

ORIGINAL ARTICLE

NON-LEISURE TIME PHYSICAL ACTIVITY FOR ADULT MALAYSIAN AND DETERMINANT FACTORS

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ABSTRACT

Non-Leisure Time Physical is the main component of physical activity in Malaysia. The aim of this study is to study the associated factors related to Non-Leisure Time Physical (occupational & travel) in Malaysia. This data is from the Third National Health and Morbidity Survey, consisting of 32,575 respondents. It was a cross-sectional study among Malaysian adult, aged 18 years and was conducted using proportional to the size stratified sampling method. Chi square test and logistic regression model were used to analyse the data. The result showed that non-leisure time physical activity (NLTPA) gives more contribution to total physical activity, as compared to leisure time physical activity with percentage of 64.3% and 35.7% respectively. There was a significant association between NLTPA with age ($P < 0.001$), gender ($P < 0.001$), ethnicity ($P < 0.001$), education ($P < 0.001$), occupation ($P < 0.001$), income ($P < 0.001$), marital status ($P < 0.001$), region ($P < 0.001$) and residence ($P < 0.001$). The main component of physical activity in Malaysia is NLTPA. Promoting NLTPA may have potential to increase physical activity levels in Malaysia.

Keywords: National Health and Morbidity Survey, Non-leisure time physical activity, Malaysia.

INTRODUCTION

In recent years physical activity has become a major public health issue, especially in Europe and other parts of the world¹. The reason for this is due to the fact that physical activity plays an important role in preventing premature deaths from cardiovascular diseases, diabetes mellitus, hypertension, obesity and certain types of cancer². Despite the benefits of physical activity, it is estimated that half of the adult population in the European region are either overweight or obese and obesity related illness are estimated to account for as much as 7.0% of total health care cost due to physical inactivity. Physical inactivity is a leading factor of mortality and morbidity worldwide. 3 million deaths and 32 million disability-adjusted life years each year are due to physical inactivity³.

Physical activity can be divided into Leisure time Physical activity (LTPA) and Non-leisure time physical Activity (NLTPA). LTPA is defined as physical activity performed during exercise, recreation or any time other than that associated with one's regular occupation, housework or transportation. NLTPA includes walking or cycling for transportation, Occupational activity is physical activity performed at work, including housework. Individuals were classified as meeting recommended NLTPA if they reported: 1) Five or more days per week of walking or bicycling for transportation at least 30 minutes per day, 2) if they reported 5 or more days of walking or bicycling per week for transportation achieving a minimum of at least 600METmin/week, individuals were define as

having physically active occupation if they reported walking around for majority of the day or reported lifting and carrying moderate to heavy loads at work⁴.

Malaysian Adult Nutritional Survey (MANS) study which was a cross sectional study representing Malaysian population age 18 to 59 years old found that most Malaysian adult walk only 9.5% of the day, while those who do heavy intensity activities like stair climbing only 0.1% of the day⁵. This shows that most Malaysian adults are inactive and choose to live a sedentary life despite knowing the fact that inactivity is a major risk factor for non- communicable diseases (NCD), 30% of ischemic heart diseases, 27% of diabetes and 21-25% of breast and colon cancer are attributed to physical inactivity⁶.

A cross-sectional study using data from the 2007-2008 and 2009-2010 cycles of the National Health and Nutrition Examination Survey (NHANES), found that there was an inverse association between the level of active transportation with mean BMI and mean abdominal waist circumference. The study also found that hypertension and diabetes were inversely associated with the level of transportation-

Study in Malaysia by Poh et al. (2010) showed that almost 75% of adult Malaysian travel using passive transportation like car or riding a motorbike to and from work⁵. Passive mode of transportations was also used to go to school to school, while 21% of adult population use active mode of transportation like walking and cycling. With such a huge number of populations using

passive transportation, it is obvious that they are living a life of physical inactivity and the risk of getting non-communicable diseases increases. This will have an impact to the health care system.

In Malaysia, very few studies have tried to understand the factors associated with participation in physical activity. The aim of this study is to determine whether NLTPA (occupational & travel) is enough to fulfill the requirement of physical activity level and what factors affecting it.

METHODOLOGY

Sampling and sample size

The data for this study was from the Third National Health and Morbidity survey (NHMS III) conducted by Ministry of Health Malaysia from April 2006 till end of July 2006. It was a nationwide, cross-sectional population based study using a two-stage stratified proportionate-to-population size sampling design to select a nationally representative study. All states in Malaysia constituted the first strata; while urban and rural areas in each respective state comprised the second strata. The sampling for this study was done with the assistance from the Department of Statistics (DOS), Malaysia. The sample selection method has been described in more detail in the NHMS III official report ²⁹.

