

Prevalence of overweight/obesity and its associated factors among secondary school students in semi urban area in Malaysia

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ABSTRACT

Introduction: This cross-sectional study aimed to determine the prevalence of overweight and obesity and factors associated among secondary school students in Batang Padang District, Perak, Malaysia.

Methods: Out of the 7247 students in the ten selected schools studied, a total of 6248 students (2928 males, 3320 females) took part. A validated self-administered questionnaire was used. Data was analysed using SPSS version 22. Multivariable logistic regression was used to determine the adjusted odd ratio.

Results: The prevalence of overweight and obesity was 16.0% and 11.5% respectively. Obesity/overweight was significantly ($p < 0.05$) associated with gender, age, ethnicity, education level of father, education level of mother, physical activity, disordered eating, smoking status, body size perception and body part satisfaction. The multivariable analysis results showed that the odds of being overweight/obesity were higher in males compared to females (OR 1.56, 95%CI: 1.37, 1.77). The results also showed that the odds of being overweight/obesity were highest among those in age group 12 and 13 years and among Malay ethnicity. The odds of overweight/obesity were higher in those who were dissatisfied with their body parts, (OR 1.96, 95%CI: 1.71, 2.25), dissatisfied with their body size (OR: 4.25, 95%CI: 3.60, 5.02), low physical activity (OR 1.23, 95%CI: 1.06, 1.44), current smokers (OR 1.38, 95%CI: 1.07, 1.78) and at risk of having eating disorder (OR: 1.39, 95%CI 1.22, 1.59).

Conclusion: The overall prevalence of overweight and obesity is high. The findings from this study can be used by policy makers to plan an integrated intervention program in schools.

KEY WORDS:

Overweight, Obesity, Adolescents, Prevalence, Factors associated

INTRODUCTION

The burden of non-communicable diseases (NCDs) remains high globally. In 2017, NCDs was responsible for 41 million of the 57 million deaths (71%) globally. The major NCDs responsible for these 41 million deaths were cardiovascular

diseases (17.9 million deaths, 44% of all NCD deaths); cancers (nine million deaths, 22% of all NCD deaths); chronic respiratory diseases (3.8 million deaths, 9% of all NCD deaths); and diabetes (1.6 million deaths, 4% of all NCD deaths).¹ These four major NCDs are causally linked with four leading behavioural risk factors: tobacco use, harmful use of alcohol, physical inactivity, and unhealthy diet. In turn, these behaviours lead to four key metabolic/physiological changes: raised blood pressure, overweight/obesity, raised blood glucose, and raised blood lipids.² World Health Organization highlighted that 78% of all NCD deaths burden is within low- and middle-income countries.²

Overweight and obesity are an important risk for NCDs such as cardiovascular and kidney diseases, diabetes, malignancies and conditions including obstructive sleep apnoea and osteoarthritis,^{3,4} adverse psychosocial consequences and lowers educational attainment.^{5,6}

The number of adults with obesity has dramatically increased from 100 million in 1975 to 671 million in 2016 and another 1.3 billion adults were overweight. The prevalence of overweight and obesity among children and adolescents aged 5-19 has also increased dramatically from just 4% in 1975 to just over 18% in 2016. In 2016, over 340 million children and adolescents aged 5-19 were overweight or obese (nearly 1 in 5).⁷ The number of obese girls increased from five million in 1975 to 50 million in 2016. The number of obese boys increased from six million in 1975 to 74 million in 2016. In addition, 213 million children and adolescents were in the overweight range, but below the threshold for obesity. From 1985 to 2017, global age-standardised mean BMI increased from 22.6kg/m² to 24.7kg/m² in women, and from 22.2kg/m² to 24.4kg/m² in men. More than 55% of the global rise in mean BMI from 1985 to 2017 and more than 80% in some low- and middle-income regions was due to increases in BMI in rural areas. However, trends in the mean BMI has recently flattened in north western Europe and high-income English-speaking and Asia-Pacific regions for both sexes.⁸ Prevalence of physical activity has not increased in the past 15 years and currently, the world is not on track to meet the global 2025 WHO NCDs target for reduced physical inactivity.² A systematic review and meta-analysis conducted by Natascha et al., reported that severity of body dissatisfaction among individuals with obesity.⁹

