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Healthy Lifestyle: Promoting Walking Behaviourin Kuala Lumpur, Malaysia

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While mostpeople recognise that walking is good for their health, very few do enough regular walking to derive the maximum health benefits. A questionnaire was administeredto a sample of local residentsin Kuala Lumpur, Malaysia and found that 65.1% did not achieve the recommended standardsfor walking to gainany health benefits,27.4% did not walk at all, and only 1% regularlyengaged in neighbourhood walking.Thesefindingsareimportant to better inform local government departments about the current situation and justifies the need for new intervention strategies to promote walking. This is because frequent physical activity, such as walking, is important for a person's health and well-being, with many individuals in urban settings heavily reliant on engagement in such activities through the intervention delivered by local government agencies.

Keywords: Walking Behaviour, Physical Activity,Social Ecological Model, Malaysia

1. Introduction

Kuala Lumpur, the capital city of Malaysia is the most urbanised and densely populated area in the country. The city has progressed into a commercial core, and becoming a popular tourist destination both for its domestic and international market (Department of Statistics Malaysia 2005, Henderson 2009,Tourism Malaysia 2010). Besides these achievements, recentstudies have demonstrated that in Malaysia, and particularly in the larger cities such as Kuala Lumpur areexperiencing increased levelsofobesity mostly due to sedentary lifestyles (Lekhraj et al. 2007, Guthold et al. 2008, World Health Organization 2008b, Bernama 2010). The World Health Survey (2003) found that physical inactivity in Malaysia was the highest (16.5%) among all of the Western Pacific Region countries (Guthold et al. 2008). A national survey (1993) on the prevalence of obesity among Malaysians (aged 18 years and above) recorded 20.1% of the urban population wereoverweight (Noor 2002). A further study in 1996 recorded a slight increase in the level of overweight to 20.7%. In 2002, a study of 12 Asian cities ranked Kuala Lumpur asthe third highest in level of obesity (Tee 2002). Two years later (2004), a national survey on the prevalence of obesity among Malaysian adults recorded that there had been a 280% increase in obesity since the last survey in 1996 (Lekhraj et al. 2007). Asrecently as2010, the Ministry of Health, Malaysia presented furtherstatistics that showed that60% of Malaysians were overweight (Bernama 2010).

The alarming increase in the level of being overweight among Malaysians especially those living in Kuala Lumpur needs urgent attention because it has become one of the major risk factors to health (World Health Organization 2002). Studieshaveshown that physical inactivity has been linked to anincrease in at least 17 different illnesses on a worldwide scale(Mutrie & Blamey 2004). Among these are cardiovascular disease, diabetes, as well as colon and breast cancer (Guthold et al. 2008). Thus, Malaysia has been identified as having the potential to experience an increased level

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of chronic illnesses due to very highlevels of physical inactivity. Consistent with increasesin being overweight, a study demonstratedthat cardiovascular mortality in Malaysia hasincreased 15 fold from 1950 to 1989 and currently accounts for about 30% of the total deaths among adults (Lekhraj et al. 2007).

The WHO record concludedthat illnesses that have beenassociated with physical inactivity have been responsible for the annual deaths of 1.9 million worldwide, over 13,000 in Australia, about 220,000 in the USA and Canada and 320,000 in 20 European countries (World Health Organization 2002, 2008b). Without intervention and prevention measures, by the year 2020, it is predicted the annual death figures that have been attributed to overweight and obesity will increase to five million people worldwide (World Health Organization 2002). This translates into substantial health care costs for governments. For example, the Australia government spends approximately $21 billion annually (Australian Bureau of Statistics 2007), the UK government spends over £1 billion (Allender et al. 2007), and the USA about $75 billion (World Health Organization 2008a) for the medical treatment of obesity and its associated illnesses.