Data collection

International Physical Activity Questionnaire (IPAQ) was used to collect data on physical activity⁵ via face-to-face interview technique. IPAQ consists of long and a short version questionnaire about physical activity. For lifestyle physical activity the long version of the questionnaire was used. Respondent asked about their physical activity for the last 7 days.

All adults 18 years and above were asked if they have hypertension, diabetes and hypercholesterolemia, if they say they do not have the diseases than their blood pressure, blood glucose and blood cholesterol were checked after getting their permission. All respondents were examined for their height and weight.

Blood pressure was checked by using Omron Digital Automatic Blood Pressure Monitor Model

HEM-907. Two readings of systolic and diastolic pressure were taken 15 minutes apart. The blood pressure was taken using the standard procedures and the correct cuff size. The blood glucose level was determined by using finger prick methods after 8-10 hours of overnight fasting using Accutrend GC machine. Blood Cholesterol levels were examined using the Accutrend GC machine. Body weight was measured in light indoor clothing without shoes to the nearest 0.1 kilogram using a Tanita digital lithium weighing scale (Tanita 318, Japan). Height was measured without shoes to the nearest 0.1 centimeters using a SECA portable body meter (SECA 206, Germany). The data collection method has been described in more detail in the NHMS III official report ²⁹.

Statistical analysis

The data was analysis using SPSS version 21.0 software. Data were presented descriptively as frequency and percentages. Differences and associations between categorical variables were analysed using chi square test. Logistic regression was used in assessing the association between the risk factors (independent variables) and NLTPA. Significant limit was set at P less than 0.001.

RESULT

Characteristic of the respondents

A total number of 33,933 respondents completed the survey, 1,478 participants' responses were incomplete and were excluded from the study leaving 32,575 respondents. The details characteristic of the respondents is shown in Table 1.

Prevalence of physical activity

From Table 2, it is obvious that leisure time physical activity (93.9 %) has the highest prevalence of physical inactivity, followed by a travel physical activity (84.6%) and non-leisure time physical inactivity was (64.3%). The overall prevalence of physical inactivity was (59.3%). This shows that more than half of Malaysian population are inactive, very few indulge people indulged themselves in physical activity during the leisure time, Malaysian population usually uses transportation such as car or motorcycle for travelling resulting in a high number of physical inactivity among them.

Table 1 Descriptive analysis of variables

Variables	N	%
Age		
Less than 20	1631	5.0
20 through 59	14159	43.5
40 through 59	12293	37.7
60 and above	4492	13.8
Income		
Less than 1000	11140	34.3
1000 through 2999	13499	41.4
3000 through 4999	3786	11.6
5000 and above	4150	12.7
Gender		
Male	14826	45.5
Female	17749	54.5
Ethnicity		
Malay	17902	55.0
Chinese	6629	20.3
Indian	2676	8.2
Other	5368	16.5
Occupation		
Professional	2198	7.0
Non-professional	18262	58.9
Unemployed	10568	34.1
Marital status		
Not married	6974	21.5
Married	23072	71.1
Divorcee/widower	2409	7.4
Education		
None	3360	10.4
Primary	9275	28.7
Secondary	16419	50.8
Tertiary	3277	10.1
Region		
West Malaysia	25489	78.2
East Malaysia	7086	21.8
Residence		
Urban	25489	78.2
Rural	7086	21.8
Hypertension		
Yes	12249	37.6
No	20313	62.4
Diabetes		
Yes	3635	11.2
No	28936	88.8
Cholesterol		
High	7419	22.8
Normal	25145	77.2
BMI		
Underweight	2731	8.6
Normal	15333	48.3
Overweight	9225	29.1
Obese	4426	14.0

Table 2 Prevalence of physical activity

Physical activity	Active (%)	Inactive (%)
Working	7776 (23.9)	24799 (76.1)
Travel	5011 (15.4)	27564 (84.6)
Leisure time	1999 (6.1)	30575 (93.9)
Overall	13259 (40.7)	19316 (59.3)
Non-leisure time	11642 (35.7)	20933 (64.3)

NLTPA, socio-demographic factors and health status

There is a significant association between age, gender, income, ethnicity, occupation, region, education, marital status, resident and NLTPA as

shown in Table 3a and 3b. There is also a significant association between hypertension, diabetes and non-leisure time physical activity as shown in Table 3a and 3b.

