MALAYSIAN CASE STUDIES ON THE RELATION BETWEEN THE USE OF GREEN SPACE AND HEALTH PROMOTION

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ABSTRACT

This study explores the use of green spaces and visitors´ self-reported health for five parks located in Kuala Lumpur and Kuching, Malaysia. A survey was conducted among the residents living within two kilometres radius from the park boundaries. A total of 1692 respondents participated in the survey. The results indicate differences in self-reported health between people according to frequency of park use, apart from the differences explained by the socio-demographic factors. The results related to the differences in self-reported health according to the distance of the residence from the park were not statistically significant. Among the 'health improving' recommendations made to close friends and family members were going for a vacation and engaging in some exercise or sport activities. These were ranked higher than taking a break in a quiet and peaceful park or forest. Although this study offers some further evidence of the positive impacts of using green spaces on health, the results show some new findings as compared to similar studies conducted in Europe. Thus, more in-depth works are needed in order to provide information to Malaysian decision makers and green space managers.

Keywords: Human health, outdoor recreation, self-reported health, urban parks, well-being

1. INTRODUCTION

In the next 30 years, it is predicted that approximately 64.7% of the world's population will live in the urban areas (United Nations Population Division, 2008), with most of the urban population growths occurring in developing and industrialised countries. More people will migrate to the urban areas in order to improve their living standards and seek better quality of life. Landesman (1986) defines quality of life as measurable experiences in an individual's life, which may include physical health, personal circumstances (i.e. wealth, living conditions, etc.), social relationships, functional activities and pursuits, as well as wider societal and economic influences. However, rapid population developments in many developing countries generate loads on infrastructure, education, health and social service systems, as well as the environment (United Nation Population Fund, 2008).

Developing countries, such as Malaysia, have been facing similar challenges of human health and well-being as their Western counterparts (Philips Index: Malaysia's Health and Well-being Report, 2010). A rapidly increasing urban populace operating on highly competitive labour markets is facing, for example, higher levels of work-related stress, which is increasingly indoor oriented (Nilsson *et al.*, 2007). Across the globe, lifestyle disorders result in diseases, such as high blood pressure, cardiac problems, diabetes, obesity and arthritis. These illnesses relate to increased stress, as well as the fact that many workers spend a large share of their time indoor and are physically inactive (Martinez-Gonzalez *et al.*, 2001).

An expanding body of scientific studies, mostly in the Western world, show that the interaction between humans and nature can help in improving physical and mental public health. Notably, this paper adopts the definition of health as suggested by WHO (1948), in which 'health' is referred to as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Natural environments, including urban green spaces, offer settings that promote both physical activities and mental restoration (Kaplan, 2001; Hartig *et al*., 2003; Björk *et al*., 2008; Van den Berg *et al*., 2010). Green space environments can help relieve mental fatigue and increase cognitive functioning (Kaplan, 2001), as well as improve work capacity (Grahn & Stigsdotter, 2010). Viewing the engagement with nature also affords the feelings of pleasure, enjoyment, relaxation, comfort, and calmness (de Vries *et al*., 2003; Korpela, 2002; Lohr *et al*., 2004; Ulrich *et al*., 1991).

The mechanisms behind the health and quality of life promoting effects of natural environments have been explored in several recent studies (see Hartig *et al*. (2011) and Nilsson *et al*. (2007) for overviews). Obviously, the very use (or non-use) of these environments is a crucial factor. Furthermore, several studies have tried to analyse whether distance from the home to neighbouring green areas affects use, and thus, qualifying it as a possible health promoting effect (e.g. Grahn & Stigsdotter, 2003; Nielsen & Hansen, 2007; Schipperijn *et al*., 2010). Research has also linked distance to nearby green spaces to (self-reported) health. A study in the Netherlands found that people who lived within 1 kilometre from the nearest green space had a lower risk of heart diseases, diabetes, chronic neck and back pains, asthma, as well as migraine (Maas *et al*., 2009). Likewise, in Sweden, people living less than 300m from the green areas reported that they felt really good or self-rated themselves as good compared to the residents living more than 1 km from the green spaces (Stigsdotter *et al*., 2010). Other studies found that people living in green neighbourhoods were healthier (de Vries *et al*., 2003) and demonstrated higher ability to cope with stress (Kuo, 2001) than those living in less green environments. In addition, exposure to green spaces was associated with lower all-cause mortality and death from circulatory disease in low-income areas (Mitchell & Popham, 2008).

Aim of the Study

The aim of the present study is to investigate the relation between urban green spaces and human health and well-being in Malaysia. Specifically, the study focuses on whether there are differences in (self-reported) health between those who live close or remote to the parks, and between those who often or less frequently visit the nearby parks. The study also looks at the recommendations which people would give to their friends and families with health problems. Different socio-demographic factors were considered in the study. As Malaysia is a multicultural society, differences between various ethnic groups were also taken into account.