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In Malaysia, NCDs were estimated to account for 74% of all deaths in 2016.² The prevalence of obesity increased from 4.4% in 1996 to 12.3% in 2004.^{10,11} The National Health and Morbidity Surveys (NHMSs) carried out in 2006, 2011 and 2015 showed further increase in the prevalence of overweight and obesity among adults ≥ 18 years from 29.1% and 14.5% in 2006, to 29.4% and 15.1% in 2011 to 30.0% and 17.7% in 2015 respectively, and there were 5.6 million Malaysian who were pre obese and 3.3 million are obese.¹²⁻¹⁴ The prevalence of overweight and obesity amongst of adolescents (aged 13-17 years) in secondary schools in 2017 was 15.2% and 13.3% respectively.¹⁵ As there was a plan to carry out an intervention program on cardiovascular disease risk factors in Batang Padang District, the need to carry out prevalence study and identify the risk factors was identified before the intervention study. The objective of this study was to determine the prevalence of overweight/obesity and its associated factors among secondary school students in Batang Padang District, Perak.

MATERIALS AND METHODS

Study design, study location and sampling frame

This analytical cross-sectional study was carried out in 10 out of the 22 secondary schools in Batang Padang District, Perak, Malaysia. One boarding school was excluded from the study. This district has a population of 123,600 in 2016 and is mostly semi-urban with three small towns, namely Tapah, Bidor, and Sungkai, and several villages and plantations.

Sample size and sampling method

The sample size of 7247 students was calculated using the Lemeshow et al.'s formula for hypothesis testing for two proportions.¹⁶ Systematic random sampling was used in this study for selecting the schools. Thereafter, cluster sampling was used whereby all students in the selected schools were included in the study. Inclusion criteria was Malaysians aged 12-17 years. Those pupils who did not give their consent or their parents did not give consent were excluded from the study.

Data collection tools and procedure

A self-administered structured validated questionnaire was used in the study. The questionnaire was in Bahasa Malaysia. The questionnaire was validated for face and content validity. The Cronhbach's Alpha was used to measure the internal consistency of questionnaire. The questionnaire was divided into seven sections (Section A-G). Section A consisted of five questions in relation to the socio-demographic characteristics of the respondents (gender, date of birth, ethnicity, father's education level, and mother's education level). Section B: consisted of physical activity questionnaire for children (PAQ-C), which was developed by Kowalski et al., 1997.¹⁷ It contained both Physical Activity Questionnaire for Children and for adolescent. Some of the sports that are not relevant in Malaysia were deleted. The instrument consists of 10 items. After calculating the summation score and the mean of item 1 to 9, the ultimate PAQ-A activity summary score was obtained. Low physical activity was represented by a score of one, whereas high physical activity was indicated by a mean score of five. All

respondents were separated into two groups which is either low or high according to their total mean score of physical activity. Respondent score from 1.00-2.33 total mean score was grouped as having low level of physical activity, and mean score of 3.67-5.00 portrayed the high level of physical activity.¹⁷ Section C consisted of Rosenberg Self-esteem questionnaire.¹⁸ Scores less than 25 indicates low self-esteem and score more or equal to 25 indicated high self-esteem.¹⁹ Section D covered Body Image Scale consisted of two parts: Section D 1: Body Area Satisfaction and Section D2: Body size perception. Body Area Satisfaction scale by Brown et al., was used to determine body part satisfaction.²⁰ Total score ≥ 27 was classified as 'satisfied' and total score < 27 was classified as 'dissatisfied'. Body size perception was measured using figure rating scale validated by Adami et al.²¹ The drawing rating Scale" by Thompson and Gray,²² was shown to the respondents. The score for all the body parts was added and a total score was calculated for each respondent. The minimum possible score for body part satisfaction was nine while the maximum score was 45. Respondent were then classified into two categories based on their total score. Total score ≥ 27 is determined as satisfied and total < 27 is determined as dissatisfied.²³