Without any health promotion interventions,thistype of unhealthy living could havea negative chain effect on the population of Kuala Lumpur and its economy. This study found that these alarming issues can be mitigated through the multi benefits of walking behaviour. This is because walking is a practical form of exercise that can be integrated into people's daily routines and is suitable for all socio-demographic groups to participate in (Fenton 2005, Gobster 2005,Merom et al. 2007). In addition, this study also hasresponded toa number of calls for interventions so as to increase levels of physical activity through increased walking behaviour(Lekhraj et al. 2007, Guthold et al. 2008). Thus, the undertaking of this study wasinspired to answer what were the levels of walking behaviour among Kuala Lumpur residents, and werethere any differences between the Malay, Chinese and Indian ethnic groups. The findings from this study will provide useful information to guidepolicy makers in designing appropriate measures of intervention strategiesfor a multi ethnic community of Kuala Lumpur.

2. Literature Review

Generally, health researchers have supported the belief that walking is a form of exercise that improves people's health. Encouraging people to walk on a regular basis is seen as the best way of providing the greatest gains to the health of the general population (Cleland, Timperio & Crawford 2008). The recommended weekly walking activity to gain the necessary health benefits is at least 30 minutes a day, five days per week (Darker, Larkin & French 2007). However, if 30 minutes walking at one time is difficult to achieve, shorter10 minute bouts of brisk walking can provide similar health benefits when they total 30 minutes a day. Experimental research has shown that walking 15 minutes a day would burn 100 calories and prevent the typical adult from gaining half to one kilogram per year, and this will eventually help to prevent weight gain and the possibility of becoming classified as obeseover a longer period of time (Brown et al. 2007). Addy et al. (2004)classifiedwalking behaviour into three levels - namely, regular walkers arepeople who walk more than 150 minutes per week;irregular walkers who walk between 10 to 150 minutes per week; and non-walkers walk less than 10 minutes per week. Among these groups, only regular walkers were found to achieve the recommended weekly walking as suggested by

the WHO. This indicates that walking is good for health however to gain this benefits, people should engage in regular weekly walking.

Although walking is good for people's health, very few do enough walking to derive the recommended health benefits. Previous researchers haveshown that walking behaviour is influencedby both non-modifiable and modifiable factors. The non-modifiable variables of walking behaviour include socio-demographic factors which are useful in guiding the formation of intervention strategies (Glanz, Rimer & Lewis 2002). The pertinent socio-demographic characteristics that are related to walking activity include the person's age, gender, ethnicity, car ownership, education and work status (Lee et al. 2007, Giles-Corti et al. 2008). On the other hand, the modifiable factors that influence people's walkingbehaviour are individual beliefs and social and physical determinants. In order to successfully promote walking behaviour withthe general population, it is essential to identify these modifiable factors so that appropriate intervention measures can be implemented(Titze et al. 2010).

The first modifiable factor is at the individual level, whichis the most basic concern in health promotion practice, and one of the most important factors in influencing walking behaviour (Giles-Corti & Donovan 2002, 2003, Titze, Stronegger & Owen 2005, Rimer 2008). Consistent with the health belief model, the individual characteristics that influence people's behaviour are (i) perceived susceptibility of contactingdiseases related to physical inactivity, (ii) perceived severity of diseases related to physical inactivity, (iii) perceived benefits of walking activity, (iv) perceived barriers in participating walking, (v) cues to action, and (vi) self-efficacy (Rimer & Glanz 2005). The second factor that has been recognised as one of the important influential determinants on walking activity arethe social factors (Giles-Corti & Donovan 2003, Burton et al. 2005, Titze et al. 2005, Cleland et al. 2008, Sugiyama & Ward Thompson 2008). Social influences exist within the structure of asocial network that can be described in terms of the specific relationships between individuals and other people in the network (Heaney & Israel 2008). This relationship creates what is termed social support whichis important in encouraging participation in walking activities, and this influence is dynamic and varies according to individual characteristics (Giles-Corti & Donovan 2002, Phongsavan, McLean & Bauman 2007). The third factor is the availability of suitable walking facilities in a local neighbourhood (Henderson 2006, Vojnovic et al. 2006, Deborah et al. 2007). The provision of walking facilities provides physical environmental enhancement, whichareable to facilitate walking activity (Cohen, Scribner & Farley 2000, Wendel-Vos et al. 2004, Wendel-Vos et al. 2007). Research findings have shown that people who were provided with appropriate physical environmental settingswill experience increased walking behaviour (Alcalay & Bell 2000). This is because walking normally occurs in specific settings that promotewalking as a natural form of exercise (Giles-Corti et al. 2005, Mota et al. 2005).