2. METHODS

Research Approach

The work was inspired by the studies on physical activity by Sallis *et al*. (2006). The author applied the so-called ecological model in a study of active living, involving multiple levels of influence on individual behaviour: intrapersonal (cognition/emotion), interpersonal (before friends/family/organization), community (neighbourhood design), and societal or cultural (social norms). The so-called socio-ecological approach combines these issues with a wider social context, as well as with the impact of people's environment. Thus, the model distinguishes between various levels of influence on a person's behaviour, which can be divided into (1) individual factors, such as age and education, as well as social aspects, such as links to family and friends, and (2) environmental factors, such as the physical and cultural environments (Giles-Corti *et al*., 2005).

In a wider study that lies at the base of this article, we used this model to assess, for instance, the effects of different socio-demographic factors on park use and preferences for different green space elements. We also looked at the relation between distance of the residence from the park, and the frequency of park use.

Study Area

The study focuses on two major cities: Kuala Lumpur, which is the capital city located in Peninsular Malaysia, and Kuching, Sarawak, which is located on the island of Borneo (Figure 1). Precisely, Kuala Lumpur is the largest city in Malaysia with a population of 1.8 million, consisting of 43% Chinese, 38% Malays, and 10% Indians. On the other hand, Kuching is the state capital of Sarawak that primarily functions as the regional centre. Its population consists of the Chinese (38%), Malays (36%), Indians (5%) and a large share of people from various indigenous ethnic groups (21%) (Department of Statistics Malaysia, 2010).

The study focuses on municipally owned and publicly accessible city parks as important parts of the urban green infrastructure. In Kuala Lumpur, three parks were selected, namely, Titiwangsa Lake Park, Permaisuri Lake Park and Kepong Metropolitan Park, whereas in Kuching, Kuching Park and Friendship Park were chosen. The parks were selected based on the suggestions by the green space managers from Kuala Lumpur City Hall and South Kuching City Hall. Furthermore, the criteria used for the selection of the parks were in accordance with their popularity among users, which are intensively used by the city dwellers, easily accessible and offer a wide range of outdoor activities due to their location in or near the city centres.

Data Collection

A survey was conducted using a written questionnaire inspired by a study in Sweden on nature and health linkages (Grahn & Stigsdotter, 2003), which also inspired a similar work in Denmark (Randrup *et al*., 2008). In September 2009, a total of 16,205 questionnaires were posted to the inhabitants in the selected neighbouring residential areas, particularly those residing within 2 km radius from the parks. The questionnaires were distributed via mail (through the Pos Malaysia Berhad). Due to time and budgetary constraints, the addresses near Permaisuri Lake Park (6300 instead of 13,800) and Kepong Metropolitan Park (5000 instead of 6500) were not included. The number of addresses was reduced using random selection. Meanwhile, for the other areas, the questionnaires were delivered to all addresses within the 2 km perimeter from the park, whereby 480 questionnaires were distributed to the residences near Titiwangsa Lake Park, 3800 questionnaires to Friendship Park and 625 to Kuching Park. The differences in the number of questionnaires delivered show that the housing density around the parks differs considerably between the different cases.

The questionnaires were constructed in two languages, namely, the English language (the international language) and the Malay language (the local language) in order to cater for the ethnic diversity in Malaysia. The respondents were asked to answer the questionnaire within three weeks after receiving it. Due to budgetary constraint, no follow-up could be undertaken. In the end, a total of 1692 (10.44%) respondents returned the questionnaires. Apparently, this very low response rate, which resulted in biased findings, is in line with the previous experiences in Malaysia. According to PriceWaterHouseCoopers (2002), responses to postal surveys in Malaysia are typically between 10% and 16%. Nevertheless, a study on people's walking behaviour resulted in a somewhat higher response rate of 22.2% (Wan Rabiah *et al*., 2011). In the

questionnaire of the study, the respondents were asked on whether they had ever visited the nearby (named) park for recreational purposes (i.e. by giving either 'yes' or 'no' response). Besides, the respondents were also asked on the number of visits to the park during the past three months (if any) and the distance to the park. Furthermore, the respondents were requested to report their own health condition in general, with the possible answer categories as follows: Poor/Not Very Good, Average and Good/Excellent. In addition, the respondents were enquired on how they scored on a range of feelings within the past four weeks in regard with the feelings of being energetic and full of life, sad, relaxed and at ease, worn out, happy and satisfied, as well as tired. Possible answer categories for these feelings are as follows: Never, Seldom, Often, and Permanently.