For body size perception, the higher the discrepancy score, the higher was the dissatisfaction level with the body size. The indication of the respondent that was dissatisfied with his/her body size and desired to have a bigger body size was represented by a positive discrepancy score while the negative discrepancy score is applied for vice-verse. Conversely, a zero-discrepancy score indicated satisfaction with one's body size. Section E: This section covered smoking status. Section F: Eating attitude was measured using EAT-26.²⁴ For all the items, except number 25, each of the answers was assign as following: Always=3, Usually=2, Often=1, Sometimes=0, Rarely=0, Never=0. For item number 25 the scores were assigned as following: Always=0, Usually=0, Often=0, Sometimes=1, Rarely=2, Never=3. Score ≥ 20 on the EAT-26, suggest that respondent are at risk of developing eating disordered.

Anthropometric measurements

Weight was measured in kilograms with a digital weight scale (TANITA model HD -319). It was reset before each use on a respondent. Weight of respondents was measured without their socks and shoes and the weight was obtained to the nearest 0.1kg. The respondents were asked to stand on the centre of the weighing scale with head erect and arms suspended by the sides. Two readings were taken and the average of it was obtained. A known weight was used at regular interval to assess the efficiency of the weighing scale. Height was measured in centimetres using Charder Portable Stadiometer Height Measurement Scale. The measurement scale was fixed against a wall and the respondents were asked to stand erect at the centre of the measuring scale with heels together and eyes looking straight forward. The measuring tongue was pushed gently down until it came in contact with the head lightly. Measurement was taken two times and the average of these three measurements was used for the BMI computation. The height was measured with the socks and shoes removed.

The BMI of each respondent was obtained by dividing the weight of each respondent in kilogram by the height in meter square. The result was then compared with WHO Growth Reference for 5-19 years for girls and boys. Each respondent was then further categorised into four category of BMI which is of underweight, normal, overweight and obese.²⁵

Validity and reliability of Questionnaire

The questionnaire was translated to Malay language by language experts and also back translated in order to ensure that the meaning of both English and Malay version were similar. The face validity was assessed by giving the questionnaire to 30 students who went through the questionnaire to see if they understood each section. Comments were noted and appropriate corrections made. To assess the content validity, the supervisory committees and expert in the field of Public Health were involved in giving the comments and appropriate corrections were made for enforcement. Based on their recommendations, questionnaire was modified and some were deleted. The reliability of questionnaires was measured by checking the internal consistency using Cronbach's Alpha and values above 0.7 were considered as acceptable. It was noted that the Cronbach's Alpha scores ranged from 0.72 to 0.91.

Data analysis

Data analysis was carried out using IBM SPSS Statistics version 22. The normality of the data was checked using the Kolmogorov-Smirnov test of normality. Categorical variable was tested for association by using the Pearson's chi-square and Fisher's exact tests, and they were presented as frequencies and percentages. Continuous variables were presented as means with their 95% Confidence Interval (95%CI). Logistic regression was used to determine the predictors of obesity. All the variables that were significantly associated with obesity from chi square analysis were used in this analysis. A univariate logistic regression was done to determine the crude odd ratio and all the variables that had p-value <0.25 were entered into multiple logistic regression analysis to determine the adjusted odds ratio.²⁶ Both reverse and forward stepwise probability proportion test were done and comparative outcome was obtained. Enter technique was at last done with the significant variables.

Ethical consideration

Informed consent was obtained from the parents and students. Only parents and students who gave consent to participate in the study were included in the study. Ethical approval was obtained from the Ministry of Education and District Education Office

RESULTS

Response Rate

Of the total of 7321 students in the 10 selected schools, 6248 students (2928 males and 3320 females) participated in this study giving an overall response rate of 86%. The response rates for individual schools ranged from 83% to 92%.