Because walking behaviour is influenced by a number of factors, any increase is dependent on a multi-level intervention which is consistent with the social ecological perspective(Hutzler 2007). Furthermore, amulti-level approach has provided strong evidence for health behavioural changes since the 1960s, and has been accepted as one of the most effective approachesto health intervention (Sallis, Owen & Fisher 2008). In the early years, social ecological models (SEM) were applied to general behaviour, but more recently models have been specifically created for their application to health intervention strategies (Sallis et al. 2008). The increased

popularity of the ecological orientation to health behaviour was inspired by a growing recognition that most public health interventions are complex and require multi-level interventions (Stokols 1996). According to Sallis et al.(2008) SEM is a generic model that can be applied to any behavioural change research setting by modifying the variables that are relevant to a specific behaviour. SEM also provides a way of thinking about the planning foran intervention that examines the relationship between individuals, social, physical, and behavioural determinants of their walking activity (Alcalay & Bell 2000).

3. Methods

This study useda quantitative research design. Data was collected using reply paid mail questionnairesthat were administered to three major ethnic groups in Kuala Lumpur (Malay, Chinese and Indian) aged 18 years and older.Together with a copy of the questionnaire, the researchers attached to ita letter informing the potential respondents about the purpose of the study and indicatingthat the questionnaire should be completed and returned in two week's time. A follow up reminder with another questionnaire wassent two weeks after the initial mail out time had closed, so as to increase the response rate. After a four month collection period, a total of 504 responses were received, and following a screening process, several were excluded leaving a final total of 478 completed questionnaires (22.2% response rate) that were wereanalysedfor the study. Data analysisusedSPSS version 17 and frequency distributions, ANOVA and factor analysis statistics were calculated. An alpha level of 0.05 was used to determine the statistical significance for all analyses.
The sample respondentswererandomly selected from aKuala Lumpur enumeration block. An enumeration block listing wascompiled by the Malaysian Statistics Department and provides basic information on all residents, such as their names and addresses. A stratified random sampling procedure was adopted as ameans of increasing the representativeness of the sample, with due consideration given for an equal number of respondents in each ethnic group and gender numbers. In the first stage, the three ethnic groups were identified from a sampling frame (the enumeration block listing) and categorised into three different ethnic groups: Malay, Chinese and Indian. In the second stage, each ethnic group was further stratified according to their gender (males orfemales). Then, using a systematic random sampling frame an equal sample numberof males and females from each of the Malay, Chinese and Indian groupings wasselected.

Thesurvey instrument that was used had beenmodified,and was based on previous studies (Craig et al. 2003, 2004). Walking behaviour was measured by asking respondents about the purpose and regularity of their walking activity (Sugiyama & Ward Thompson 2008). This included self-reported recall of walking activity by asking respondents to report their weekly duration and frequency of walking for recreation, exercise, and/or to reach a destination. Each participant's walking time wascalculated, and their estimated weekly walking (minutes/week) was used to classify each respondent into three levels of walking frequency: regular, irregular and non-walker for further analysis(Addy et al. 2004).A pilot test was firstly conductedto test the reliability co-efficients of the survey questions.Results of the test-retest reliability analysis found that all questions were considered to have high reliability with interclass correlation coefficient ranging from 0.82 to 0.95.

