

ORIGINAL ARTICLE

LIFESTYLE PREDICTORS OF OVERWEIGHT AMONG MALAYSIANS

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ABSTRACT

The epidemic of overweight is encroaching in the world today, irrespective of economic and social status and regions. It is now seen as a public health threat and one that must be taken seriously in all aspects of public health interventions. There is a need to deeper understand the relationship of lifestyle behaviors and the epidemic of overweight and obesity. This cross-sectional study investigates the lifestyle predictors (smoking, physical activity, diet, and sleeping) of overweight as measured by body mass index (BMI) and waist-to-hip ratio (WHR). A questionnaire survey was conducted among 459 samples (18 years old and above) from those who attended a health screening drive, conducted in three major regions in Peninsular Malaysia. Data were analyzed using descriptive statistics as well as regression model, with $p < 0.05$ considered significant. The overall Body Mass Index (BMI) of the population was overweight at 24.69 while the Waist-to-Hip ratio (WHR) for female was 0.86, classified as high and for male, 0.94 which was borderline. Predictor model revealed that smoking ($P < 0.05$, $R^2 = 0.38$) and physical activity ($P = 0.02$, $R^2 = 0.11$) were predictors for body mass index while smoking ($P < 0.05$, $R^2 = 0.50$) was a predictor of Waist-to-hip ratio. Findings showed that the problem of overweight in Malaysia is real and smoking and physical activity play a strong role and need to be considered in any public health interventions.

Keywords: Overweight, body mass index, waist-to-hip ratio, smoking, physical activity

INTRODUCTION

The epidemic of overweight is now seen as a public health threat; one that must be taken seriously in all aspects of public health interventions. Not only it has a debilitating impact to the morbidity and mortality of the population but that the economic impact of this rapidly rising phenomenon is affecting both the developed and the developing countries¹. The World Health Organization (WHO) reports that globally, obesity has almost tripled from 1975 until 2016, where 1.9 billion adults aged 18 years old and above are overweight, of which, 650 million are obese². The problem is not isolated in the developed countries, but is sweeping over the developing countries as well³, increasing in all population groups—regardless of gender, sex, race and/or ethnicity, socioeconomic status, education level, and region.

In Malaysia, there was an increase in the overweight and obesity trend from 1996 to 2006; that is, from 4.4 percent to 14.6 percent increase, respectively⁴. Further, it was seen that obesity was greater in women than in men⁵; highest among adults 40-59 years old and highest among Indians, followed by Malays, Chinese, and Aborigines⁴. To date, Malaysia is now known as the fattest nation in Southeast Asia region⁶.

There are multi-factorial causes of overweight and obesity; some cannot be modified or changed, like age, race, or gender; but lifestyle or behavioral factors such as unhealthy diet, physical activity and/or smoking are modifiable. Lifestyle modifications need to be addressed in conducting individual and population interventions to address the challenges of the growing overweight epidemic⁷. To effectively do this, there is a need to acquire a deeper understanding regarding the relationship of lifestyle behaviors and the growing global and regional epidemic of overweight and obesity. Therefore, this study was conducted to determine the lifestyle predictors of overweight and obesity among Malaysians.

METHODS

This research utilized 468 respondents based on the data generated from the previous study on the predictors of healthy behaviour among Malaysians⁸. This research employed descriptive design using questionnaire survey together with biometric testing which was composed of body mass index (BMI), waist-to-hip ratio (WHR), blood pressure and resting heart rate; conducted as part of a countrywide health screening activity targeting individuals who were at risk of chronic diseases. A team of researchers consisting of four trained nurses and a nutritionist conducted the program.

Free personalized counselling and health education were provided for those participants who were at high risk.

The inclusion criteria for this study include a minimum age of 18 years old, of Malaysian descent, and belonging to three major ethnic groups (Malays, Chinese, and Indians). The study setting was in the three major cities of Peninsular Malaysia (Penang, Kuala Lumpur, and Johor Bahru). It was made to best target urban young adults given the early, preventive focus of this programme. Respondents who attended the free screening programme were inducted into the study if they gave their consent.

