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## **THE EFFECT OF SOCIO-DEMOGRAPHIC ATTRIBUTES ON WALKING BEHAVIOUR OF RESIDENTS IN SHAH ALAM CITY, MALAYSIA**

**Nurain Mohd Talmizi<sup>1</sup>, Nor Eeda Haji Ali<sup>2</sup>, Safizahanin Mokhtar<sup>3</sup>**

*<sup>1,2</sup>Department of Built Environment Studies and Technology, Faculty of Architecture, Planning & Surveying,*

**UNIVERSITI TEKNOLOGI MARA, PERAK BRANCH, MALAYSIA**

*<sup>3</sup>Faculty of Built Environment & Surveying,*  
**UNIVERSITI TEKNOLOGI MALAYSIA**

### **Abstract**

Walking is the most common form of physical activity people engages in. However, people walk for different purposes, which most times are influenced by environmental, and socio-economic factors operational within a particular setting. Literature on walking behaviour is dominated by physical environment factors with little mention of socio-demographic factors. Therefore, this study examined the influence of socio-demographic attributes on two categories of walking behaviour: the utilitarian and recreational walking. Through an online survey, 320 copies of the questionnaire were purposefully administered to adults of 18 years old and above in Shah Alam City, Malaysia. A multiple linear regression analysis technique was adopted in identifying the predictors (socio-demographic attributes) that significantly influenced the utilitarian and recreational walking behaviour of respondents. Findings revealed that monthly income ( $\beta=-.350$ ,  $p<0.05$ ), educational qualification ( $\beta=.187$ ,  $p<0.05$ ), and age ( $\beta=-.126$ ,  $p<0.05$ ) have a negative association with utilitarian walking. In contrast, educational qualification ( $\beta=.295$ ,  $p<0.05$ ) and age ( $\beta=.240$ ,  $p<0.05$ ) have a positive association with recreational walking. The findings also revealed that male respondents engaged more in recreational walking while the unmarried walking behaviour varied. Thus, in formulating policies and actions that promote walking, the identified differences in walking behaviour of various groups must be taken into consideration.

**Keywords:** Utilitarian walking, recreational walking, socio-demographic attributes, multiple linear regression

<sup>1</sup> Lecturer at Universiti Teknologi MARA Perak Branch. Email: nuraintalmizi@uitm.edu.my

## **INTRODUCTION**

Regular engagement in physical activity has been associated with a wide range of health, environmental and social benefits (Poitras et al., 2016; World Health Organization, 2018). There has been a decline in levels of physical activity globally, especially among teenagers (Aubert et al., 2018; Guthold et al., 2019), and one of the feasible ways to integrate physical activity into people's daily life is by encouraging walking (Rainham et al., 2012). Hunter et al. (2021), noted that walking is the most common and accessible form of physical activity behaviour. For example, in the United States of America, walking is the most predominant recreational physical activity and the most often reported physical activity among people who meet the public health physical activity standards (Paul et al., 2015). Walking is categorized into two: utilitarian walking (walking as means of transport) and recreational walking. The latter involves a conscious decision, with an intended purpose and level of commitment (Coughenour et al., 2019). Frank et al. (2003) noted that walking occurs incidentally while accomplishing another purpose, for example walking to the market, shopping, work, inter alia. Walking is one of the ways to reduce auto dependency and greenhouse gas emission associated with the transport sector (Rifaat et al., 2019), protection of the environment and overall human health (Thunberg, 2020). Walking is the most form of physical activity that individuals engage in (Rosenberg et al., 2009) and it has some mental and physical health benefits, such as reduced obesity, diabetes and cardiovascular diseases (Warburton et al., 2010). Neighbourhoods that promote walking are inadvertently increasing means of physical activity within a given population (Giles-Corti et al., 2013; Harun et al., 2020).

Literature is replete with studies that have examined the influence of the physical environment on walking (McCormack et al., 2004; Owen et al., 2004; Malek & Nashar, 2018; Hosseinzadeh, 2021). Other studies have equally examined the influence of socio-demographic attributes on walking behaviour (Cao et al., 2009; Azmi et al., 2012; Pinna & Murrau, 2018; Hunter et al., 2021). There is no consensus among researchers on the influence of each socio-demographic attribute on walking behaviour as results obtained are frequently contradictory. The reason for this is due to different social, cultural and environmental conditions where these studies were conducted.

This paper, therefore, examines the effect of socio-demographic attributes on the walking behaviour of residents in Shah Alam City, Malaysia. Most of the existing literature were studies conducted in European or American settings. This paper intends to add to a growing body of knowledge on socio-demographic correlates of walking behaviour, by examining utilitarian and recreational walking in urban setting of a developing country.