4. Results

Table 1 summarises the socio-demographic background of the sample respondents.The total number of sample respondents was 478, with 35.4% Malays, 34.3% Chinese and 30.3% Indians. Although the number of respondents for each of the three groups was not equal, Chi square analysis found that they did not differ significantly from each other (χ^2=2.01, df=2, p=0.366). Thus, the sample wasconsidered to be representative of the three ethnic groups used in thestudy.Genderdifferences werealmostequal between males (49.4%) and females (50.6%). The three largest age groups surveyed were within the 18-24 years,40-49 yearsand 30-39 year old categories.Looking at the educationalbackground of respondents, they were from various educational backgrounds, ranging from primary school to the postgraduate level, with the majority (32.6%) completing secondary school, and 31.8% havingan undergraduate degree. With respect to employment status, over 88.5% of the respondents were employed and only 10.5%were not working/or retired.A majority (38.9%) of respondents worked five days per week. Records on household income showed that46.0%respondents were low-income earners (below RM3000.00 per month) and 46.0% respondents were middle-income earners (RM3000.00 to RM8000.00 per month). In regards to access to a motor vehicle, 88.7% respondents were able to access a motor vehicle and only 11.3% were not able to access one. Marital status foundthat 67.2% respondents were married/living with partner and 28.5% were single. The majority (48.7%) of respondents hadno children under 12 years oldof age,and only 2.5% has more than five children.

Table 1: Characteristics of respondents

Characteristics	Frequency	Percentage
Ethnicity:		
Malay	35.4	169
Chinese	34.3	164
India	30.3	145
Gender:		
Male	49.4	236
Female	50.6	242
Age:		
18-29	31.6	151
30-39	27.4	131
40-49	29.7	142
50-59	8.4	40
60 and older	2.9	14
Education:		
Primary school	6.9	33
Secondary school	32.6	156
Certificate/diploma degree	28.7	137
Degree and above	31.8	152
Working day per week:		
Not working/retired	10.5	50
>4	3.1	15
5	38.9	186
6	37.4	179
7	10.0	48
Household's monthly income:		
Low income	46.0	220
Middle income	46.0	220
High income	7.9	38
Access to a motor vehicle:		
Yes	88.7	424
No	11.3	54
Marital status:		
Married/living with partner	67.2	321
Separated/Widowed/Divorced	4.4	21
Single	28.5	136
Children under 12 years old:		
None	48.7	233
1 -2	34.3	164
3 - four	14.4	69
>5	2.5	12

Table 2 shows the overall walking time of the sample respondents. Overall walking refers to respondents who walked anywhere (in their local neighbourhood or elsewhere) for any purpose including walking for recreation, exercise and transport. Neighbourhood walking on the other hand refers to walking activity for any purpose engaged in and around respondents' local neighbourhood. Resultsfound that on average, a respondent walked forapproximately 108 minutes per week, which includes40 minutes walkingfor transport, 36 minutes for exercise, and 34 minutes for recreation.Of these total, a respondent only walking33 minutes in their local neighbourhood, which indicates that neighbourhood walking was not popular physical activity.

Table 2: Average walking time of the respondents

Walking activity	Mean (minutes)	t-value	Sig.
Overall walking	108.49	22.213	0.000
• Recreation	34.10	18.895	0.000
• Exercise	36.40	16.112	0.000
• Transportation	40.01	16.062	0.000
Neighbourhood walking	33.80	18.929	0.000

Table 3 presents a comparison of walking behaviour levels between the Malay, Chinese and Indian respondents. The levels of walking behaviour were estimated based on total walking minutes per week and were categorised into non-walker (walked less than 10 minutes), irregular (between 10 to 150 minutes), and regular walkers (more than 150 minutes).Resultsfoundthat walking activity was not a popular physical activity among the three ethnic groups withonly 18.9% of Chinese, 37.9% of Malays and 49.7% of Indians (50.3%) achieved the recommended level forwalking activity. In addition, results also demonstrated that there were significant differencesinthe level of walking behaviour between the three ethnic groups with thelargestgroupof regular walkers beingIndian (n=72, 49.7%), most irregular walkers were Malays (n=93, 55%) and the largest group ofnon-walkers were Chinese (n=90,54.9%). In regards to walking purposes, only 1.8% of Malays and 1.4% of Indians were regular neighbourhood walkers, 1.8% of Malays and 1.4% of Indians were recreational walkers, 2.4% of Malays, 3.0% of Chinese and 5.5% of Indians were regular exercise walkers, and 3.6% of Malays, 9.1% Chinese and 8.3% of Indians were regular walkers for transport purposes.