Table 3a Non-leisure time Physical Activity

Variables	Active (%)	Inactive (%)	X ²	p
Age				
Less than 20	473(29.0)	1158(71.0)	395.944	<0.001*
20 through 59	5327 (37.6)	8832 (62.4)		
40 through 59	4782 (38.9)	7511 (61.1)		
60 and above	1060 (23.6)	3432 (76.4)		
Income				
Less than 1000	4133 (37.1)	7007 (62.9)	57.115	<0.001*
1000 through 2999	4900 (36.3)	8599 (63.7)		
3000 through 4999	1335 (35.3)	2451 (64.7)		
5000 and above	1274 (30.7)	2876 (69.3)		
Gender				
Male	6342 (43.0)	8454 (57.0)	620.955	<0.001*
Female	5270 (29.7)	12479 (70.3)		
Ethnicity				
Malay	6725 (37.6)	11177 (62.4)	65.680	<0.001*
Chinese	2140 (32.3)	4489 (67.7)		
Indian	927 (34.5)	1753 (65.5)		
Other	1854 (34.5)	3514 (65.5)		

* significance $p < 0.05$

Multiple Logistic Regression

Using the final model of multivariate logistic regression model with adjustment for covariates (age, gender, income, education level, marital status, ethnicity, occupation, region, residence and diabetes), the only significant factors that contribute to physical activity were age, gender, income, education level, marital status occupation, people with diabetes, region and residences. Elderly person have 1.8 (95%CI: 1.459-2.047) times higher odds of being physically inactive compared to those less than 20 years of age. Females are 1.4 (95%CI: 1.296 - 1.449) more inactive than males. Person in

tertiary education had 1.6 (95%CI: 1.378-1.804) times greater chance of being physically inactive compared to those who have no educations. People living in urban area have 1.3 (1.197, 1.330) times higher odds of being physically inactive. People with income RM 5000 and above have 1.2 (95%CI: 1.131-1.351) times greater odds of being physically inactive compare to those earning less than RM 1000. Divorcee/widower are 1.1 (95%CI: 0.967 - 1.245) times more likely to be inactive compare with unmarried people. People with diabetes are 0.8 times (95%CI: 0.762 - 0.896) less active compared to normal people (Table 4).

Table 3b Non-leisure time Physical Activity

Variables	Active (%)	Inactive (%)	X ²	p
BMI				
Underweight	1023(37.5)	1708(62.5)	3.996	0.262
Normal	5514(36.0)	9819(64.0)		
Overweight	3264(35.4)	5961(64.6)		
Obese	1594(36.0)	2832(64.0)		
Occupation				
Professional	697 (31.7)	1501 (68.3)	1268.248	<0.001*
Non-professional	8102 (44.4)	10160 (55.6)		
Unemployed	2495 (23.6)	8073 (76.4)		
Marital status				
Not married	2479 (35.5)	4495 (64.5)	131.186	<0.001*
Married	8514 (36.9)	14558 (63.1)		
Divorcee/widower	606 (25.2)	1803 (74.8)		
Education				
None	934 (27.8)	2426 (72.2)	193.898	<0.001*
Primary	3620 (39.0)	5655 (61.0)		
Secondary	6021 (36.7)	10398 (63.3)		
Tertiary	974 (29.7)	2303 (70.3)		
Region				
West Malaysia	9360 (36.7)	16129 (63.3)	49.267	<0.001*
East Malaysia	2282 (32.2)	4804 (67.8)		
Residence				
Urban	6466 (33.3)	12928 (66.7)	120.094	<0.001*
Rural	5176(39.3)	8005(60.7)		
Hypertension				
Yes	4205 (34.3)	8044 (65.7)	517.112	< 0.001*
No	7434 (36.6)	12879 (63.4)		
Diabetes				
Yes	1123 (30.9)	2512 (69.1)	41.843	<0.001*
No	13821 (47.8)	15115 (52.2)		
Cholesterol				
Yes	2633 (35.5)	4786 (64.5)	0.272	0.602
No	9007 (35.8)	16138 (64.2)		

* significance $p < 0.05$

DISCUSSION

This study was carried out throughout Malaysia so it is a national representative sample. The present study finds age, gender, income, education, marital status, living with diabetes, region, residence and occupations to affect an individual's likelihood of being physically inactive. From the study it is clear that elderly people, high income earner, females, those with higher education, divorcee/widowed individuals, residing in East Malaysian, people with diabetes, those living in urban area and unemployed individuals are more likely to spend less time in NLTPA compare to others.