Sociodemographic characteristics of respondents

The overall mean age of the respondents was 14.73 (Standard Deviation, SD 1.47 years). The mean age for the males was

14.73 years (SD 1.46) as compared to 14.74 (SD 1.44) years for the female. Majority of the respondents were females (53.1%), Malays (55.9%). Most of the respondent's parent education level was up to secondary school (Table I). Majority (90.3%) of the respondents had never smoked, 79.5% of the respondents had low physical activity, 81.2% had high self-esteem, 75.8% were satisfied with their body parts, and 75.3% had normal eating behaviour. However, only 28.6% were satisfied with body size.

The results showed that the overall mean BMI for males was 21.23 (SD 5.22) and 21.46 (SD 4.95) for females. Table I shows prevalence of underweight, normal weight, overweight and obesity and demographic and other factors among the respondents.

Table II and Table III shows that overweight/obesity is significantly associated with gender, age, ethnicity, educational level of mother and father, physical activity, eating behaviour, smoking status and body size perception and body part satisfaction. However, overweight/obesity was not significantly associated with self-esteem.

The odds of overweight/obese was 1.54 times higher among males (OR 1.56; 95% CI: 1.37, 1.77) as compared to the females. Malays (OR 1.78; 95%CI: 1.33, 2.34) have the highest odds of being overweight/obese followed by Indians (OR 1.60; 95%CI: 1.16, 2.21) and Chinese (OR 1.16; 95%CI: 0.85, 1.58) as compared to others. Respondents with low level of physical activity had higher odds of being overweight/obese (OR 1.25; 95%CI: 1.07, 1.46) as compared to those with high levels physical activity. Those dissatisfied with their body parts and body size had 1.96 times (OR 1.96; 95%CI: 1.71, 2.25) and 4.24 times (OR 4.24; 95%CI: 3.59, 5.01) higher odds of being overweight/obese, respectively. Current smokers had higher odds of being overweight/obese as compared to non-smoker (OR 1.40; 95%CI: 1.08, 1.80). Similarly, those who are at risk of eating disorder have higher odds of being overweight/obese (OR 1.40; 95%CI: 1.22, 1.60).

The multivariable analysis results showed that the odds of being overweight/obesity were higher in males compared to females (OR 1.56, 95%CI: 1.37, 1.77). The results also showed that the odds of being overweight/obesity were highest among those in age group 12 and 13 years and among Malay ethnicity. The odds of overweight/obesity were higher in those who was dissatisfied with their body parts, (OR 1.96, 95%CI: 1.71, 2.25), dissatisfied with their body size (OR: 4.25, 95%CI: 3.60, 5.02), low physical activity (OR 1.23, 95%CI: 1.06, 1.44), current smokers (OR 1.38, 95%CI: 1.07, 1.78) and at risk of having eating disorder (OR: 1.39, 95%CI 1.22, 1.59).

DISCUSSION AND CONCLUSION

In a study carried out in 2005 among secondary school students in Klang district by Rampal et al.,²⁸ reported the prevalence of overweight and obesity was 11.4% and 8.2% respectively and in another study in Putrajaya in 2010 showed prevalence of overweight and obesity was 12.5% and 11.7% respectively.²⁹ The current study showed that the prevalence of overweight and obesity among the secondary school children was 16.0% and 11.5% respectively. It is

Table I: Prevalence of overweight and obese by gender, age, ethnicity, parents education level, physical activity, smoking status, eating behaviour, self-esteem, body part satisfaction and body size perception