Table 3: Comparison of the level of walking behaviour by ethnicity

Ethnicity (N=478)	Weekly walking (n/%)			Chi square/p
	Sufficient	Not sufficient		
	Regular	Irregular	Non-walker	
Overall walking				
Malay	64(37.9)	93(55.0)	12(7.1)	116.267/0.000
Chinese	31(18.9)	43(26.2)	90(54.9)	
Indian	72(49.7)	44(30.3)	29(22.1)	
Total	167(34.9)	311(65.1)		
Neighbourhood walking				
Malay	3(1.8)	106(62.7)	60(35.5)	22.416/0.000
Chinese	0	76(46.3)	88(53.7)	
Indian	2(1.4)	100(69.0)	43(29.7)	
Total	5(1.01)	473(98.9)		
Recreation walking				
Malay	3(1.8)	106(62.7)	60(35.5)	19.692/0.001
Chinese	0	77(47.0)	87(53.0)	
Indian	2(1.4)	98(67.6)	45(31.0)	
Total	5(1.0)	473(99.0)		
Exercise walking				
Malay	4(2.4)	108(63.9)	57(33.7)	970350/0.000
Chinese	5(3.0)	2716.5)	132(80.5)	
Indian	8(5.5)	87(60.0)	50(34.5)	
Total	17(3.6)	461(96.4)		
Transport walking				
Malay	6 (3.6)	98(58.0)	65(38.5)	57.008/0.000
Chinese	15(9.1)	39(23.8)	110(67.1)	
Indian	12(8.3)	87(60.0)	46(31.7)	
Total	33(6.9)	445(93.1)		

Table 4 compares the average walking time between the three ethnic groups. Results show that Indian respondents reported that theyengaged in walking per week of approximately 147 minutes, Malays 121 minutes and Chinese 61 minutes. In relationto neighbourhood walking, results show that on average, each Malay respondent walked for approximately 30 minutes, Chinese walked for 25 minutes and Indians walked for 47 minutes per week. This indicates that neighbourhood walking was not popular among all three ethnic groups. In addition, analysis of variance between the three ethnic groups and walking purpose foundthat themajority of Indians and Chinese walked mainly for transport purposes (approximately 55 and 30 minutes respectively) while the Malays walked for recreation (approximately 43 minutes).

Table 4: Comparison of walking time by ethnicity

Walking	Walking activity (minutes/week)			F-value	Sig
	Malay (n=169)	Chinese (164)	Indian (n=145)		
Overall walking	121.22	61.31	147.00	29.863	0.000
• Recreation	43.22	15.37	44.66	31.836	0.000
• Exercise	40.71	16.71	53.66	24.768	0.000
• Transportation	37.29	29.82	54.72	8.642	0.000
Neighbourhood walking	30.80	25.09	47.14	13.742	0.000

Socio-demographic variables were also analysed to determine which of these socio-demographic factors were found to be significant in regardto walking behaviour of the three different ethnic groups. The socio-demographic factors discussed in this study refer to gender, age, marital status, number of children below 12 years, education, household income, access to a vehicle, and working days per week. With regards tothe Malay respondents, ANOVA analysis did not find any significant differences in their behaviour, as indicated at p.> 0.05.