## **LITERATURE REVIEW**

Individuals whether old or young engage in walking. It is the most common type of physical activity (Hunter et al., 2021), and also a basic mode of transportation in sustainable urban transport (Sharifi et al., 2020). In the United States of America, walking is the most reported recreational activity among adults who meet public health physical activity requirements (Paul et al., 2015). The effect of socio-demographic attributes on walking behaviour of individuals have become a subject of research over the years. Azmi et al. (2012) compared walking behaviour of individuals residing in urban and rural neighbourhoods and found that the mean walking speed of men and women within the age range of 13-60 years old was higher than those above 60 years. In another study, Rosselli et al. (2020) found that age increase brings about reduction in walking and other physical activities, because sedentary lifestyle becomes dominant among the elderly ones. Male participate more in walking and other physical activities than females (Barr et al., 2020; Asiamah, 2016). Educational qualifications influence the prevalence of recreational walking. Those with higher educational qualifications engaged more in recreational walking than those with lower qualifications (Kruger et al., 2008; Buehler et al., 2020). The low and medium-income groups tend to use non-motorized transportation such as walking and cycling (Manoj & Verma, 2015), while advancement in income increases the opportunity of motorized vehicle ownership (Jain & Tiwari, 2019). In the study of COVID-19 effect on walking behaviour of people in the United States of America, Hunter et al. (2021) reported that residents of low-income group neighbourhoods engaged more in walking than those in the high-income neighbourhoods.

## **METHOD**

Self-report measurements are the most appropriate method for examining context-specific behaviours in population studies (Giles-Corti et al., 2006). Thus, respondents were asked in the questionnaire to state the time spent per/day for walking (recreational work and utilitarian work). Through an online survey, 350 copies of the questionnaire were purposefully mailed to respondents in Shah Alam City, and only 91% (320) responded to the questionnaire. After that, the data was coded into SPSS 20 software for further analysis. The multiple linear regression analytical technique was employed in testing the relationship that exists between walking behaviour (number of time spent on utilitarian and recreational walking per/day) and socio-demographic attributes of respondents. Multiple linear regression analysis is a statistical technique that seeks to associate the value of a set of independent variables (predictors) to a further variable whose value is supposedly dependent on them. According to Gallimore et al. (1996), the idea is to produce a model or equation, that explains the relationship and thus

enable prediction of the outcome (dependent variable) in cases where it is unknown.

In general, the multiple regression model is written as:

$$Y = C + \beta_1V_1 + \beta_2V_2 + \beta_3V_3 + \dots + \beta_nX_n$$

where,

Y, is the dependent variable

C, is the constant

$\beta_1, \beta_2, \beta_3, \dots, \beta_n$ , is the regression coefficient

$V_1, V_2, V_3, \dots, X_n$ , are the independent variables

Y = time spent on walking per/day

$V_1$  = age in years

$V_2$  = monthly income in Ringgit

$V_3$  = number of years spent in school

$V_4$  = gender as dummy whereby 1 = male, otherwise 0

$V_5$  = car ownership (number of cars from 0, 1, 2, 3 ...)

$V_6$  = marital status as dummy whereby 1 = single otherwise married or divorced

Walking can either be for recreational purposes or as a means of transport. Thus, two regression models are generated.

**Utilitarian walking (means of transport) model:**

$$YMT = C + \beta_1V_1 + \beta_2V_2 + \beta_3V_3 + \dots + \beta_nX_n \quad (1)$$

**Recreation walking model:**

$$YMR = C + \beta_1V_1 + \beta_2V_2 + \beta_3V_3 + \dots + \beta_nX_n \quad (2)$$

**RESULT AND DISCUSSION**

Majority of respondents (60.1%) are between 18-24 age range, while 34.7% are between 25-44 age bracket and 5.2% between 45-64. 68percent of respondents are female while 32% are male. In terms of marital status, 76% are unmarried, while 23% are married and 1% divorced/separated. Monthly income of 71% respondents falls within the range of < RM2,500-RM4,850, 22.4% (RM4,851-RM10,970) and 6.2% (RM10,971-> RM15,04). 69% of respondents obtained

university and other degrees, 25% pre-varsity, 2% high school and 4% primary education.

In multiple linear regression analysis, two major assumptions that must be met are: (i) normal distribution of data and (ii) collinearity (i.e., the independent variables must not be highly correlated with each other). The kurtosis value obtained in SPSS for each of the variables in the regression model ranged between -2 to +2, which is an acceptable standard to prove that univariate normal distribution exists (George & Mallery, 2011). For the collinearity, the SPSS diagnostic statistics revealed that all the independent variables fall within the acceptable range. Based on the rule of thumb, tolerance must not be less than 0.10 or the variance inflation factor (VIF) greater than 10.