Characteristic	n	Underweight n (%)	Normal n (%)	Overweight n (%)	Obese n (%)
Overall	6248	1373 (22.0)	3160 (50.6)	999 (16.0)	716 (11.5)
Gender					
Male	2928	677 (23.1)	1377 (47.0)	457 (15.6)	417 (14.2)
Female	3320	696 (21.0)	1783 (53.7)	542 (16.3)	299 (9.0)
Age					
12-	949	170 (17.9)	456 (48.1)	158 (16.6)	165 (17.4)
13-	1262	270 (21.4)	616 (48.8)	211 (16.7)	165 (13.1)
14-	1271	309 (24.3)	663 (52.2)	209 (16.4)	90 (7.1)
15-	1222	277 (22.6)	609 (49.8)	196 (16.0)	141 (11.5)
16-	1184	259 (21.9)	631 (53.3)	176 (14.9)	118 (10.0)
17-	359	88 (24.5)	185 (51.5)	49 (13.6)	37 (10.3)
Ethnicity					
Malay	3496	711 (20.3)	1754 (50.2)	577 (16.5)	453 (13.0)
Chinese	1537	315 (20.5)	836 (54.4)	238 (15.5)	147 (9.6)
Indian	891	284 (31.9)	372 (41.8)	136 (15.3)	99 (11.1)
Others	326	63 (19.3)	198 (60.7)	48 (14.7)	17 (5.2)
Fathers education level					
No formal education	206	43 (20.9)	110 (53.4)	32 (15.5)	21 (10.2)
Primary school	839	192 (22.9)	447 (53.3)	117 (13.9)	83 (9.9)
Secondary School	4068	908 (22.3)	2031 (49.9)	651 (16.0)	478 (11.8)
Higher Institution	1135	230 (20.3)	572 (50.4)	199 (17.5)	134 (11.8)
Mothers education level					
No formal education	229	49 (21.4)	121 (52.8)	40 (17.5)	19 (8.3)
Primary school	864	202 (23.4)	445 (51.5)	115 (13.3)	102 (11.8)
Secondary School	4127	943 (22.8)	2060 (49.9)	664 (16.1)	460 (11.1)
Higher Institution	1028	179 (17.4)	534 (51.9)	180 (17.5)	135 (13.1)
Physical activity					
Low	4967	1098 (22.1)	2477 (49.9)	804 (16.2)	588 (11.8)
High	1281	275 (21.5)	683 (53.3)	195 (15.2)	128 (10.0)
Smoking status					
Non smoker	5644	1233 (21.8)	2868 (50.8)	906 (16.1)	637 (11.3)
Ex- smoker	269	72 (26.8)	140 (52.0)	32 (11.9)	25 (9.3)
Current smoker	335	68 (20.3)	152 (45.4)	61 (18.2)	54 (16.1)
Eating behaviour					
Normal	4702	1046 (22.2)	2442 (51.9)	725 (15.4)	489 (10.4)
At risk	1546	327 (21.2)	718 (46.4)	274 (17.7)	227 (14.7)
Body part satisfaction					
Dissatisfied	1513	261 (17.3)	673 (44.5)	322 (21.3)	257 (17.0)
Satisfied	4735	1112 (23.5)	2487 (52.5)	677 (14.3)	459 (9.7)
Body size perception					
Dissatisfied	4460	950 (21.3)	1988 (44.6)	858 (19.2)	664 (14.9)
Satisfied	1788	423 (23.7)	1172 (65.5)	141 (7.9)	52 (2.9)
Self esteem					
Low	1174	269 (22.9)	597 (50.9)	180 (15.3)	128 (10.9)
High	5074	1104 (21.8)	2563 (50.5)	819 (16.1)	588 (11.6)

Table II: Association of overweight/obesity by socio-demographic factors (gender, age, ethnicity, education level of father, education level of mother)

Factors	Overweight/obese status		χ ²	df	P
	Yes n (%)	No n (%)			
Overall	1715 (27.4)	4533 (72.6)			
Gender					
Male	874 (29.8)	2054 (70.2)	16.0	1	<0.001*
Female	841(25.3)	2479 (74.7)			
Age					
12-	323(34.0)	626 (66.0)	40.3	5	<0.001*
13-	376(29.8)	886 (70.2)			
14-	299 (23.5)	972 (76.5)			
15-	337 (27.6)	886 (72.4)			
16-	294 (24.8)	890 (75.2)			
17-	86 (24.0)	273(76.0)			
Ethnicity					
Malay	1030(29.5)	2465 (70.5)	21.3	3	<0.001*
Chinese	385 (25.1)	1151 (74.9)			
Indian	235 (26.4)	656 (73.6)			
Others	65 (19.9)	261 (80.1)			
Educ. Level of father					
No formal education	53 (25.7)	153 (74.3)	8.0	3	0.045*
Primary	200 (23.8)	639 (76.2)			
Secondary	1129 (27.8)	2939 (72.2)			
Higher institution	333(29.3)	802 (70.7)			
Educ. Level of Mother					
No formal education	59 (25.8)	170 (74.2)	8.0	3	0.045*
Primary	217 (25.1)	647 (74.9)			
Secondary	1124 (27.2)	3003 (72.8)			
Higher institution	315 (30.6)	713 (69.4)			