Moreover, the questionnaire also asked for recommendations to close friends or family members if any of them feels worried or stressed. Among the possible answers available for selection are as follows: take a walk in the forest, listen to relaxing music, see a fun movie, sleep, and take a break in a quiet and peaceful park. The last part of the questionnaire consists of demographic questions related to gender, ethnicity, marital status, age, highest education level and occupation.

Demographic and Socio-economic Characteristics

In line with the socio-ecological model, factors, such as gender, marital status, ethnicity, age, educational level, and socio-economic status, are important for understanding the differences in green space use. This study incorporates demographic factors, such as gender and ethnicity. Based on the composition of Malaysian population, the ethnic groups distinguished were the Malays, Chinese, Indians, and others, with the latter included the indigenous ethnic groups, such as the Iban, Bidayuh, Melanau and Kayan. Six age groups were also distinguished, namely, youths (aged 17 – 25 years), young adults (26 – 32 years), mature adults (aged 33 – 40 years), semi-older adults (aged 41 – 50 years), older adults (aged 51 – 60 years), and the elderly (aged 60+ years). Socio-economic status was also measured by means of educational level (i.e. primary school, secondary school, certificate and university degree holders).

Data Analysis

The Statistical Package for Social Sciences (PASW 18.0) was used to analyze the collected data. A Chi-square ($\chi2$) test was carried out to compare the variables by using cross tables in order to see if there were any significant

differences (p<0.05). Moreover, a logistic regression model was used to look into the different health evaluations between the two cities and how variables, such as frequency of visits and distance to the park, were associated with the respondents' self-reported health and emotions during the past four weeks. The odd ratio is shown in tables to estimate how strongly a variable (rank) is associated with the outcome of interest. In the logistic regression model, we used or beta coefficient as the parameter to estimate when the predictors and outcomes have been standardized to have variance = 1.

3. RESULTS

The results presented here start with a comparison between the two cities, followed by the results for different socio-demographic characteristics in terms of self-reported health and well-being. This is followed by the results on whether (and how) the distance to the park, frequency of park use, and time spent in the park influence the people's self-reported health and well-being. Next, the differences in findings for the five different parks are also highlighted. Finally, the respondents' suggestions to their close friends and family if they would experience stress or anxiety are presented as well.

Comparison between the Two Cities

Table 1 shows the logistic regression which models the health evaluations in each of the two cities. The model search shows that the population in Kuching seemed to have a poorer health condition with the estimate B=-20.82 as compared to the people living in Kuala Lumpur (B=-15.12). Furthermore, the people in Kuala Lumpur were over-represented in the groups, who reported good or excellent health, as compared to the people in Kuching. For the excellent health category, the findings were significant (p=0.00).

Table 1: Logistic regression model predicting the probability of population in the two cities in terms of own health evaluation.

			OWN HEALTH EVALUATION							
			Not Very							
	Poor		Good		Average		Good		Excellent	
	B	p-value	B	p-value	B	p-value	B	p-value	B	p-value
Kuala Lumpur	-15.12	0.99	-0.22	0.47	-0.09	0.49	0.08	0.55	0.30	0.26
Kuching	-20.82	1.00	-3.21	0.00	-0.50	0.13	-0.09	0.77	-2.58	0.00

The Impact of Socio-demographic and Economic Factors on Self-reported Health and Feelings

Table 2 displays the overview of the survey results for all parks (i.e. in both cities) in relation to self-reported health according to different types of socio-demographic (including ethnicity) characteristics, visiting the park, distance of the park from the residence (as assessed by the respondents), and frequency of park use.

Table 2: Chi-square tests of self-reported health.

