

ORIGINAL ARTICLE

Associations of Sociodemographic Factors and Body Image With Body Weight Status Among Yemeni Adolescents in Selangor and Putrajaya, Malaysia

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ABSTRACT

Introduction: Despite the high prevalence of malnutrition in Yemen, little is known on malnourished Yemeni adolescents in Malaysia. This study aimed to assess the body weight status among Yemeni adolescents in Malaysia and its association with sociodemographic factors and body image. **Methods:** A cross-sectional study involving 364 Yemeni adolescents aged between 12 to 18 years were recruited from four schools in Selangor and Putrajaya, Malaysia. Sociodemographic factors and body image data were collected through face to face interview. Height and body weight were measured and body mass index (BMI) was calculated. **Results:** The prevalence of overweight and obesity was 23.6%, with 5.2% of thinness. Multivariable logistic regression revealed that a family income greater than RM5,001 ($OR = 3.77$, $p = 0.004$), body shape dissatisfaction ($OR = 3.54$, $p = 0.001$) and perception of overweight/obesity ($OR = 5.75$, $p = 0.001$) were associated with an increased risk of being overweight and obese. Whereas a positive perception of underweight ($OR = 0.23$, $p = 0.009$) was found to be a significant protective factor against overweight and obesity. **Conclusion:** Overweight and obesity are prevalent among Yemeni adolescents in Malaysia. These findings highlight the need for regular weight status assessments amongst adolescents. Additionally, an obesity intervention program that incorporates body image perception may improve the children's body weight status.

Keywords: Body weight status, Body image, Adolescents, Yemeni

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INTRODUCTION

The epidemic of childhood obesity has spread dramatically in recent decades and is recognised as a major global public health concern (1-4). Childhood obesity is an importance issue as it is a predictor of adulthood obesity and also increases the risk of adult morbidity and mortality (5). Countries in the Middle East and North Africa (MENA) region, especially in the Gulf area reported high prevalence of overweight and obesity among those less than 20 years old with 25.6% and 34.8% among males and 20.8% and 20.5% among females (6). In contrast, children and adolescents in Yemen are generally prone to double burden of malnutrition; prevalence of wasted was 10.1%, normal-weight 69.2%, overweight 12.7%, and obese 8.0% (7). Yemen had one of the highest rates of malnutrition even before the war started in the Arabian Peninsula (8). Malnutrition in children and adolescents is particularly

serious, and its effects intensified, putting these vulnerable group at greater risk of death than adults (9).

The political conflict and civil war in Yemen has forced many Yemenis family to migrate temporarily to Malaysia. This has led to the opening of several Yemeni' schools in Selangor and Putrajaya, Malaysia. Owing to the fact that reasonable amounts of children's time are spent in school where they learn and develop skills, the school setting has been identified as one of the appropriate and logical venues for the effective combatting and prevention of obesity in adolescents (10-12).

It is predictable that a poor body image perception (misperception of body weight status and body shape dissatisfaction) and weight concerns are very common in a society where most adults, adolescents and children are making an effort to lose weight (13, 14). Body image perception constitutes a multidimensional phenomenon involving cultural, social, biological and psychological factors (15). During the adolescent stage of human development, particularly between the age of 12 and 18 years, alongside socialisation and culturalisation, the body undergoes physiological changes. Hence, this

period is critical for body image development (16).

There has been limited studies in Yemen on the overweight and obesity among adolescents (7, 17). Furthermore, only a few similar studies exist, an outcome of the civil unrest and political crises that are ongoing in the country (18). Notwithstanding, studies have shown that misperceptions of body weight status and body shape dissatisfaction are associated with overweight and obesity among Arab adolescents (19).

Yemeni adolescents in Malaysia have going through changes in living status and environment compared to their peers in Yemen, yet very few studies have investigated on the contributing factors of their body weight status. To the best of our knowledge, no studies have analysed misperceptions of body weight status and the associations with body shape dissatisfaction among Yemeni adolescents in Malaysia. The purpose of this study was therefore to assess the body weight status among Yemeni adolescents in Malaysia and its association with sociodemographic factors and body image.

MATERIALS AND METHODS

Study design and respondents

This cross-sectional study was conducted among Yemeni adolescents who were studying in Yemeni government schools in Selangor and Putrajaya, Malaysia. A total of 364 Yemeni adolescents were recruited from four Yemeni schools. The sample size was estimated according to the proportion of obesity and overweight, based on the globally estimated prevalence in children of under 20 years, for the period 1980 to 2013 (20). Two proportion formula by Lemeshow (21) was used to calculate the sample size. After taken into account 10% of missing data, the total number of sample size needed was 374 respondents. Students from each school were proportionally selected by using random number generator until the desired sample size of students were reached.