In contrast to the Malay respondents, socio demographic factors were found significant among the Chinese respondents by gender (F=6.654, p=0.002) having children younger than 12 years (F=4.122, p=0.018), educational level (F=9.706, p=0.000), income (F=3.103, p=0.048), and working days (F=4.419, p=0.014). This indicates that even though a majority of Chinese respondents were non-walkers, walking activity was found to be more popular among females, and respondents who had3-4 children younger than 12 years, hada university degree and higher, had access to motor vehicle, and workedbetween four and five days a week.

Indian respondents werefound to significantly differ intheir level of walking behaviour in respect totheir educational level (F=5.237, p=0.001),income (F=7.360, p=0.001),and number of days worked (F=25.540, p=0.000).Walking activity wasfound to be more popular among Indians who attained an educational level between secondary school and technical college, were low and high income earners and who worked seven days a week. Linear regression between thewalking behaviour of Indians and the number of working days found thattheir walking behaviour was positively associated with the number of days they worked (t=6.775, p=0.000).

5. Discussion and Recommendations

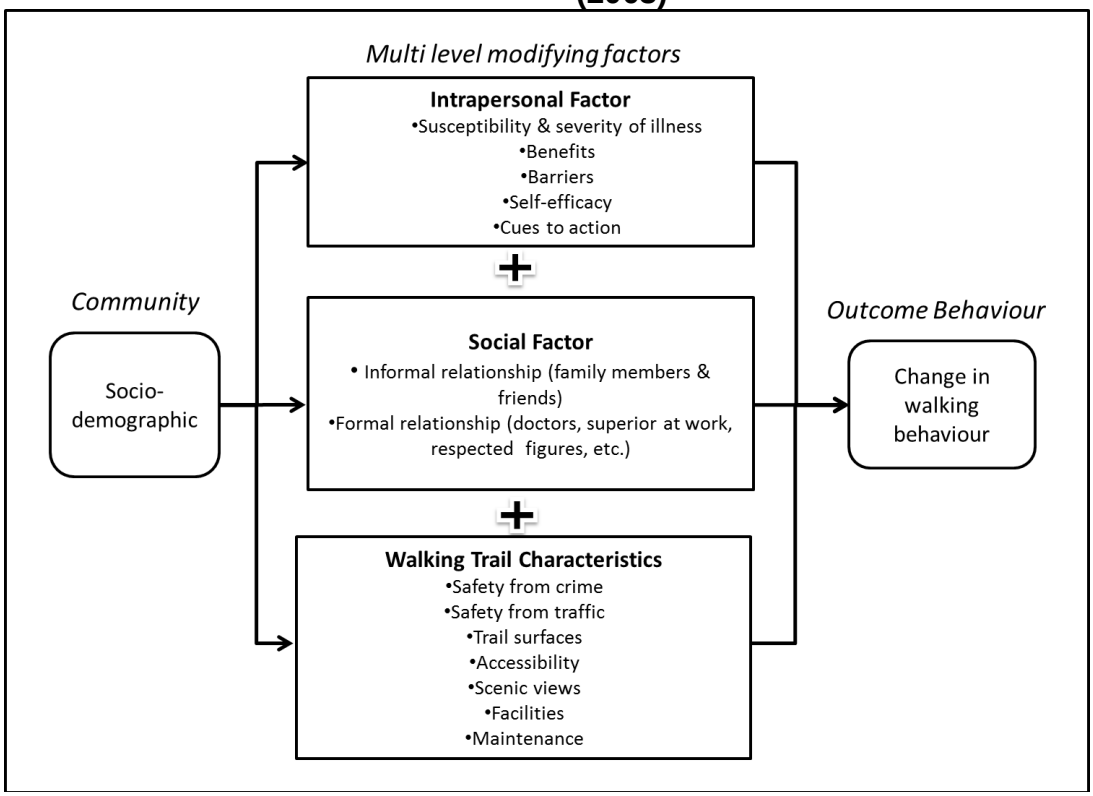
Walking activity has been found to be the most popular and accessible form of physical activity with little expense involved, as well as suitable for all socio-demographic groups (Giles-Corti, 2001; Humpel, Owen et al., 2004; Owen, Humpel et al., 2004; T. Sugiyama & C. Ward Thompson, 2008). However, only one third of the respondents in this study werefound to engage in weekly walking behaviour at the recommended level for health benefits. When comparing between different ethnic groups, the findingsindicatedthat walking behaviour varied significantly between the three ethnic groups, with Indian respondents recording the highest levels of walking activity per week (49.7% being regular walkers), followed by Malay (37.9%) and Chinese (18.9%). This provides evidence to the previous finding that an epidemic of physical inactivity is occurring in Kuala Lumpur (Noor 2002, Lekhraj et