### **Utilitarian Walk Model**

The major thrust of conducting the multiple regression analysis was to examine the influence of walking behaviour towards socio-demographic attribute in the study area. With an  $R^2$  (coefficient of determination) value of .487 and  $F= 10.709$ ,  $p<0.05$  (Table1), socio-demographic attributes account for major variation in utilitarian walking behaviour (dependent variable). Therefore, there is a significant relationship between socio-demographic attributes and utilitarian walking. Out of six predictors (socio-demographic attributes) in the model, only four (income, education, gender and marital status) significantly influenced utilitarian walking at 0.05 (5%). In multiple linear regression analysis, the contribution of each predictor (independent variable) shows its relevance in the model vis-à-vis other predictors. This is determined by the value of the standardized beta coefficient of each predictor in the model. Results (Table1) show that monthly income ( $\beta= -.350$ ,  $p<0.05$ ) contributed most to explaining variation in time spent per/day for utilitarian walking by respondents. A closer look at the value obtained shows it is negative, which suggests that there is an inverse relationship between monthly income and utilitarian walking. What this implies, is that a unit decrease in monthly income could bring about an increase in time spent per/day for utilitarian walking. In other words, the lower income group, tends to embrace walking as a mode of transportation than the higher income group respondents. Improvement in income increases the chances of car ownership (Bansal et al., 2018), however, will reduce utilitarian walking. Mirzae et al. (2020) reported that monthly income and age have a negative association with utilitarian walking and that the younger ones tended to walk more frequently for utilitarian walking than the elderly. Mirzae et al. (2020) also noted that the negative relationship between age and utilitarian walking may be due to possible safety concerns of the elderly and limitations in mobility. This result is also consistent with the studies conducted by Cao et al. (2009) which reported that respondents between age 64 years old and above

walked less on average compared to the younger ones (those within the age range 18-45). Similarly, results from this study reveal that educational qualification, with the second highest beta coefficient, is inversely related to utilitarian walking ( $\beta = -.187, p < 0.05$ ). This means respondents with lower educational qualification (high school and primary school) tend to adopt walking as a modal choice than those with higher educational qualification. Marital status also significantly influenced walking ( $\beta = .135, p < 0.05$ ). Marital status was coded as dummy variable, whereby 1 stands for unmarried otherwise 0 (married or separated). Based on this, the unmarried respondents are likely to adopt walking as a means of transport than the married or divorced. This result contradicts a study by Pettee et al. (2006) that married men engaged more in physical activity than their single counterparts. This may be due to the fact that the study examined gender and marital status together, while in the present study, only marital status was examined. Age as revealed by the results is negatively related to utilitarian walking ( $\beta = -.126, p < 0.05$ ). Meaning that a unit decrease in age would bring about an increase in time spent on utilitarian walking when other variables in the model are held constant. These results infer that increase in age could bring about reduction in time spent per/day on utilitarian walking. In other words, younger respondents (age 16-40) are more likely to adopt walking as a modal choice than the elderly. This is consistent with the findings of Roselli et al. (2020), who reported that participation in physical activities decline with age.

**Table 1:** ANOVA results for utilitarian walking model

	df	SS	MS	F	p-Value
Regression	6	136.583	22.764	10.709	.000 <sup>b</sup>
Residual	313	665.339	2.126		
Total	310	801.922			
		R	.698 <sup>a</sup>		
		R Square	.487		
		Adjusted R square	.154		
		Standard Error	1.45797		
		Observations	320		
		Standardized Coefficients (Beta)	Standard Error	t	p -Value
Intercept			2.153	-1.015	.311
Income		-.350	.179	-6.254	.000**

Age	-.126	.186	1.054	.042**
Car ownership	.072	.042	1.010	.313
Gender	.077	.186	1.054	.292
Marital status	.135	1.526	2.003	.036**
Education	-.187	.264	2.812	.005**