χ² = Chi square, Level of significance (p) < 0.05, * = Significant association

Table III: Association between overweight/obesity by lifestyle factors (physical activity, smoking behavior, disordered eating)

Factors	Overweight/obese status		χ ²	df	p
	Yes n (%)	No n (%)			
Physical Activity					
Low	1392 (28.0)	3575(72.0)	4.0	1	0.044*
High	323 (25.2)	958 (74.8)			
Self Esteem					
Low	308(26.2)	866 (73.8)	1.1	1	<0.301
High	1407 (27.7)	3667 (72.3)			
Disordered eating					
Normal	1214(25.8)	3488 (74.2)	25.4	1	<0.001*
At risk of eating disorder	501 (32.4)	1045 (67.6)			
Body Size Perception					
Satisfied	193(10.8)	1595 (89.2)	348.9	1	<0.001*
Dissatisfied	1522 (34.1)	2938 (65.9)			
Body Part Satisfaction					
Satisfied	1136 (24.0)	3599 (76.0)	117.4	1	<0.001*
Dissatisfied	579 (38.3)	934(61.7)			
Smoking status					
Non-Smoker	1543 (27.3)	4101 (72.7)	13.3	2	<0.001*
Ex-Smoker	57 (21.2)	212 (78.8)			
Current smoker	115 (34.3)	220 (65.7)			

χ² = Chi square, Level of significance (p) < 0.05, * = Significant association

Table IV: Univariable logistic regression showing crude odd ratio (cOR)

Parameter	Crude OR	95% CI	P value
Gender			
Female	1.00	1.4-1.8	0.001*
Male	1.54		
Age			
17-	1.00		0.001*
12-	1.96	1.5-2.6	0.001*
13-	1.53	1.1-2.0	0.003*
14-	1.01	0.8-1.3	0.961
15-	1.24	0.9-1.7	0.138*
16-	1.04	0.8-1.4	0.801
Ethnicity			
Others	1.00		<0.001*
Malay	1.67	1.2-2.3	0.001*
Chinese	1.14	0.8-1.6	0.413
Indian	1.59	1.1-2.2	0.006*
Educ. Level of father			
No formal education	1.00		0.506
Primary	0.93	0.6-1.4	0.710
Secondary	1.05	0.7-1.6	0.796
Higher institution	0.96	0.6-1.5	0.842
Educ. Level of mother			
No formal education	1.00		0.889
Primary	0.91	0.6-1.4	0.649
Secondary	0.93	0.6-1.4	0.709
Higher institution	1.00	0.7-1.6	0.997
Body Part Satisfaction			
Satisfied	1.00	1.7-2.3	<0.001*
Dissatisfied	1.97		
Body Size Perception			
Satisfied	1.00	3.6-5.0	<0.001*
Dissatisfied	4.23		
Smoking status			
Non Smokers	1.00		<0.001*
Ex-smokers	0.61	0.4-0.8	0.002*
Current smokers	1.40	1.1-1.8	0.010*
Eating behaviour			
Normal	1.00		
At risk of eating disorder	1.40	1.2-1.6	<0.001*

Significance level $p < 0.25$, OR= Odd ratio. *= significant p value

further compounded by the fact that Klang and Putrajaya are urban areas while Batang Padang District is mainly semi-urban or rural. A systematic review Bibiloni et al., reported that the prevalence of overweight and obesity among adolescents worldwide was high, and obesity is higher among boys.²⁷ This study shows that only 79.5% had low physical activity level and physical activity was significantly associated with overweight/obese, those who had low level of physical activity were at higher risk of being overweight or obese. Ochoa et al., in 2007, reported similar findings that those who had low level of physical activity were at higher risk of being overweight or obese.³⁰ Khor et al., reported that body part dissatisfaction could lead to eating disorders like bulimia and binge eating which subsequently lead to obesity.³¹