	Poor/ Not very good	Average	Good/ Excellent	Total	p-value
Gender					
Men (N=845)	4.4 (n=37)	41.7 (n=352)	54.0 (n=456)	100.0	0.00
Women (N=847)	7.8 (n=66)	49.7 (n=421)	42.5 (n=360)	100.0	
Age (years old)					
17-25 (N=262)	9.2 (n=24)	42.4 (n=111)	48.5 (n=127)	100.0	0.00
26-32 (N=320)	7.8 (n=25)	49.7 (n=159)	42.5 (n=136)	100.0	
33-40 (N=387)	7.0 (n=27)	53.2 (n=206)	39.8 (n=154)	100.0	
41-50 (N=398)	4.0 (n=16)	43.0 (n=171)	53.0 (n=211)	100.0	
51-60 (N=229)	3.5 (n=8)	39.7 (n=91)	56.8 (n=130)	100.0	
>60 (N=96)	3.1 (n=3)	36.5 (n=35)	60.4 (n=58)	100.0	
Education level					
Primary (N=48)	6.3 (n=3)	47.9 (n=23)	45.8 (n=22)	100.0	0.11
Secondary (N=522)	7.3 (n=38)	50.0 (n=261)	42.7 (n=223)	100.0	
Certificate (N=199)	5.0 (n=10)	45.2 (n=90)	49.7 (n=99)	100.0	
University (N=922)	5.6 (n=52)	43.2 (n=399)	51.1 (n=472)	100.0	
Ethnicity					
Malay (N=651)	7.1 (n=46)	44.2 (n=288)	48.7 (n=317)	100.0	0.01
Chinese (N=764)	6.2 (n=47)	49.3 (n=377)	44.5 (n=340)	100.0	
Indian (N=50)	2.0 (n=1)	38.0 (n=19)	60.0 (n=30)	100.0	
Others (N=227)	4.0 (n=9)	39.2 (n=89)	56.8 (n=129)	100.0	
Visit the park					
Yes (N=1497)	6.1 (n=91)	45.3 (n=678)	48.6 (n=728)	100.0	0.64
No (N= 195)	6.2 (n=12)	48.7 (n=95)	45.1 (n=88)	100.0	
Distance from the resident (as assessed by respondent)					
0-300m (N=506)	5.9 (n=30)	41.7 (n=2119)	52.4 (n=265)	100.0	0.26
301-600m (N=256)	5.5 (n=14)	50.0 (n=128)	44.5 (n=114)	100.0	
601m-1km (N=339)	6.5 (n=22)	44.0 (n=149)	49.6 (n=168)	100.0	
1.1-2km (N=591)	6.3 (n=37)	48.3 (n=285)	45.5 (n=269)	100.0	
Frequency of visits during the past 3 months					
Not once (N=467)	6.6 (n=31)	50.7 (n=237)	42.6 (n=199)	100.0	0.04
1-20 (N=944)	5.6 (n=53)	45.0 (n=452)	49.4 (n=466)	100.0	
More than 20 (N=260)	6.2 (n=16)	40.0 (n=104)	53.8 (n=140)	100.0	

Differences in self-reported health were significant for all socio-demographic characteristics, apart from the educational level (p=0.11). In terms of gender, men were found to be over-represented (54.0%) among the respondents stating good/excellent health compared to women, who scored higher in

the average health group. Regarding educational level, the highly educated respondents with certificates and university degrees were over-represented in the group, who stated good/excellent health, while the respondents with primary or secondary school education scored higher in the average health group. In terms of ethnic background, the scores for all groups were well represented in the category of good/excellent health, but the Chinese were under-represented while scoring higher in the group reporting average health. When looking at the respondents' feelings (Table 3), ethnicity was found as an important factor. The Chinese had the tendency to feel less energetic (B=-0.42, p=0.00), whereas the Indians claimed to feel more enjoyable (B=0.52) but less relaxed (B=-0.43). Furthermore, the Chinese felt more tired and worn-out, while the other groups scored higher on the feeling of sadness. When looking at the age category, all positive feelings were estimated to increase from the teenagers (starting from 17 years old) to the older people. The old people claimed to feel more tired and worn-out compared to the younger people, with B= -0.15, p=0.00 and B=-0.14, p=0.00, respectively. However, concerning the feeling of sadness, the teenagers scored higher than the old people.

Impact of the Distance to the Park and Park Use on Self-reported Health and Feelings

Differences in the self-reported health were not significant for visiting the park (p= 0.64) nor the perceived distance from the residence (p=0.26). However, the frequency of visits was found to have a significant (p=0.04) impact on the self-reported health.

The visitors to the park were over-represented in those respondents reporting to be in good or excellent health (48.6%), while the non-visitors were found over-represented in the group reporting to be in average health. The people living within 300 metres from the park were over-represented among those reporting to be in good/excellent health, while those living one kilometre away from the park were over-represented among those stating to be in average health. However, these did not show any significant differences.

The frequency of visits during the past 3 months shows that the respondents who never visited the park were reported to be in average health condition (50.7%). However, those who used the park more than 20 times were found to be in good/excellent health condition (53.8%), which was slightly higher than those who used the park only within 1-20 times (49.4%).

Table 3 shows that the respondents who used the park more than 20 times felt more energetic and joyful, with B=0.65, p=0.00 and B=0.21, p=0.34, respectively. However, the people who used the park about 1–20 times felt

Table 3: Logistic regression model prediction the probability of respondents' emotions during the past four weeks with the use of park and socio-demographic profile.