Note: Statistics is significant at 0.05\*\*

### Recreational walking model

As stated earlier, walking behaviour in this study is conceived as walking as means of transportation (utilitarian) and walking as a form of recreation. This section examines the regression model to see whether the predictors (socio-demographic attributes) varied in their influence on the walking behaviour of respondents. The results present in Table 2 shows that there is a significant relationship between socio-demographic attributes and time spent per/day for recreational walking ( $F=8.279$ ,  $p<0.05$ ,  $R^2=.216$ ). In other words, the predictors (socio-demographic attribute) explain for significant variation in the respondents' recreational walking behaviour. The results reveal that out of six predictors (socio-demographic attributes) in the model, three of them (income, education, gender) are significant at 0.05. Their contribution in predicting variation for recreational walking behaviour in the model is quite significant. Based on the beta coefficient values, education ( $\beta=.295$ ,  $p<0.05$ ) contributed most among the socio-demographic attributes in explaining variation in recreational walking. This represents a positive relationship between educational qualification and time spent per/day on recreational walking. Particularly, those respondents with higher educational qualification are more likely to engage in recreational walking compared to those with lower educational qualifications. This result is consistent with past studies (Kruger et al., 2008; Buehler et al., 2020). For example, Buehler et al. (2020) in their study, found that the rate of walking and cycling is highest among those with higher educational qualification in the United States of America. Cheah (2011) posited that those with a higher educational qualification have more tendency to engage in physical activity (recreational walking, etc.) because they have more knowledge on the health benefits that are accruable from regular participation in physical activity. Also, Asiamah (2016) reported a positive relationship between educational qualification and participation in physical activities among the working class in Ghana. However, in another study conducted in South Africa, Muzindutsi (2016) reported that the level of study (educational qualification) is negatively related to participation in leisure time/recreational activities among undergraduate students. The author noted that first year students participated more in recreational/leisure time activities than the old students. The result in Table 2 shows that, there is a positive relationship

between income and time spent per/day on recreational walking ( $\beta = .240$ ,  $p < 0.05$ ). It should be noted that a unit increase in income would bring about a change in time spent per/day on recreational walking. Thus, it could be said that the higher income group in the study area tends to spend more time on recreational walking than the lower income group. Monteiro et al. (2003) and Varo et al. (2003), reported that individuals with higher income have a greater propensity of participating in recreational activities like walking, cycling and jogging. Gender as shown by results contributed significantly ( $\beta = .233$ ,  $p < 0.05$ ), in predicting the time spent per/day on recreational walking in the model, 1 stands for male otherwise 0. Given this, it could be said, that male respondents in the study area tended to spend more time on recreational walking than their female counterparts. This is consistent with earlier studies that reported the probability of males engaging in physical activities such as walking is higher than their female counterparts (Barr et al., 2020; Rosseli et al., 2020).

**Table 2:** ANOVA results for recreational walking model

	df	SS	MS	F	p-Value
Regression	6	11832.346	1972.058	8.279	.000 <sup>b</sup>
Residual	313	74556.901	238.201		
Total	310	86389.247			
		R	.465 <sup>a</sup>		
		R Square	.216		
		Adjusted R square	.120		
		Standard Error	15.43376		
		Observations	320		
		Standardized Coefficients (Beta)	Standard Error	t	p -Value
Intercept					
Income		.240	.648	4.100	.000**
Age		-.096	1.969	-1.293	.197
Car ownership		.016	.528	.181	.857
Gender		.233	1.864	4.163	.001**
Marital status		.005	2.805	.077	.939
Education		.295	.429	3.641	.000**

*Note: Statistics is significant at 0.05\*\**



## CONCLUSION

Walking regardless, whatever purpose it may serve, has both health and environmental benefits. For individuals, walking as a form of recreation promotes healthy living. It also helps in reducing the carbon emission associated with high use of motorized transport in cities. Studies on factors influencing walking behaviour are dominated by physical attributes or urban design qualities. This study diverges the influence of socio-demographic attributes into two categories of walking in the existing literature – that are utilitarian and recreational walking. Mirzaei et al. (2018) noted that people walk with varying degrees of motivation from intrinsic to extrinsic motivation. Therefore, the findings of this study provide an insight into the interplay of socio-demographic attributes on walking behaviour in a developing country urban setting. Results from the multiple regression analysis revealed that four explanatory variables (income, educational qualification, age and marital status) influenced utilitarian walking while three explanatory variables (income, gender and educational qualification) influenced recreational walking. However, the degree of influence of this explanatory on the respondents' walking behaviour in the study is somewhat different. For the first regression model (utilitarian walking model), income, educational qualification and age have negative association with utilitarian walking. This suggests that younger respondents, those with low income and educational qualification spend more time per/day on utilitarian walking. The second regression model, income, educational qualification and gender have a positive significant effect on time spent per/day by respondents on recreational walking. Meaning that respondents with high educational qualifications and those with high income tended to spend more time per/day on recreational walking. Also, male respondents spend more time per/day on recreational walking compared to their female counterparts. Engaging in utilitarian or recreational walking by individuals, as revealed from this study, is partly influenced by different socio-demographic factors. Some of the results may corroborate or contradict similar studies conducted in other parts of the world, where their socio-economic setting may vary from Malaysian context. This study has shown that socio-demographic attributes are essential in understanding motivation for walking behaviour, which may require policy action.

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