Screening for inclusion were Yemeni citizens registered in 2016/2017. Those who were disabled, with physical and/or mental illnesses as per their health records were excluded. Respondents information sheet and consent form were sought from their parents before the data collection day. Ethical clearance was obtained from the Ethics Committee for Research Involving Human Subjects at Universiti Putra Malaysia (approval no. UPM/TNCPI/RMC/1.4.18.1 [JKEUPM]/E2).

Research instruments

A face to face interview was conducted using a standard Arabic-English questionnaire consisted of two sections; socio-demographic factors and body image. The sociodemographic factors included information on respondents' age, gender, family size and income, and

parents' education and occupations. Anthropometric measures include assessment of body weight and height of the respondents.

Anthropometric measurements

Body weight was measured using Omron HBF 375 to the nearest 0.1 kg when wearing light clothing, while the SECA body meter 206 was employed to measure their heights to the nearest 0.1 cm. Body mass index (BMI)-for-age (z-score) were analysed using WHO AnthroPlus version 1.0.4 software (22), and the WHO Growth Reference was used to categorise their body weight status using the reference data for children and adolescents aged 5–19 years (23).

Body image

The items in the questionnaire pertaining to body image included assessment on perception of body image (24) and perception of body weight status (25). Perception of body image required the respondents to select the figure that most closely resembled their actual body figure, the healthiest body figure and the ideal body figure. The body shape discrepancy score was calculated by subtracting the numeric values of the 'ideal' and 'actual' figures. The resultant score thus represented the extent of their body shape dissatisfaction. A positive score indicated a preference for a bigger body size, while a negative body shape discrepancy score indicated a preference for a thinner body size.

Items on perception of body weight status were derived and modified from the Food and Agriculture Organization of United Nation (FAO) (26). The respondents were asked to select the options that best described their perceptions about their body weight status: 'very thin' (1), 'thin' (2), 'normal' (3), 'overweight' (4) and 'obese' (5). A comparison was then performed between their perceived body weight status and their actual body weight status, then these respondents were tagged as over-estimators (bigger perception versus actual body weight status), under-estimators (smaller perception versus actual body weight status), and correct estimators (equal perception when compared with their actual body weight status).

Data collection procedures

The principals from four Yemeni government schools in Selangor and Putrajaya were approached and approvals were sought. The list of students were obtained from the respective schools and eligible students were selected through random number generator. Respondents were interviewed by the researcher in the class prepared for interview. All anthropometric measurements (height and weight) were assessed by the researcher. Data collection was conducted from September 2017 to December 2017.

Statistical analyses

Data were analyzed using IBM SPSS version 22. The data

were summarised using frequency, standard deviation, means, percentages. The simple logistic regression was used to determine an association between two variables. Multivariate logistic regression models was employed to determine the adjusted odds ratios (OR). Only the variables with p value of less than 0.25 in the simple logistic regression models were retained. Backward elimination of the variables was then conducted in the multivariate logistic regression models, a two-sided test with a level of significance of 0.05 was set.

RESULTS

Socio-demographic characteristics of the respondents

A total of 372 adolescents were identified, 364 participated in the study, 4 students were absent from school on the days of data collection and 4 students refused to participate in the study. More than two-third of the respondents 224 (61.5%) were male and 140 (38.5%) female with a mean age of 14.33 ± 1.8 years. Table I shows the sociodemographic characteristics of the respondents. Fathers had better education level than the mothers of the respondents. Nearly three-quarters (73.6%) of the mothers were employed as housekeepers, while one-third were students or employees. Most fathers (80.2%) were had bachelor's degrees and above while 49.2% were working in Kuala Lumpur. The average family size was 6.11 ± 2.06 siblings, with a minimum number of 3 siblings and a maximum of 13. Almost all of them lived with their families and on the average had been in Malaysia around 38 months. The respondents daily spend was between RM1 and RM45 (RM $9.85 \pm RM 8.73$) and family income varied between RM1,000 and RM15,000 (RM $5391 \pm RM 3070$).

Anthropometry

The respondent's mean weight, height and BMI-for-age were 51.52 ± 15.32 kg, 157.37 ± 0.10 cm and 20.56 ± 4.37 kg/m², respectively. The current study revealed that almost three-quarters (71.2%) of the respondents were of normal weight, 8.8% were obese and 14.8% were overweight, while 0.8% were severely thin and 4.4% were thin.

Perception of Body image

Table II presents the respondent's body image perceptions. The study revealed that, overall, the majority of the respondents (67%) were dissatisfied with their body size, with 28% wishing for a bigger body size and 39% wishing for a smaller body size.

Perception of Body Weight Status

Table II shows the perceptions of the respondents regarding their actual body weight status. The study findings revealed that 28.3% of the students underestimated their body weight status, and 16.8% overestimated their body associate of sociodemographic factors and body weight status.

