

FACTORS RELATED TO OVERWEIGHT MIDDLE SCHOOL CHILDREN IN DAGON TOWNSHIP, YANGON DIVISION, UNION OF MYANMAR

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ABSTRACT: A descriptive cross-sectional study was carried out in Dagon Township, Yangon, to find out the prevalence and factors related to overweight middle school children. 487 middle school children aged 10 to 14 years participated in the study during February, 2011. After gaining consent from guardians and participants, height and weight measurement took place at school. Children were given a self-administered questionnaire to report their dietary habits, lifestyle behaviors and environmental settings. Overweight status was determined by comparing body mass index (BMI) to World Health Organization growth reference 2007 for 5-19 years of age. Prevalence of overweight in children including obesity was 20.1% in total; boys had prevalence of 30.8% and girls' 9.2%. Chi-square analysis was done to find the association between dependent and independent variables and statistically associated variables were incorporated into multiple logistic regression. Significant predictors were male gender (OR=3.73, 95% CI= 2.08-6.67), the habit of eating while watching television (OR=4.66, 95% CI=2.63-8.26), the choice of electronic games as leisure activity (OR=1.75, 95% CI=1.01, 3.04), duration of physical activity more than 30 minutes daily and taking private car to school (OR=0.53, 95% CI=0.31-0.89). Thus, middle school children should be encouraged to engage in more active forms of leisure activities for more than 30 minutes of duration every day.

Keywords: Childhood overweight, Middle school children, Myanmar

INTRODUCTION

Childhood overweight and obesity is one of the health threats of the 21st century. According to the WHO, childhood obesity is escalating all around the world especially in middle and low income countries. In 2010, 42 million children under five years were obese with more than 80% from developing nations [1].

In addition to such rapidly increasing incidence, childhood overweight and obesity has most serious health consequences. In fact, even for five-year-olds, it is associated with type 2 diabetes mellitus, fatty liver, asthma and orthopedic problems [2, 3]. Moreover, overweight children have been the target of teasing and bullying. Stigmatization and discrimination start from very young ages and being overweight has been viewed in many negative ways by society [4, 5].

Overweight adolescents are particularly vulnerable to health-risk behaviors and maladaptive coping methods. Overweight youth are more likely to experience impaired peer relationships and weight bias. Research has shown positive associations between BMI and smoking initiation, binge drinking, substance abuse, aggression and bullying [6, 7]. To consider the increasing global prevalence and its consequences, pediatric obesity should be given priority and it is crucial to react and prevent immediately.

While studies cannot precisely state the etiology of being overweight in children, it is postulated to be a condition arising from the interaction of hereditary factors, environment and individual lifestyle. Recent studies found out that the dietary patterns and low physical activities are related with childhood obesity. Sedentary lifestyle, especially watching television was proved to be a significant predictor of overweight status in children [8].

In Asia, the prevalence of overweight children rises concomitantly with the socio-economic level of nations. China once known as the lean country now has 20% of overweight urban school children [9]. Secular trends in India also showed that the prevalence of overweight had increased from 9.8% in 2006 to 11.7% in 2009 [10]. Since the change of political system in 1986, Myanmar has been enjoying socio-economic development. It is estimated to have increasing overweight and obesity population yet this was documented in limited literature on the burden and causes of overweight in adolescents. Thus, our study aims to find out the prevalence and factors related to overweight in middle school children.

MATERIALS AND METHODS

Purposive sampling was done to select Basic Education High School No. 1 Dagon as the representative of urban schools in Yangon since it was located in the downtown area, had a student body of more than 2,500 and a nearly equal enrollment of boys and girls. The sample size was

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calculated by setting p at 0.5 to obtain a maximum sample size. Generally, middle school children refers to the early adolescent of age 10 to 14 years old who are in grade 6 to grade 9. List of school children in each class were obtained from the school after permission from the school committee and proportional sampling was used to determine the number of participants from each class.

Ethical Statement: This study was reviewed and approved by Mahidol University, Institutional Review Board for compliance with International Guidelines of Human Research Protection (COA.No.2011/040.1502). After gaining permission to conduct the study from the principal and the school committee, informed written consent were obtained from parents or guardians and children.

Measurements: Overweight status of children was determined by BMI according to WHO growth reference 2007 for 5-19 years of age since specific cut-off points for Myanmar nationals were in the progress of development. The WHO reference was selected over CDC 2000 and IOTF cut-off points for its increased sensitivity to detect overweight status. Height and weight of school children were measured by trained investigators. Self-administered questionnaires were delivered to participating school children to assess the dietary patterns, lifestyles and environment. Environmental analysis was based on the analysis grids for environments linked to obesity (ANGELO) framework.