Elderly people are less active in NLTPA is in line with studies from previous studies⁸. Bélanger, Townsend & Foster (2011) used data that was obtained from the 2008 Health Survey for England, a nationally representative survey of the non-institutionalized population consisting of the 14 250 households found that there is a marked age-related decline in the proportion of total moderate or vigorous intensity physical activity⁹. A study by Burton & Turrell (2000) found that rates of insufficient activity increases with age¹⁰. Similar finding was also noted by Tuyckom, & Scheerder (2010)¹.

Table 4 Multiple Logistic Regression

Variable	B	S.E	Wald	p-value	OR	95% CI
Age			210.590	0.001		
Less than 20					1.000	
20 through 39	-1.25	0.072	2.995	0.084	0.882	0.765, 1.017
40 through 59	-0.087	0.077	1.284	0.257	0.916	0.788, 1.066
60 and above	0.547	0.086	40.088	<0.001*	1.728	1.459, 2.047
Income			23.600	<0.001*		
Less than 1000					1.000	
1000 through 2999	0.097	0.30	10.311	<0.001*	1.102	1.039, 1.170
3000 through 4999	0.093	0.045	4.237	0.040*	1.098	1.004, 1.199
5000 and above	0.212	0.045	21.876	<0.001*	1.236	1.131, 1.351
Gender						
Male					1.000	
Female	0.315	0.028	122.578	<0.001*	1.370	1.296, 1.449
Occupation			562.484	<0.001		
Unemployed					1.000	
Professional	-0.493	0.059	69.013	<0.001*	0.610	0.543, 0.686
None professional	-0.765	0.032	556.504	<0.001*	0.465	0.436, 0.496
Marital status			13.289	0.01		
Single					1.000	
Married	-0.075	0.036	4.330	0.037	0.927	0.864, 0.996
Divorcee/ widower	0.093	0.065	2.057	0.151	1.097	0.967, 1.245
Education			108.493	<0.001*		
None					1.000	
Primary	-0.085	0.049	2.961	0.085	0.919	0.834, 1.012
Secondary	0.145	0.052	7.887	0.005	1.566	1.045, 1.278
Tertiary	0.455	0.069	43.977	<0.001*	1.577	1.378, 1.804
Region						
East Malaysia					1.000	
West Malaysia	-0.300	0.32	85.488	<0.001*	0.741	0.695, 0.790
Residence						
Rural					1.000	
Urban	0.232	0.027	74.566	<0.001 *	1.261	1.197, 1.330
Constant	1.068	0.097	121.324	<0.001*	2.908	

OR - Odd Ratio, CI - confidence interval

* significant $p < 0.005$

The ageing body is most likely the reason for reduced participation in NLTPA. Elderly people are usually associated with body limitation and more health problems as compare to younger generation and thus have difficulty in performing physical activity. But there are other studies such as Lin et al. (2011) eight year follow up study done on 1,435 Taiwanese population aged 65 years and above found that NLTPA is a major source of physical activity among elderly¹¹. The study also found that elderly people who engaged themselves with NLTPA had lower mortality risk. Study by Hu et al. (2002) found that men aged 50-69 years were more likely to perform over 30 min of commuting physical activity on foot or by bicycle than males aged

15-34 years¹². From this study it is clear that the elderly population can be motivated to indulge themselves in NLTPA and hence reduced their mortality risk. This is important for Malaysia, as the number of aging population in Malaysia is on the rise and Malaysia is become an aging country. This will certainly put pressure on our health care system. One way to reduce the health care burden is by encouraging elderly people to do NLTPA.

The finding on gender is consistent with study by Davis et al. (2011) found that men travel more to do their daily task compare to women and therefore are more involved in NLTPA¹³.

Similar findings were also found in other studies like in a study by Gal, Santos & Barros (2005) found that 70% of women and 60% of men not undertaking any regular physical activity or sports during leisure time¹⁴. This could be due to the natural roles of the gender where women tend to be family care takers, spend more time in the house rather than doing physical activities whereas men are more outgoing and adventurous so are more involved in NLTPA.

There have been conflicting reports regarding occupation and NLTPA, present study shows that professionals are physically inactive. This is consistent with the finding by Kandula, & Lauderdale (2005), their study found that professionals are less active in NLTPA and are more likely to utilize labor saving technology or have sedentary occupations resulting in them being physically inactive⁴. Forrest et al. (2001) found that senior civil servants spend most of their time sitting unlike their junior staff that does most of the heavy occupational activity, so they do not do any NLTPA¹⁵. But study by Takao et al. (2003) on Japanese workers found that NLTPA was higher among intermediate occupational groups like clerks compared to low class occupations and high class occupations¹⁶. Declines in occupational activity are signs of shifts in the job market towards less labour intensive occupations¹⁷.