The questionnaire underwent a backward-forward translation process by linguistic and technical experts. Preliminary testing through a pilot study was conducted prior to the actual conduction of the data gathering, revealed an alpha of 0.811 (n = 70). For the analysis, this study adopted the Statistical Package for the Social Sciences (SPSS) software version 19.0. Frequencies and percentages were used to compute demographic data, means and standard deviation were used to describe the independent and dependent variables. Further, enter method was employed to determine existing relationships between the independent and dependent variables.

RESULTS

Overall response rate of this study was good at 98% (N=468). Incomplete questionnaires were excluded from the analysis. Table 1 showed the background characteristics of the sample in terms of gender, age and ethnicity. There were more females (60.8% or 279) than males (39.2% or 180); 276 or 60.1% comprise of those aged between 18 to 39, 159 or 34.6% were those 40-59 years of age while 87 or 19% belong to 60 years old and above. The overall BMI of the population in this study was 24.69 while the

WHR for female was 0.86, classified as high and for male, 0.94 with a classification of borderline.

Table 1: Frequency Distribution of Respondents in terms of Gender, Age, and Ethnicity (n=459)

Variables	Frequency	Percent (%)
Gender		
Female	279	60.8
Male	180	39.2
Age		
18-39	276	60.1
40-59	159	34.6
60 and above	24	5.2
Ethnicity		
Chinese	236	51.4
Malay	128	27.9
Indian	87	19.0

In determining the predictors of BMI and WHR, the study utilized enter method. Table 2 showed the variables that entered the regression which are considered statistically significant. The highest predictor of BMI was smoking with an unstandardized coefficient of 1.26, a t-value of 4.09 with a significant value P<0.05. This means that the more the respondents smoke, the higher their BMI becomes. Physical activity also entered into regression with unstandardized coefficient of 0.73, a t-value of 2.29, and significant value of 0.023 which is also significant at 0.01 level.

The best predictor of WHR was smoking with unstandardized value of 0.03, a t-value of 4.38 and a significance of <0.05. This shows that as the respondents' smoking is increased, the more likely they will have higher WHR. Physical activity did not show significance at 0.062, a t-value of 1.87 and unstandardized value of 0.01.

Table 2: Lifestyle Predictors of Body Mass Index (BMI) and Waist-to-hip ratio (WHR) (n=459)

	Unstandardized Coefficients B	l. Error	Standardized Coefficients B	t	Sig.	R-Square Change
*(Constant)	20.08	1.04		19.40		
Smoking	1.26	0.31	0.19	4.09	< 0.05	0.49
Physical Activity	0.73	0.32	0.10	2.29	0.023	0.38
** (Constant)	0.79	0.02		35.58	< 0.05	
Smoking	0.03	0.01	0.20	4.38	< 0.05	0.11
Physical Activity	0.01	0.01	0.86	1.87	0.062	0.50

*BMI R-Square= 0.049, F= 11.757, Sig=<0.05; **WHR R-Square=0.043, F=20.434, Sig=<0.05

DISCUSSION

Many studies showed that not only is WHR closely associated with overweight and obesity but it is also highly associated with other unfavorable conditions such as cardiovascular and stroke problems^{9,10,11}. It was shown that even women with normal weight, or

The overall BMI of the population in this study exceeds that of the Asian 'normal standard' of 18.5-22.9 and is categorized as overweight¹⁴; BMI offers a good indicator of body fatness and is normally used to screen overweight and obesity, especially in a community setting¹⁵. It is a number obtained from calculating a person's weight in kilogram divided by height in meter squared. The WHO notes that BMI is a simple health index that is used to classify underweight, overweight and obesity among adults, independent of age and gender¹⁴.

