had a high association with walking [44]. Furthermore, the current study supports the results reported by Rhodes et al. [22] confirming that low levels of perceived crime contributed to a larger influence of the attitude on the intention to walk compared with the individuals who perceived high levels of crime. The result of this study showed that the mean for the presence of lighting was the highest (mean= 3.3) among the other items of the crime safety in the area. In this vein, we can generally compare the result with the other studies on exploring the existence of lighting in improving the feeling of safety in the area. In a study done by (Painter, 1996), it was found the improved lighting was associated with less crime and mounted pedestrian activity after dark thereby boosting the surveillance. Moreover, Herbert and Davidson (1994) reported that enhanced lighting could diminish the fear of crime. Consequently, we can commonly state that increasing the feeling of safety from

Influence of Interpersonal Barrier and Fear of Crime on Walking Behavior

crime can elevate the intention and regularity of leisure walking as it was supported by other studies such as [45].

On the other hand, the findings of this study demonstrated a significant negative effect of the individual barrier on the intention and regularity of exercise walking ($b=-0.19$), ($b=-0.18$) respectively. The value of the path coefficient for the intention and regularity of exercise walking in terms of the individual barrier resembled each other, implying that the path coefficient of the individual barrier exerted almost the same effect on the decision and the frequency of walking for exercise. The effect size of the individual barrier of exercise walking was found to be medium that supports the importance of this barrier in decision of walking for health, although the result found different values for recreational walking. The effect size of the individual barrier on regularity of recreational walking was found to be large confirming the importance of the individual attitude to walk regularity in recreation; nevertheless, there was no significant effect of the individual barrier on decision to walk for recreation; this means the individual attitude do not impress the people to decide to walk for recreation but it was significant on the frequency ($b=-0.16$). Yet, according to Cohen [46], the values inside the endogenous variables are considered high when they are upper than 0.80. In addition, we can establish a comparison between the strength of the endogenous construct in a path model. As for this case through, none of R^2 of the endogenous constructs was high. This suggests that although these two exogenous constructs (IB & CS) affected the intention and regularity of leisure walking, there was no big different among the endogenous constructs in terms of IB and CS.

By and large, the findings obtained in this study indicate that the crime safety is more important than the individual attitude to walk for leisure as approved by the participants of the study. Yet, the results of this study are in opposition to the findings of some studies such as Kitamura et al. [47] as well as Bagley and Mokhtarian [25]. Besides, the hierarchy of walking of Alfonzo [28] showed that the initial factor in deciding to walk is the individual attitude while the third level belongs to the safety; however, this study found that feeling safe in terms of fear of crime is the initial need in decision to walk leisurely. More importantly, for recreational walking the results of this study found that the crime safety is the initial reason for people to walk while no association with the individual barrier was found. According to the result of the PLS Algorithm, criminals (CS1) obtained the highest weight among the other items of the crime safety (0.53) while lack of time and negative attitude (0.52) gained the highest weigh among the other items of the individual barrier on the construct, meaning that these three items exerted the largest influence on the two exogenous constructs of the study model.

5. CONCLUSION

This study scrutinized the interactions between the individual and social barriers in terms of leisure walking and the results proved the important role of both factors on the decision and regularity of leisure walking. The results of this study can be helpful for health researchers in Malaysia due to the lack of walking among the residents in the neighbourhood areas, plus informing them of the barriers which prevent the residents from walking; in details, the results obtained in this study showed more walking among the people in the neighbourhood area in comparison with the cities studied before[5].

For the future studies, the researchers can study the interaction of social, individual and physical barriers with leisure walking together. This being said, this study only focused on barriers while the influence of the motivation barriers remained unclear, then again; this study was done only in one neighbourhood and based on differences in cities and neighbourhood areas, for this reason this result cannot refer to all communities. Finally, this study only examined the regularity and intention of leisure walking without investigating the role of two barriers on duration of leisure walking. For the future study, this study recommends other factors to be included in terms of walking such as the physical environment to test the important barriers (social, individual and physical) in terms of walking. Additionally, this study suggests running the same study for other big cities as the result would be different from the ones related to the neighbourhood area. This can be also performed in a different community.

REFERENCES

- [1] Bernama, "60 Per Cent of Malaysians Overweight or Obese," 2010. *Access My Library*. <http://www.accessmylibrary.com/article-1G1-242658250/60-per-cent-malaysians.html>