Obesity has been reported as an important health problem for many years and yet not a single country has succeeded in reducing obesity rates in the past 33 years.³² If the current trends continue, the probability of meeting the global obesity target is virtually zero.³³ CVDs are the leading cause of death for past 50 years in Malaysia.³⁴ The prevalence of obesity and other risk factors continue to rise.¹⁰⁻¹⁵ The rapid and marked socioeconomic advancement has brought about significant changes in the lifestyles of communities in the past few decades. Supermarkets and fast-food industry have led to significant changes in the dietary patterns and changes in meal patterns. More families eat out and the adolescents rely too much on meals outside their homes. Fast food outlets have opened up even in small towns. There is an increase in the consumption of highly processed foods and sugar-sweetened beverages. Sedentary activities such as watching

Table V: Multivariable logistic regression final model showing adjusted odd ratio(aOR)

Parameter	Adjusted OR	95% CI	P value
Gender			
Female	1.00		
Male	1.545	1.4-1.8	0.001*
Age			
17-	1.00		0.001*
12-	1.971	1.5-2.6	0.001*
13-	1.543	1.2-2.1	0.003*
14-	1.015	0.8-1.4	0.917
15-	1.248	1.0-1.7	0.127
16-	1.040	0.8-1.4	0.790
Ethnicity			
Others	1.00		0.001*
Malay	1.697	1.3-2.3	0.001*
Chinese	1.149	0.8-1.6	0.383
Indian	1.588	1.1-2.2	0.005*
Physical Activity			
High	1.00		
Low	1.254	1.1-2.2	0.005*
Body Part Satisfaction			
Satisfied	1.00		
Dissatisfied	1.964	1.7-2.3	0.001*
Body Size Perception			
Satisfied	1.00		
Dissatisfied	4.233	3.6-5.0	0.001*
Smoking			
Non Smokers	1.00		0.001*
Ex-smokers	0.611	0.4-0.8	0.002*
Current smokers	1.404	1.1-1.8	0.009*
Eating behaviour			
Normal	1.00		
At risk of eating disorder	1.401	1.2-1.6	0.001*

Significance level $p < 0.05$, OR= Odd ratio.

television, use of other screen based media, video game playing, use of mobile phones and applications have increased.

The current prevention program has not shown significant results in reducing the NCDs risk factors. There is an urgent need for a paradigm shift in the overall program. It is not an individual or a community problem but a National problem. It cannot be solved merely by the governmental action nor by individuals on their own, but as a task for all of us. The Ministry of Health and the Government cannot solve it alone. It requires a whole government approach. The association between reduced physical activity and obesity has been well established, however, there is a current view that physical exercise acts as a co-factor in fighting obesity in childhood.³⁵ WHO. has recommended that children and young people aged 5-17 years old should accumulate at least 60 minutes of moderate to vigorous-intensity physical activity daily. Vigorous-intensity activities should be incorporated, including those that strengthen muscle and bone, at least three times per week.³⁶

CONCLUSION

The overall prevalence of overweight and obesity in this study is high. The factors associated with overweight/obesity are age, gender, ethnicity, physical activity, disordered eating, smoking status, body size perception and body part satisfaction. There is an urgent need for a paradigm shift in the overall NCDs program at all level starting from home, schools, colleges, universities, work place and in the community. It requires a political will and the relevant Ministries should ensure that the food industry play a significant role in promoting healthy diets by: ensuring adequate supply of vegetables and fruits are available and affordable to all consumers at a reasonable price; reducing the fat, sugar and salt content of processed foods. Restricting marketing of foods high in sugars, salt and fats, especially those foods aimed at children and teenagers. Mass media such as newspapers and television advertising is responsible for a large share of the marketing of unhealthy foods and these advertisements influence children's food preferences, purchase requests and consumption patterns. Every citizen of Malaysia must recognise or made to realize their moral responsibility to our generation and future generations.

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