Higher income groups are less active in NLTPA according to the present study, similar findings were also found in a study done by Hu et al. (2002) in China¹². Their study found that low incomes were significantly more likely to engage in transportation physical activity lasting 30 min or more than those who had higher income. Using public transport can involve a substantial amount of walking, so that commuters who use public transport tend to walk more than those who travel by car¹⁸. However study done by Cerin & Leslie (2008) showed that lower socioeconomic groups have higher risk of being physically inactive¹⁹. Similar findings were also observed by Giles-Corti (2002) using Australian populations. Common barriers for NLTPA in low income groups include poor access to parks, lack of time and lack of meaningful transportation²⁰. Lower income neighborhoods may have local facilities with less access and lower quality that may limit participation in physical activity²¹.

Current study showed that those with higher education are physically inactive compared to those with no education, these findings are similar to a study by Karmakar & Breslin (2008) which found that high school graduates were more likely to work in jobs with low physical demands compared to those who had not completed high school, while those with a university degree were more likely to be holding jobs with low physical demands resulting in low participation in NLTPA²².

Findings of urbanization and decrease in NLTPA are consistent with the findings by Ng et al. (2009)¹⁷. Their study found that urbanization is negatively associated with both occupational and total physical activity levels for both adult men and women in China; they also found that community economic wellbeing, availability of educational institutions, improved sanitation and housing infrastructures were the reasons for decline in occupational physical activity for both men and women. A cross-sectional study by Padrão et al. (2012) on Mozambique population found that people from rural areas were more involved in vigorous physical activity²³. This could be due to the fact most people in rural areas are farmers, rubber tappers or own their own small business, lack of infrastructure, transportation and telecommunication may result in many rural people using bicycles, walking or doing most of the stuff by themselves resulting in vigorous physical activity.

Divorcees/widowers were found to be physically inactive in a study done using Health ABC cohort consisting of 3075 participants²⁴. Similar findings were also noted in a study done by Eberth & Smith (2010)²⁵. This finding is similar to our current study. On the contrary a study by Hu et al. (2002) found that those who were married were significantly more likely to engage in NLTPA lasting 30 min or more than those who were unmarried¹². Study by Hu et al. (2002) found that married individuals were more likely to be active than their single counterparts¹². The study also demonstrated a strong relationship between individual members of a married couple. Compared with the low active husband, a highly active husband was more likely to also have a similarly active wife. Similar findings were also found in a study by Lee & Moudon (2006)²⁶.

Among the health conditions, only people living with diabetes showed significantly low NLTPA. A study done by Liese et al. (2013) found that compared to youth without diabetes, Type 2 diabetes youth seem to engage in markedly less physical activity²⁷. In terms of steps per day, O'Neill et al. (2012) suggest a 1500-2000 step difference, depending on gender²⁸. There was a significant moderate and positive correlation between steps per day and the perception of physical abilities. These 2 studies concur with our national study that people with diabetes are less involved in NLTPA. Reason for this could be that many diabetes patients have a sedentary life style, sociodemographic background and family support plays a role for them to participate in NLTPA.

Limitations to the study include data on physical activity were based on self-report without an objective measure of physical activity. Self-report can lead to recall bias. It was not possible to estimate the intensity of active transportation without knowledge of the relative contribution

of walking and biking to time spent in active transportation. Another limitation was those respondents who have comorbid like hypertension, diabetes and cholesterol, their status was not confirmed again by laboratory test. There is a possibility that the respondent may have made an error and declare himself as having the comorbid.

Engaging in walking and transportation and occupational physical activities can lead to health benefits like preventing diabetes, hypertension and also reduce cardiovascular risk factors. NLTPA is a form of activity that can be engaged with the elderly and reduce mortality in the elderly. Sociodemographic factors like gender, age, income, education, occupation, marital status, region, residence and diabetes have significant association with NLTPA. From the study it is clear that overall more than half of Malaysia population (59.3%) are physically inactive. This is an alarming rate, imaging all of them having non-communicable diseases, the impact it will cause on our health care system and economy will be devastating. We have to create awareness and empower the public about the importance of being physically active and the health benefits that one can get from it. Public need to be involved in the intervention program design for them. Programs like Non-communicable disease prevention 1 Malaysia (NCDP1M), walking 10,000 steps in a day are programs designed to encourage people to be active. The most important intervention is to change the mindset of the public to be active.

In conclusion, the main component of physical activity in Malaysia is NLTPA. There was a significant association between NLTPA with age, gender, ethnicity, education, occupation, income, marital status, region and residence. Promoting NLTPA may have potential to increase physical activity levels in Malaysia.

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