- [2] R. Guthold, T. Ono, K. L. Strong, S. Chatterji, and A. Morabia, "Worldwide variability in physical inactivity: a 51-country survey," *Am. J. Prev. Med.*, vol. 34, no. 6, pp. 486–494, 2008.
- [3] WHO, "2003 World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension," *J. Hypertens.*, vol. 21, no. 11, pp. 1983–1992, 2003.
- [4] M. I. Noor, "The nutrition and health transition in Malaysia," *Public Health Nutr.*, vol. 5, no. 1a, pp. 191–195, 2002.
- [5] W. Omar, I. Patterson, and S. Pegg, "Using a Health Belief Model to investigate the walking behaviour of residents living in Kuala Lumpur, Malaysia," *Ann. Leis. Res.*, vol. 16, pp. 16–38, 2013.
- [6] N. Mutrie and A. Blamey, "Getting the inactive active: Implications for public health policy," *J. R. Soc. Promot. Health*, vol. 124, no. 1, p. 16, 2004.
- [7] R. Lekhraj, S. Rampal, G. L. Khor, A. M. Zain, S. Bin Ooyub, R. Bin Rahmat, S. N. Ghani, and J. Krishnan, "A national study on the prevalence of obesity among 16,127 Malaysians.," *Asia Pac. J. Clin. Nutr.*, vol. 16, no. 3, pp. 561–566, 2007.
- [8] W. Omar, I. Patterson, and S. Pegg, "Healthy Lifestyle: Promoting Walking Behaviour in Kuala Lumpur," *World J. Manag.*, vol. 3, no. 1, pp. 109–123, 2011.
- [9] M. Fenton, "Battling America's epidemic of physical inactivity: building more walkable, livable communities," *J. Nutr. Educ. Behav.*, vol. 37, pp. S115–S120, 2005.
- [10] P. H. Gobster, "Recreation and leisure research from an active living perspective: taking a second look at urban trail use data," *Leis. Sci.*, vol. 27, no. 5, pp. 367–383, 2005.
- [11] D. Merom, C. Rissel, P. Phongsavan, B. J. Smith, C. Van Kemenade, W. J. Brown, and A. E. Bauman, "Promoting walking with pedometers in the community: the step-by-step trial," *Am. J. Prev. Med.*, vol. 32, no. 4, pp. 290–297, 2007.
- [12] E. Berke, T. Koepsell, A. Moudon, R. Hoskins, and E. Larson, "Association of the built environment with physical activity and obesity in older persons.," *Am. J. Heal. Promot.*, vol. 97, pp. 486–492, 2007.
- [13] B. Saelens and S. Handy, "Built environment correlates of walking: a review," *Med Sci Sport. Exerc.*, vol. 40, pp. 550–566, 2008.
- [14] A. King, C. Castro, S. Wilcox, and A. Eyler, "Personal and environmental factors associated with physical inactivity among different racial–ethnic groups of US middle-aged and older-aged women.," *Heal. Psychol.*, 2000.
- [15] A. Bauman and F. Bull, *Environmental correlates of physical activity and walking in adults and children: A review of the reviews*. London, U.K.: National Institute of Health and Clinical Excellence, 2007.
- [16] E. Cerin, C. Vandelandotte, E. Leslie, and D. Merom, "Recreational facilities and leisure-time physical activity: An analysis of moderators and self-efficacy as a mediator," *Heal. Psychol.*, 2008.
- [17] J. Carlson, J. Sallis, and T. Conway, "Interactions between psychosocial and built environment factors in explaining older adults' physical activity," *Prev Med*, 2012.
- [18] C. Addy, D. Wilson, K. Kirtland, B. Ainsworth, P. Sharpe, and D. Kimsey, "Associations of Perceived Social and Physical Environmental Supports with Physical Activity and Walking Behaviour," *Am. J. Public Health*, vol. 94, no. 3, pp. 440–443, 2004.
- [19] V. Cleland, A. Timperio, and D. Crawford, "Are perceptions of the physical and social environment associated with mothers' walking for leisure and for transport? A longitudinal study.," *Prev. Med. (Baltim.)*, vol. 47, no. 2, pp. 188–193, 2008.
- [20] T. Pikora, B. Giles-Corti, and F. Bull, "Developing a framework for assessment of the environmental determinants of walking and cycling," *Soc. Sci. Med.*, 2003.
- [21] A. Loukaitou-Sideris and J. Eck, "Crime prevention and active living," *Am. J. Heal. Promot.*, 2007.