Aside from BMI, this study also utilized the use of WHR ratio to determine the central obesity of the participants. WHR is the result of measuring the narrowest point of the torso (waist) divided by the hip circumference measurement or the widest part of the hip¹⁶. For both men and women, a WHR of 1.0 or higher is considered "at risk" for undesirable health outcomes (i.e., heart disease) and ailments associated with overweight. A healthy result is 0.90 or less for men, and 0.80 or less for women¹⁷.

Literature is divided as to the effect of smoking BMI; some say that current smokers have lower BMI and some say, they have higher or it depends^{18,19,20}; while current smokers tend to have normal BMI, however, it cannot be said about long-term smokers, who appeared to have higher BMI²¹. Decrease or increase of BMI may depend on the length of the smoking status of the individual²². Authors concluded that the effect of nicotine among short term smokers result in increased energy expenditure thus, reducing appetite, which may explain why smokers tend to have lower body weight than nonsmokers do; moreover, although current smokers have a tendency to be less likely to be obese as compared those who never smoked, however the inverse relationship is not a causal association²³. In Malaysia, one in five adults smoke or 22.85 prevalence of smokers; the sixth highest in Southeast Asia region²⁴.

Physical activity was another predictor of BMI. Surprising result of this study showed that that the higher the engagement in physical activity is, the higher the BMI. Malaysians are generally the least active population group, with almost half of Malaysians are either not exercising at all, or not exercising enough²⁵. Generally, we assume that as people engage in physical activity, they eventually lower their body fat; while this may be true to

a BMI of less than 25, were of increased risk of developing chronic conditions, if they were carrying that weight around their abdominal area¹². In Malaysia, females and non-Malays have high abdominal obesity despite the fact that they have normal BMI¹³.

some, however it cannot be generalized. For example, in a cross-sectional analysis of 2,840 participants regarding the relationship of physical activity and BMI, authors concluded that moderate physical activity and lowered BMI were only present among obese participants and not from those overweight or of normal weight²⁶. Result was consistent with another study among 151,656 respondents in China over a period of 14 years; result showed that as physical activity increased, there was also a notable increase in overweight and obesity as measured by BMI thus, physical activity alone is not a predictor of normal BMI²⁷, but prolonged sedentary life has an ill effect on health, despite physical activity, including increasing BMI²⁸. Moreover, overweight and obese people, who, despite engaging in physical activity but do not follow the required recommendation of physical activity, did not show changes in BMI²⁹.

The only variable that entered into regression and is the best predictor of WHR was smoking; this was confirmed by many studies. For example, in a meta-analysis of 116,146 participants, researchers found a significant link between cigarette smoking and high WHR³⁰; also, a Finnish study on the associations between smoking, BMI and waist circumference, result showed that people who used to smoke as well as current smokers tend to have higher WHR and bigger waist as compared to those who never smoked³¹. A meta-analysis study to determine whether smoking is associated with obesity revealed that indeed, increased smoking leads to increased WHR³². Currently, there are more than 20% adult smokers in Malaysia, with the highest prevalence among males and of Malay ethnicity³³.

One of the limitations of this study was the use of convenience sampling during the selection of the sample, which as a result, potential bias may occur; however, the population of interest was chosen from the three major cities of the country, with good representation from the three major ethnic backgrounds. Another limitation was the language barrier as some of the respondents were not able to speak English or Bahasa well. However, there were available interpreters during the data collection process in order to assist those who have difficulty in answering the survey questionnaire.

CONCLUSION

The findings of this study clearly showed that the main predictors of overweight and obesity among Malaysians are smoking and the lack of sustained physical activity. As the increasing prevalence of overweight and obesity in Malaysia heightens the susceptibility of the population's risk for chronic diseases, result of this study signifies an increasing need of health promotion programs on smoking and physical inactivity. Interventions and strategies aimed at controlling overweight and obesity must incorporate programs on anti-smoking and promotion of physical activity.

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