		Positive feeling			Negative feeling		
		Energetic	Enjoy	Relaxed	Tired	Wornout	Sad
Frequency of use							
1-20 times	Estimate (B)	0.32	0.16	0.60	-0.37	-0.16	-0.10
	Sig.	0.18	0.29	0.00	0.00	0.24	0.53
> 20 times	Estimate (B)	0.65	0.21	0.41	-0.65	-0.29	-0.50
	Sig.	0.00	0.34	0.00	0.00	0.16	0.49
Not once	Estimate (B)	-	-	-	-	-	-
	Sig.	-	-	-	-	-	-
Distance from the resident (as assessed by respondent)							
301-600m	Estimate (B)	0.00	-0.11	-0.13	0.18	0.28	-0.18
	Sig.	0.99	0.56	0.51	0.29	0.13	0.40
601m-1km	Estimate (B)	0.26	0.07	0.14	0.02	-0.67	-0.37
	Sig.	0.13	0.72	0.47	0.89	0.72	0.77
1.1-2km	Estimate (B)	0.35	0.33	0.30	0.03	-0.16	-0.32
	Sig.	0.02	0.05	0.07	0.85	0.31	0.77
0-300m	Estimate (B)	-	-	-	-	-	-
	Sig.	-	-	-	-	-	-
Name of park							
Friendship Park	Estimate (B)	0.80	0.62	0.84	-0.83	-0.44	-0.30
	Sig.	0.00	0.02	0.00	0.00	0.07	0.30
Kuching Park	Estimate (B)	0.23	0.22	0.54	-0.91	-0.52	-0.22
	Sig.	0.40	0.02	0.05	0.00	0.06	0.50
Permaisuri Lake Park	Estimate (B)	0.56	0.72	0.72	-1.06	-0.68	-0.67
	Sig.	0.13	0.05	0.00	0.00	0.00	0.02
Kepong Metropolitan Park	Estimate (B)	0.25	0.43	0.84	-0.88	-0.68	-0.6
	Sig.	0.24	0.05	0.00	0.00	0.00	0.30
Titiwangsa Lake Park	Estimate (B)	-	-	-	-	-	-
	Sig.	-	-	-	-	-	-
Ethnicity							
Chinese	Estimate (B)	-0.42	0.03	-0.29	0.19	0.69	-0.29
	Sig.	0.00	0.83	0.06	0.14	0.25	0.10
Indian	Estimate (B)	-0.33	0.52	-0.43	0.09	0.44	1.07
	Sig.	0.37	0.29	0.25	0.78	0.22	0.02
Other groups	Estimate (B)	-0.23	-0.06	-0.17	0.04	-0.07	-0.44
	Sig.	0.57	0.80	0.51	0.87	0.78	0.15
Malay	Estimate (B)	-	-	-	-	-	-
	Sig.	-	-	-	-	-	-
Age							
Age	Estimate (B)	-0.15	-0.18	-0.59	0.68	0.66	-0.35
	Sig.	0.45	0.40	0.00	0.18	0.00	0.12
Age^2	Estimate (B)	0.06	0.05	0.13	-0.15	-0.14	0.02
	Sig.	0.05	0.12	0.00	0.00	0.00	0.66
Constant	Estimate (B)	0.41	0.82	0.77	0.10	-1.16	-0.14
	Sig.	0.23	0.03	0.03	0.75	0.00	0.71

a. reference categories are: Not once, 0-300m, Titiwangsa Lake Park and Malay

more relaxed than those who used the park more than 20 times (p=0.00). The latter group also scored significantly higher for feeling tired (p=0.00).

In terms of distance, the people who lived further away from the park felt more energetic, joyful and relaxed; however, this finding was not significant. Meanwhile, the people who lived between 301-600m were generally more tired than those people who lived within 300m from the park. The people who lived within 601m-1km were found to feel more worn-out and sad, with B=-0.67 and B=-0.37, respectively.

Differences between the Parks

The respondents' feelings differed between the five parks (Table 3). The results indicate that the people who visited Friendship Park were more likely to feel energetic (B=0.80) compared to those using the other parks. Next, the people who visited Permaisuri Lake Park were most joyful (B=0.72), followed by Friendship Park (B=0.62), Kepong Metropolitan Park (B=0.43) and Kuching Park (B=0.22), with all results being significant (p<0.05). Meanwhile, the people who visited Friendship Park and Kepong Metropolitan Park tended to feel more relaxed compared to the other parks (p<0.05). The people who visited Permaisuri Lake Park felt more tired, worn-out and sad compared to the other parks (p<0.05).

Respondents' Recommendations to Close Friends or Family Members Experiencing Stress or Anxiety

Figure 2 shows the results for activities recommended by the respondents to their close friends and family members who may experience stress or anxiety. The highest scoring recommendations were taking a vacation (n=1596), getting involved in sports/outdoor activities (n=1549), and listening to relaxing music (n=1544). Evidently, taking medicine received the lowest level of mentioning.