Table I: Socio-demographic characteristics of the respondents (n=364)

Demographic variables	Male (n=224)	Female (n=140)	Total n (%)
Education level			
Secondary school	83(37.1)	57(40.7)	140 (38.5)
Middle school	141(62.9)	83(59.3)	224 (61.5)
Age groups (years) Mean \pmSD			
12 - 13	78(34.8)	56(40.0)	134 (36.8)
14 -15	65(29.0)	38(27.1)	103 (28.3)
16 -17	59(26.3)	41 (29.3)	100 (27.5)
18 years	22(9.8)	5(3.6)	27 (7.4)
Mothers' education			
Illiterate	35(15.6)	10(7.1)	45 (12.4)
Secondary or less	74(33.0)	54(38.6)	128 (35.2)
High diploma	18(8.0)	18(12.9)	36 (9.9)
Bachelor degree or above	97(43.3)	58(41.4)	155 (42.6)
Fathers' education			
Illiterate	3(1.3)	1(0.7)	4 (1.1)
Secondary or less	27(12.1)	19(13.6)	46 (12.6)
High diploma	15(6.7)	7(5.0)	22 (6.0)
Bachelor degree or above	179(79.9)	113(80.7)	292 (80.2)
Mothers' occupation			
House wife	173(77.2)	95(67.9)	268 (73.6)
Student	12(4.5)	14(10.0)	26 (7.1)
Self-employee	1(0.4)	3(2.1)	4 (1.1)
Employee	38(17.0)	28(20.0)	66 (18.1)
Fathers' occupation			
Student	41(18.3)	21(15.0)	62 (17.0)
Self-employee	112(50.0)	67(7.9)	179 (49.2)
Employee	71(31.7)	52(37.1)	123 (33.8)
Family size			
3-6	151(67.4)	95(67.9)	246 (67.6)
7-9	55(24.6)	40(28.6)	95 (26.1)
>9	18(8.0)	5(3.6)	23 (6.3)
Duration of stay in Malaysia (months) Mean \pmSD			
1-12 month	50(22.3)	28(20.0)	78 (21.4)
13-24 month	80(35.7)	54(38.6)	134 (36.8)
25-36 month	24(10.7)	13(9.3)	37 (10.2)
>36 month	70(31.3)	45(32.1)	115 (31.6)
Pocket money per day (RM) Mean \pmSD			
1-5	93(41.5)	69(49.3)	162 (44.5)
6-11	80(35.7)	46(32.9)	126 (34.6)
12-16	16(7.1)	6(4.3)	22 (6.0)
>16	35(15.6)	19(13.6)	54 (14.8)
Family income (RM) Mean \pmSD			
\leq 2500	40(17.9)	29(20.7)	69(19.0)
2501 – 5000	90(40.2)	57(40.7)	147 (40.4)
\geq 5001	94(42.0)	54(38.6)	148(40.7)

SD: Standard deviation

Associations of Sociodemographic Factors and Body Image with Body Weight Status

Table III presents the adjusted OR of overweight/obesity and the 95% confidence interval (95% CI) for all the risk factors, namely, family income, body size dissatisfaction and perception of body weight status. Among the

Table II: Characteristics of the respondents according to perception of body size (N=364)

	Male (n=224)	Female (n=140)	Total n (%)
Body size discrepancy score			
Bigger Size (Positive >0)	76(33.9)	26(18.6)	102(28.0)
Smaller Size (Negative <0)	81(36.2)	61(43.6)	142(39.0)
Normal (Discrepancy score=0)	67(29.9)	53(37.9)	120(33.0)
Perception of body weight status			
Under-estimator	71(31.3)	33(56.4)	104(28.3)
Correct- estimator	120(54.0)	79(23.6)	199(54.9)
Over-estimator	33(14.7)	28(20.0)	61(16.8)

SD: Standard deviation

Table III: Multivariable logistic regression

Variables	^a B	Crude ^b OR	Adjust- ^c ed OR	95% ^d CI	^e P-value
Family income (RM)					
≤ 2500	1.00				
2501-5000	.881	2.207	2.414	(0.96-6.06)	0.061
>5001	1.327	3.331	3.77	(1.52-9.36)	0.004
Body shape dissatisfaction					
Satisfied	1.00				
Dissatisfied	1.265	3.462	3.543	(1.65-7.61)	0.001
Perception of body weight status					
Underweight	-1.456	-0.288	0.233	(0.08-0.69)	0.009
Normal weight	1.00				
Overweight and obesity	1.749	6.484	5.748	(3.19-10.36)	0.0001