Statistical Analysis: Data analysis was done using WHO AnthroPlus and Minitab software. Categorical variables were analyzed with chi-square test for association to the status of overweight. Multiple logistic regression was done to assess the significant predictors of overweight. All statistical tests for variable analysis were considered significant at p -value of 0.05.

RESULTS

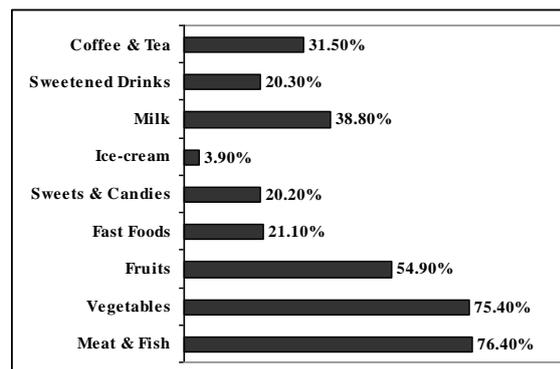
The study population consisted of 487 middle school children from Basic Education High School No. 1 Dagon in Dagon Township, Yangon Division, Union of Myanmar. Gender distribution was nearly equal at boys 51% and girls 49%. The majority of middle school children were Myanmar Buddhists. Middle school children were mainly taken care of by their parents. Nearly all care providers were highly educated i.e. college and university level. Family history of overweight was present in a fifth of them. Overweight family member tended to parents.

Table 1 shows the prevalence of overweight middle school children by age and sex. School children were categorized as overweight by having BMI z -scores more than +1 standard deviation and others were termed normal weight. Boys were three times more overweight than girls and there was a decline in overweight prevalence with increasing age.

Table 1 Prevalence of overweight in middle school children

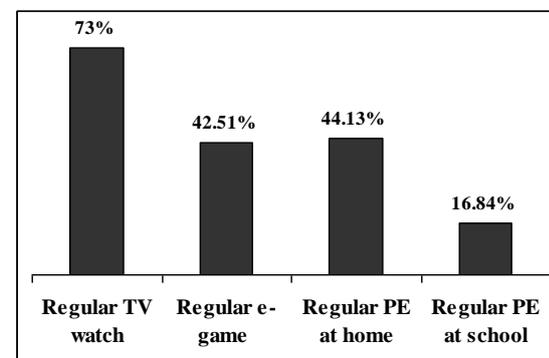
Prevalence	Normal weight		Overweight	
	Number	Percent	Number	Percent
Total	389	79.90	98	20.10
By Gender				
- Boys	171	69.23	76	30.77
- Girls	218	90.83	22	9.17
By Age				
- 12 years	115	78.23	32	21.77
- 13 years	212	79.70	54	20.30
- 14 years	62	83.78	12	16.22

Figure 1 Dietary pattern of middle school children



28.3% were found to snack more than 2 times regularly whereas over 50% took more than two main meals per day. It was found that almost all middle school children ate during television and this was associated with being overweight in univariate analysis. Dietary habits according to type of food are shown in Figure 1. Regular consumption referred to consumption of a food type more than 4 times per week. Meat and vegetables were regularly consumed by three quarters of the children. It was also shown that fast food consumption was found in 20.1% of respondents. However, except for eating while watching television, dietary patterns were not found to be statistically associated.

Figure 2 Regular activity and sedentary behavior



Lifestyle

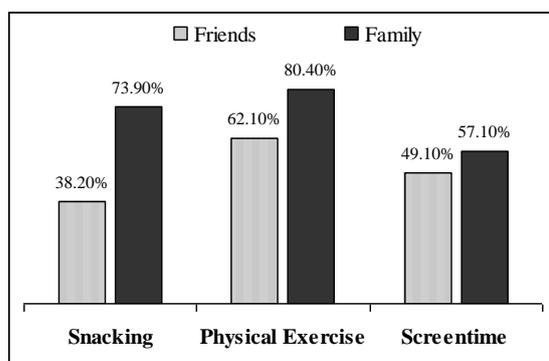
Watching television and playing electronic games were most popular leisure activities among the children. Moreover, more than 80% of their

transportation to school was inactive; by private car and school bus. From Figure 2, it can be seen that engagement in physical exercise was lower than sedentary activities like watching TV and playing electronic games. Regular engagement referred to the participation in one active form of leisure activity more than 4 days per week.

Environment

By using the ANGELO framework, environments were dissected into physical, socio-cultural, political and economic environments. In physical environment, the accessibility of playgrounds and electronic game shops in both home and school environments were assessed. 47.6% of the children had playground access at home. However, electronic game shops were easily accessible in both settings with more than 80% at home environment and 90% at school environment.