The results differed when they were broken down according to socio-demographic factors. Figure 3 shows the respective rankings for men and women, illustrating, for example, that both men and women were inclined to suggest taking a vacation. Women ranked listening to relaxing music as their second choice, followed by engaging in exercise or sport activities and meeting a friend. The findings for men were quite similar. Moreover, dancing and shopping were more frequently given recommendations amongst women, while men frequently recommended a break in a quiet and peaceful forest and taking medicine. Significant differences (p<0.05) were noted for all

Figure 1: Map of Malaysia, with the cities of Kuala Lumpur and Kuching indicated (Source: Web Design Copyright).
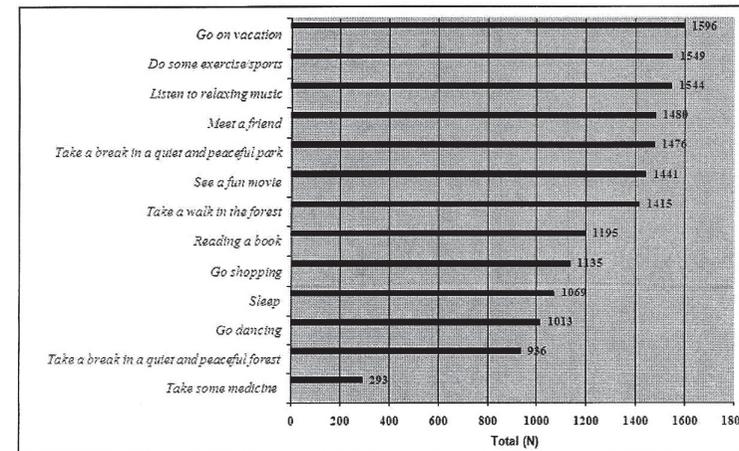

Figure 2: Recommendations made to close friends/family member if they would experience stress or anxiety. More than one option could be selected.
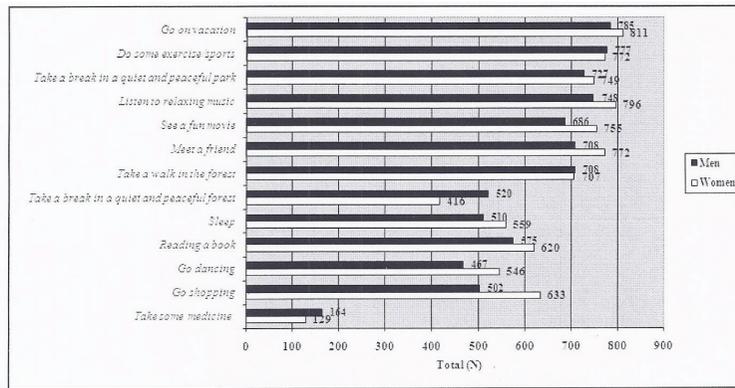
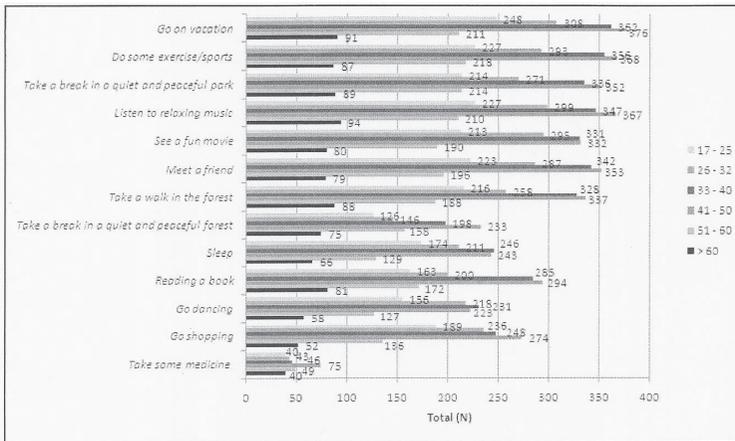*Figure 3: Recommendations made to a stressed out close friends/family members – a breakdown between genders.*

Figure 4: Recommendations made to a stressed out close friend/family – a breakdown between age groups.
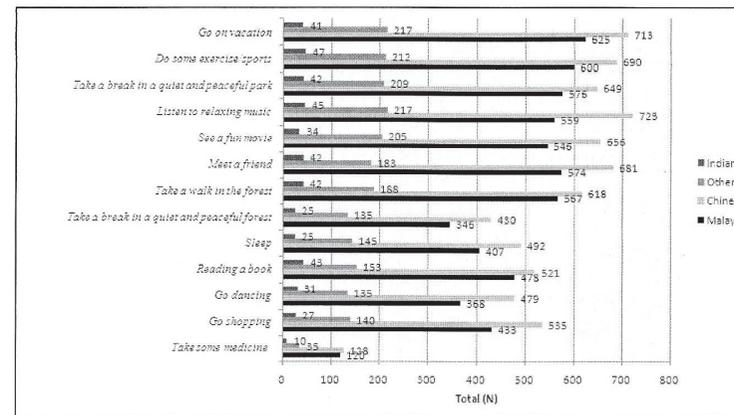

Figure 5: Recommendations made to a stressed out close friend/family member – a breakdown between different ethnic groups.

recommendations, apart from taking a walk in the forest (p=0.86), taking a break in a quiet and peaceful park (p=0.14), and doing some exercise or sport activities (p=0.55).