al. 2007, Guthold et al. 2008). The government of Kuala Lumpur is now faced with the serious challenge of developing effective strategies to increase the walking behaviour of its residents so as to obtain the necessary health benefits. If local residents do not engage in strategies to increase levels of physical activity such as walking behaviour for health purposes, the chance of having an unhealthy population will increase.

The intervention that has received increasedrecognition from previous research studies isto increase walking behaviour by integrating walking activity into people's regular routine and because it will reach the largest number of individuals in the most cost effective manner (Siegel, Brackbill & Heath 1995, Hillsdon & Thorogood 1996, Giles-Corti 2001, Humpel et al. 2004, Owen et al. 2004, Merom et al. 2007). Determining factors that impact onwalking behaviourat the local community level in Kuala Lumpur is critical,because two thirds of residents stated that they did not walk on a regular basis to gain any health benefits. One of the recognised approaches is by promoting walking activity in and around a neighbourhood, whichis generally accessible to the majority of the population. In addition, these findings also showed that the majority (85.7%) of respondents had at least two days per week that arefree from work commitments(i.e., they worked five days or less per week)which allows them time to engage in regular walking activities around their neighbourhood. However,findings from this studyalso found that 99.0% of respondents did not engage in regular walkingin or around their neighbourhood. This suggests that a close proximity location (such as a neighbourhood area) has not provedpopular inattractinglocal communitiesto engage in walking(Abildso et al. 2007). This is because walking behaviour is influenced by multi-levelfactors such as individual beliefs, social support as well as the importance of adequate physical walking facilities (Hutzler 2007).

In line with this suggestion, this study suggests that the use of a Social Ecological Model (SEM) that integrates a multi-levelintervention, that targetstheindividual, social, and environmental aspects (such as the provision of walking trails)as an overarching conceptual framework for an intervention strategy. Given that the SEM is a generic model that allows the combination of other theories or models to suit the specific behavioural research, this study recommendsthat the health belief model(Champion & Skinner 2008)be used to examine and to understand the individual influences(Cohen et al. 2000)that help to identify social and trail characteristic influences on walking behaviour. Using a structural model based onCohen et al. (2000)it will be possible to identify four intervention strategies that help to modify the social and physical factors: (i) social structures and policies, (ii) media and cultural messages, (iii) availability of physical product (walking facilities), and (iv) the characteristics of the physical product (trail characteristics). Manipulating these factors will help to create an impact on the entire population. This conceptual framework, which has been developed and based on the SEM,will help to provide anunderstanding of thefactors that influence walking behaviour, and areshown in Figure 1.

Figure 1: Conceptual Framework based on the Social Ecological Model for Walking Behaviour, adapted from Hutzler (2007) and Pikora et al. (2003)



Despite new insights generated by this study, several limitations have been recognised and should be avoided in future research. These limitations include the cross sectional nature of the data that was collected, the sampling issue and the use of a revised version of the survey instrument. The first limitation was the nature of the quantitative data that was collected. Survey questionnaires were mailed to selected respondents who fulfilled the sample criteria based on considerationsforobtaining ethnic and gender balances. The sample respondents was not a random sample, thus, findings of this study could notbe generalised to the population of Malaysia. Therefore,arecommendation for future research would be to use a random sampling design to replicate this research for the general population of Malaysia, as well as a further comparison study between urban and rural communities.

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