- [22] R. Rhodes, S. Brown, and C. McIntyre, "Integrating the perceived neighborhood environment and the theory of planned behavior when predicting walking in a Canadian adult sample," *Am. J. Heal. Promot.*, 2006.
- [23] X. Cao, S. L. Handy, and P. L. Mokhtarian, "The Influences of the Built Environment and Residential Self-Selection on Pedestrian Behavior: Evidence from Austin, TX," *Transportation (Amst.)*, vol. 33, no. 1, pp. 1–20, Jan. 2006.
- [24] S. Handy, X. Cao, and P. Mokhtarian, "Correlation or causality between the built environment and travel behaviour? Evidence from Northern California.," *Trans. Res. D*, vol. 10, pp. 427–444, 2005.
- [25] M. Bagley and P. Mokhtarian, "The impact of residential neighborhood type on travel behavior: A structural equations modeling approach.," *Ann. Reg. Sci.*, vol. 36, no. 2, pp. 79–97, 2002.
- [26] S. Handy, "Urban form and pedestrian choices: Study of Austin neighborhoods.," *Transp. Res. Rec.*, pp. 35–44, 1996.
- [27] A. Moudon, P. Hess, M. Snyder, and K. Stanilov, "Effects of site design on pedestrian travel in mixed-use medium density environments," *Transp. Res. Rec.*, vol. 1578, pp. 48–55, 1997.
- [28] M. a. Alfonzo, "To Walk or Not to Walk? The Hierarchy of Walking Needs," *Environ. Behav.*, vol. 37, no. 6, pp. 808–836, Nov. 2005.
- [29] F. Dieleman, M. Dijst, and G. Burghouwt, "Urban form and travel behaviour: micro-level household attributes and residential context," *Urban Stud.*, vol. 39, no. 3, pp. 507–527, 2002.
- [30] M. Booth, A. Bauman, N. Owen, and C. Gore, "Physical activity preferences, preferred sources of assistance, and perceived barriers to increased activity among physically inactive Australians.," *Prev. Med. (Baltim.)*, vol. 26, no. 1, pp. 31–37, 1997.
- [31] C. Hutchings, "Creating Fear by Design," *Geogr. Mag.*, 1994.
- [32] I. Colquhoun, *Design Out Crime*. 2004.
- [33] R. . Suminski, W. S. . Poston, R. . Petosa, E. Stevens, and L. . Katzenmoyer, "Features of the Neighborhood Environment and Walking by U.S. Adults," *Am. J. Prev. Med.*, vol. 28, no. 2, pp. 149 – 155, 2005.
- [34] K. Painter, "The influence of street lighting improvements on crime, fear and pedestrian street use, after dark," *Landsc. Urban Plan*, vol. 35, pp. 193–201, 1996.
- [35] D. Herbert and N. Davidson, "Artistic and literary places in France as tourist attractions," *Tour. Manag.*, vol. 17, pp. 77–85, 1996.
- [36] A. Vrij and F. . Winkel, "Characteristics of the built environment and fear of crime: a research note on interventions in unsafe locations," *Dev. Behav. An Interdiscip. J.*, vol. 12, pp. 203–215, 1991.
- [37] B. . Brown, D. . Perkins, and G. Brown, "Crime, newhousing, and housing incivilities in a first-ring suburb:multilevel relationships a cross time," *Hous.PolicyDebate*, vol. 15, pp. 301–345, 2004.
- [38] L. Wood, T. Shannon, M. Bulsara, T. Pikora, G. McCormack, and B. Giles-Corti, "The anatomy of the safe and social suburb: an exploratory study of the built environment, social capital and residents' perceptions of safety," *Heal. Place*, vol. 14, pp. 15–31, 2008.
- [39] D. . Austin, L. . Furr, and M. Spine, "The effects of neighborhood conditions on perceptions of safety," *J. Crim. Justice*, vol. 30, pp. 417–427, 2002.
- [40] F. Kuo, M. Bacaicoa, and W. Sullivan, "Transforming inner-city landscapes: Trees, sense of safety, and preference," *Environ. Behav.*, vol. 30, pp. 28–59, 1998.
- [41] C. Lee and A. Moudon, "Physical activity and environment research in the health field: implications for urban and transportation planning practice and research," *J. Plan. Lit.*, 2004.
- [42] B. Giles-Corti and R. Donovan, "The relative influence of individual, social and physical environment determinants of physical activity," *Soc. Sci. Med.*, 2002.
- [43] W. . Chin, "Issues and opinion on structural equation modeling," *MIS Quarterly*, 22vii–xvi, 1998.

- [44] W. Omar, I. Patterson, and S. Pegg, "A Green Pathway for Future Tourism Success: Walking Trails in Kuala Lumpur," *Tour. Plan. Dev.*, vol. 9, no. 1, pp. 57–76, Feb. 2012.
- [45] E. Nehme, A. Oluyomi, and T. C. TV, "Environmental Correlates of Recreational Walking in the Neighborhood," *Am. J. Heal. Promot.*, 2015.
- [46] D. Cohen, R. Scribner, and T. Farley, "A structural model of health behavior: a pragmatic approach to explain and influence health behaviors at the population level," *Prev. Med. (Baltim.)*, 2000.
- [47] R. Kitamura, P. Mokhtarian, and L. Laidet, "A micro-analysis of land use and travel in five neighborhoods in the San Francisco Bay Area," *Transportation (Amst.)*, vol. 24, no. 1, pp. 25–58, 1997.

AUTHORS' BIOGRAPHY



Zeinab Aliyas, she got her bachelor of urban design at 2012 in Universiti Teknologi Malaysia and started her PhD in the field of urban design and planning at Universiti Putra Malaysia at 2012. She is now a lecturer in Islamic Azad University of Bandar Abbas in Iran. Her research interests are physical activity, neighborhood safety, park and recreational planning.



Norsidah Ujang, she got her PhD in the field of urban design and planning at 2008 from Universiti Putra Malaysia, she is currently a faculty member at department of landscape architecture at Universiti Putra Malaysia. Her research interests are place attachment, sense of place, walk ability and urban tourism.