Similar patterns were found for different age groups, with almost all the age groups recommending going for a vacation as their first choice, except for the respondents from the 51-60 year age group and >60 year age group, who recommended doing some exercises and listening to relaxing music, respectively. Apart from that, all age groups recommended some form of exercise, and listening to relaxing music. Only the oldest group recommended taking a break in a quiet and peaceful park, while the 26-32 age group proposed watching a fun movie. None of the age groups recommended taking some medicine to deal with anxiety or stress. Significant differences between the groups (p<0.05) were noted for all recommendations, apart from taking a walk in the forest (p=0.16), sleeping (p=0.11), meeting a friend (p=0.25), and going on a vacation (p=0.44).

As shown in Figure 5, the results were broken down according to the different ethnic groups. There were similar patterns of recommendations between the Chinese, the Malays and other ethnic groups, with the top three recommendations being listening to relaxing music, going on a vacation and

doing some exercise or sport activities. However, it is interesting to note that the top three scoring recommendations among the Indians included more nature-based options, such as taking a break in a quiet and peaceful park, and taking a walk in the forest. It appeared that no significant differences were found between the different ethnic groups (i.e. the Malays, Chinese, Indians and others) for sleeping (p=0.22), dancing (p=0.13), taking medicine (p=0.67), doing some exercises/sports (p=0.36), and taking a break in a quiet and peaceful forest (p=0.30).

4. DISCUSSION

Impact of the Use of Green Spaces on Self-reported Health

The study shows that a large share of the respondents rated their health to be poor or not very good.. This might contrast with the results from the Philips Index: Malaysia's Health and Well-being Report (2010), which showed that Malaysians generally have a positive perception of health. For example, most Malaysians (53%) rated their physical health as generally good but with some minor problems, while 29% rated their health as excellent, with no significant health problems.

This study identifies differences between cities. The people in Kuala Lumpur, for example, seemed to be healthier than those in Kuching, although this finding was not significant. There could be many reasons for this difference. According to the Malaysian Quality of Life Report (2000), for example, the quality of life in Kuala Lumpur is higher compared to Kuching in terms of health, education and transportation. Thus, access to public green spaces is only part of the picture here, which could be an important aspect to be developed further.

The present study found significant differences in the self-reported health for several socio-demographic and economic factors, such as gender, age and level of education. Differences according to gender were also noted in other studies. Malaysian women, in general, were found to have lower health-related quality of life than men (Azman *et al*., 2003). A study in the UK found that men who used the green space or lived near it were likely to be healthier than women (Richardson & Mitchell, 2010). This might be because women

are more likely to take care of the children or do part time works rather than using the parks (Wheater *et al*., 2007). In Malaysia, women from all ethnic groups stay indoor, something which could be explained by, for instance, the cultural factors, such as women generally take care of their children and do household tasks (Rohana, 1997). Age is also an important explanatory factor as confirmed by earlier research. In the Netherlands, a study by Maas *et al*. (2006) found that older people (65 years and over) and younger people (0-24 years) scored higher in terms of perceived general health related to living in greener environments.

The results of the present study provide convincing evidence on the positive impacts of use of green spaces (and of living close to parks) on self-reported health. The people who frequently used the nearby parks also had higher levels of self-reported health, which was a significant finding. However, studies carried out elsewhere had found stronger links between green spaces and (self-reported) health. Nevertheless, this study found no significant correlation between distance to green spaces and self-reported health. A recent work in Denmark, however, found that the people living nearer to the green spaces reported better levels of health than those living further away (Stigsdotter *et al*., 2010). This confirms the results of other works in Denmark by Nielsen and Hansen (2007), as well as in Sweden by Grahn and Stigsdotter (2003), which found that those people who often used green spaces were more likely to report good health compared to those who did not use the green spaces at all.

The findings from the logistic regression show that frequent park use has more positive impacts than the length of stay in the park. Positive feelings, such as the feelings of energetic, joyful and relaxed, were found to increase with park use. Another study in Malaysia indicated that participating in green space activities provided the residents with the opportunity to be active and energetic, and to feel healthy and happy (Mansor *et al*., 2009). However, contradictory to the results from Scandinavia (Grahn & Stigsdotter, 2003), this study found that the park use in the selected Malaysian cities did not reduce the feelings of being tired, worn-out or sad.