^aB -Coefficient for adjusted OR, Crude^bOR – Crude Odds ratio, Adjusted^cOR -Adjusted Odds ratio, 95%^dCI - Confidence interval, ^eP -value- Significant at p<0.05

participants who had a higher family income in excess of RM5,001, the odds of being overweight/obese were 3.77 times higher than among those with a lower monthly family income of less than RM2,500 (95% CI: 1.52-9.36). Among the respondents who expressed dissatisfaction with their weight, the odds of being overweight/obese were 3.54 times higher than among those who expressed satisfaction with their weight (95% CI: 1.65-7.61). In addition, for the participants who perceived themselves as being overweight/obese, the odds of being overweight/obese were 5.75 times higher than for those who perceived themselves as being of normal weight (95% CI: 3.19-10.36). Furthermore, for the participants who rated themselves as being underweight, the odds of being overweight/obese were 0.23 times lower than for those who perceived themselves as being of normal weight (95% CI: 0.08-0.69).

DISCUSSION

The body weight status of Yemeni children living in Selangor and Putrajaya was unsatisfactory. The prevalence of overweight and obesity (23.8%) was about five times higher than the prevalence of thinness and severe thinness (5.2%). This finding compares well to

the findings of the Global School-based Student Health Survey, which was conducted among school students in Yemen aged 13–17 years (27) which reported that the overweight/obesity was 13.7%. Therefore, there was a higher prevalence of overweight/obese observed among the adolescents living in Putrajaya and Selangor, Malaysia. This could be explained by the fact that the respondents in the former having more access to better and much energized food, good transportation network that reduces frequent body movement, as well as sedentary life style. Furthermore, children living in the welfare homes have always been given the opportunity to eat out, especially on weekends, and they usually go to western fast food outlets. Furthermore, in the current study, a low prevalence underweight was observed among the adolescents, while the Global Schools-based Health Survey of Yemen revealed that 15.0% of the survey participants were underweight (27).

Contrary to the current findings, previous studies of adolescents in countries like India, Yemen, Bangladesh and Cambodia reported a higher prevalence of underweight than overweight (17, 28-30). However, the current results are in line with study conducted among adolescents in country like Malaysia where a higher prevalence of overweight and obesity (15% and 12%, respectively) than the prevalence of underweight (8.4%), has been reported (31). This difference could have occurred due to variances in the study periods as well as a majority of the respondents were from high income households (32, 33). It could also be due to changes in the economic situations of the respondents which come from Yemen; a conflict and in crisis country and they moved to more stable country such as Malaysia. As compare to Yemen, accessibility to food in Malaysia is more stable and advancement in technology could make their life become more sedentary. These could contribute to higher prevalence of overweight and obesity among Yemeni children in Malaysia compared to children in Yemen.

In previous years in Yemen, the parents of these students would likely have had low income levels and lived in poor economic conditions within underdeveloped regions (34) compared to their stay in Malaysia. Thus, the presence of the students and their families in Malaysia could explain the low prevalence of underweight in this study population compared to the prevalence reported in earlier studies (35).

The multivariable logistic regression analysis showed that family income, body image perception and body weight perception were risk factors for overweight/obesity. The respondents with a family income exceeding RM5,000 were 3.77 times more likely to become overweight/obese compared to those with a family income of less than RM2,500 (95% CI: 1.52–9.36). Family income was thus found to be related to excess weight. This result is consistent with other study findings in which obesity

has been associated with higher family incomes. Manal Ibrahim et al. (2010) reported that a higher family income status in Amman, Jordan, placed adolescents at a higher risk for overweight/obesity (36). A possible explanation for this relationship may in part be a combination of the increased food quantities in higher income families (37). The current study's findings also revealed that adolescents with a higher BMI were at a higher risk of developing body image dissatisfaction compared to the adolescents with underweight or normal weight (OR = 3.54, 95% CI: 1.65–7.61). This result, which is in line with the research findings of Latiff et al. (2018), found that those who were overweight/obese were four times more likely to develop dissatisfaction with their body image (38).

There were several limitations in the current study. This cross-sectional study does not yield the evidence on the infer causality of socio-demographic and psychological factors on BMI-for-age. In addition, the study involves only the children and not the parents, hence, answers were highly dependent on the honesty and certainty of the respondents and the accuracy of this information was depended on the ability of respondents to report and recall information. However, the present study adds important information to the literature regarding the association of socio-demographic and body image factors with body weight status among children living in urban environment.

CONCLUSION

The current study found a higher prevalence of overweight/obesity. These findings highlight the need for regular weight status assessments amongst adolescents. Additionally, an obesity intervention program that incorporates body image perception may improve the children's body weight status in future. Efforts designed to combat obesity among children and adolescents must include regular weight measurement program, education, research and intervention, through the involvement of policy makers, health care providers, educators and parents.

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