Figure 3 Effect of socio-cultural environment on obesogenic behaviors



Socio-cultural environment was assessed according to whether the friends or the family members of the children were models for their lifestyles concerning risk for being overweight. It was found out that family members were more influential than friends in snacking behavior, sedentary lifestyle and physical activity as shown in Figure 3.

Political environment was assessed according to whether there was the practice of using food as a reward, rules and regulations on food, screen time and physical exercise. 60% of the children experienced food as reward and food rules was present in only a quarter of households of. Screen time limit and PE requirements were said to be present for more than two thirds of the children yet these higher proportions were contradictory with the lifestyle patterns. Economic environment was found to have no relation with to status of being overweight.

A multiple logistic regression model was constructed from the statistically associated variables from univariate analysis. Significant predictors of overweight are displayed in Table 2.

Table 2 Significant predictors of overweight

Variables	Adjusted OR	95% CI
Gender		
Boys	3.73	2.08-6.67**
Girls	1	
Eating during TV watch		
Yes	4.66	2.63-8.26**
No	1	
Choice of leisure activity		
Electronic games	1.75	1.01-3.04*
Others	1	
Duration of physical activity at home		
< 30 min	0.53	0.31-0.89**
> 30 min	1	
Transport to School		
Private car	2.71	1.61-4.57**
Others	1	

p-value <0.05, **p-value < 0.01

DISCUSSION

This study found out that the prevalence of overweight middle school children was 20.1%; 30.77% in boys and 9.23% in girls. Overall prevalence compared to some Middle Eastern nations was high. K.O. Hajian-Tilaki et al, found out the prevalence of overweight was 18.1% in primary school children in Iran [11]. 16.5% of Palestinian adolescents were overweight according to the Palestinian Health Behavior in School-aged Children Survey in 2004 [12]. However, it is lower than affluent countries in Asia such as India with the prevalence of overweight adolescent 25.2% in 2009 [9], Jordan with prevalence of 25% in 2006 and United Arab Emirates with 26.9% in 2005 [13, 14].

Male gender was statistically significant to being overweight in this study. However, results by Vito et al found no association between gender and body weight while Giugliano et al. found out female gender had statistical relation to being overweight [15, 16]. This may be explained by the popularity of electronic games in boys as well as their ignorance on body image. In this study, due to the narrow age range of the study group, no statistical association was found between age and prevalence of overweight.

Though overweight and obesity can also be attributed to genetic disorders and early life events, this study found no relation of overweight status and family history of overweight.

Owing to the dietary patterns, the habit of eating while watching television was a significant predictor of overweight status. Although many previous studies have shown positive association between high calorie intake and overweight, this study failed to confirm the association. Since this

was a cross-sectional study, it was difficult to determine total calorie intake due to under reporting. Another explanation could be the cultural similarity and uniformity in the dietary intake in urban areas of Yangon.

A significant negative association between overweight and physical activity at home was noted but not for physical activity at school. Since school day duration was only 5 hours, it would be impossible for the children to participate in activities at school. Duration of physical activity at home was a significant predictor of overweight and similar results can be found in studies from other countries [17, 18]. Sedentary behaviors such as taking private car to school, watching television and playing electronic games were associated with being overweight. Similar findings were also reported in studies by Lowry et al., Kerkadi et al., and Khader et al. [8, 12, 13].

With regard to physical environment, the accessibility of neither playgrounds nor electronic game shops was found to be associated with being overweight. However, the presence of three or more electrical appliances at home was significantly associated (p-value of 0.007). Being early adolescents in urban settings, most of the middle school children had to spend their time at home due to the busy schedules of their parents. Thus, the in-house environment favoring sedentary life was found related to the overweight children.

Although the relationship between social environment and being overweight was not significant, our study found out that family members were more influential than friends in obesogenic behavior modeling. This is consistent with the finding that treatment of childhood obesity including parents was superior to conventional methods according to a study by Golan et al. [19].

Political environment was also not found to be related to overweight status in middle school children. It was similar with the study by Patterson et al. but the recent study by Martha et al. found that policies of using food as reward and allowing frequent snacks were associated with high BMI in middle school children [20, 21]. Economic environment was not a predictor of overweight status in this study but it has been statistically associated with overweight children in a number of studies in Jordan and the United States [13, 22]

The results from this study cannot be generalized for the whole Yangon Division since it was limited to the urban setting only. This study did not consider the amount of food intake or type of physical activity for precise scaling of total calorie intake and physical activity.

CONCLUSION

Although, the prevalence of overweight of middle school children was lower than affluent nations,

20.1% prevalence suggests that Myanmar may be undergoing a nutritional and epidemiological transition process toward increasing childhood overweight. Therefore, policy makers as well as communities should prepare multiple strategic interventions to prevent the related factors to overweight in middle school children.

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