Our findings also show that the different characteristics of the parks could influence the people's feelings, which resulted in different levels of self-reported health. For example, the green space elements in Friendship Park and Permaisuri Lake Park made the people feel better and could reduce their

negative feelings. Apparently, both parks are very different, with Friendship Park in Kuching being highly designed following the Chinese architectural elements, while Permaisuri Lake Park in Kuala Lumpur has more trees and vegetation elements.

In the case of the respondents' feedbacks from the two Malaysian cities, going for a vacation was the top recommendation to friends or family members in case they are experiencing stress or anxiety. Notably, the Malaysian government has introduced the 'Cuti-Cuti Malaysia' programme to strengthen the travel culture amongst Malaysians and to get Malaysians to change their mindset about tourism and travelling (Badaruddin & Yusnita, 2012). During vacations, people can experience prettier scenery, better climate, slower pace of life, quieter surrounding or anything else that is missing or deficient in their lives back home. Also, spending time in parks and forests scored relatively high among the recommendations. A similar question included in the Swedish survey (Grahn & Stigsdotter, 2003) found that 'take a walk in the forest' was ranked as the top recommendation made to a stressed close friend. In addition, in a work by Maas *et al*. (2009), the recommendation for people with depression or anxiety to use nature and green spaces was also stressed. The fact that 'take a break in a quiet and peaceful forest' was ranked lower than 'take a walk in the forest' in this Malaysian study can be explained from the different role of forests. Malaysian forests are not frequently seen as recreational environments and people are hesitant to visit them because of the fear of wild animals and insect bites (for instance).

Methodological Limitations

This study applied a research design developed in a very different part of the world, that is Scandinavia. As discussed, people in Scandinavia and Malaysia have very different relations and perceptions to forests and recreational forest use. This is only one example of the many cultural differences between the two areas. Thus, it will be difficult to compare the findings between the studies. More fundamentally, the use of a Western research design in a newly industrialised country could be questioned.

There were other differences with the studies in Denmark and Sweden (Grahn & Stigsdotter, 2003; Nielsen & Hansen, 2007; Randrup *et al*., 2008) that provided the inspiration for this work, such as the smaller population in the Malaysian study. However, all studies did investigate similar issues and based themselves on similar theoretical foundations. In the present study, the survey questions were structured in a categorical rather than interval form, primarily because of the large number of questions in the survey (which deal with green space use in general) and the need to be able to handle the data. This choice has hampered the analysis of data on green space in relation to health linkages. The work by Stigsdotter *et al*. (2010) showed that the interval form replies can give choices in making the statistical analysis, such as multiple logistic regressions.

Although the number of respondents was close to 1700, the study probably holds considerable bias due to the low response rate, even though this should be seen in the light of the large sample population (which included most of the people in the target areas). Therefore, the findings need to be interpreted cautiously. However, it is probably not realistic to expect high response rates as in the Western countries. Unfortunately, the resources for the study did not allow for a proper follow-up, something which could have enhanced the response rate.

Apart from the work in Denmark and some other studies mentioned, there was very limited empirical data from earlier works to frame this study. In the industrialised world, in particular, we have seen very few studies looking into the relationships between green space use and health.

5. CONCLUSION AND PERSPECTIVE

The rates of mental health problems and obesity amongst Malaysians are quite high. According to the national data, 49% of Malaysians faced emotional problems while 41% experienced aggressiveness. Among the adult population, 43.1% of the adults were overweight while 14% were obese (Philips Index: Malaysia's Health and Well-being Report, 2010). Furthermore, the typical leisure activities which people engage in include static activities, such as surfing the internet, watching television and reading. Health rates are even more challenged through the fast-food revolution and the carbohydrate-laden two-minute noodles as convenient substitutes for more healthy and wholesome food.

The study's findings indicate that green spaces and their different characteristics can have an impact on people's feelings and self-reported health, even though not all findings were significant. In light of this, awareness should be raised among the public on the importance of green space. Moreover, more efforts

are needed from decision-makers and planners to ensure that city dwellers across Malaysia have access to nearby green spaces. Hence, to encourage people to use the green spaces and walk more, local councils should provide safe and comfortable pedestrian lanes.

In light of the above, more research is needed on linkages between the use of green spaces and residents' health and well-being. Here, it is important not just to rely on self-reported health, but also to study the direct health indicators and use more epidemiological approaches. Moreover, very little is known about the mechanisms that can explain why nature and green spaces can have a positive effect on our health. This information is important to help urban planners and green space managers in countries like Malaysia to develop healthier cities and promote better public health. Studies like this can raise awareness among authorities and professionals on the importance of green spaces for public health.

6. ACKNOWLEDGEMENTS

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