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Dietary Pattern and 24-Hours Movement Activities of Urban Preschool Children in Dhaka, Bangladesh-A Pilot Study

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Abstract **Original Research Article**

In emerging nations, the prevalence of childhood obesity and overweight has considerably grown. A cross sectional study was conducted to find out the prevalence of obesity and dietary pattern and 24 hours' movement activities amid two selected schools (English and Bangla Medium) of Dhaka, Bangladesh. 103 participants aged 4 to 11 years were chosen from those schools to collect data. BMI of the children was calculated, and weight status was categorized according to Centers for Disease Control and Prevention (CDC) criteria. Food frequency and 24 hours' movement activity data was collected through a self-administered well-structured questionnaire. The prevalence of overweight and obesity was found 20.4% and 20.4 % respectively and 5.8% underweight. 70% children spent more than 2 hours' screen time and 71.8% did not meet WHO sleeping guideline. In this study, it was found that 25.2% children consumed fried food and 20.4% fast food like pizza, burger 2-4 days a week. The frequency of overweight and obesity was found quite high in this study. High levels of sedentary activities, less sleep, higher energy intake from carbohydrate and processed food habit are major underlying elements for increasing prevalence of childhood overweight and obesity among the school children in Dhaka, Bangladesh.

Keywords: Obesity, Dietary pattern, 24-hours movement, overweight, BMI, fast food.

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INTRODUCTION

World Health Organization (WHO) considers childhood obesity as one of the most serious public health challenges in the 21st century [1]. In high-income countries, the prevalence of overweight and obesity (OWOB) is still high among children but the rising trend has plateaued recently whereas the increasing trend of OWOB has accelerated in many developing countries and likely to increase in future [2]. Rapidly changing lifestyle factors (food habit and sedentary behaviors) have led to increasing prevalence of childhood obesity [3, 4]. Many developing countries with a long history of under nutrition are now confronting with the issue of childhood overweight/obesity as a major public health concern. Unfortunately, these habits are growing exponentially in developing countries like Bangladesh. A low level of physical activity is definitely promoted by an automated and automobile-oriented environment that is conducive to sedentary lifestyle. Lack of facilities like safe walkways, bicycle paths, adequate playgrounds and parks for children and adolescents that can help preventing obesity should be considered on priority basis in dealing the management of childhood obesity [5, 7].

OBJECTIVES

- To monitor the dietary pattern in children of urban context.
- To monitor 24-hour movement activity as recommended by WHO.
- To investigate socio-economic factors in relation to dietary pattern and 24-hours movement activities.
- To investigate the associations between childhood obesity and dietary pattern and 24-hour activity.

MATERIALS AND METHODS

Study design and setting: The cross-sectional study was conducted in two preschools Dhaka. One was English medium and another was Bangla medium school. Written approval was obtained before collecting data from participating school.

Participants of the study: The target population was the children aged 4 to 11 years attending kindergarten. Convenient sampling technique was applied. Data were collected from the students and their mothers in each selected school. Written informed consent was obtained before collecting data from participating mothers.

Procedures: Data were collected in two steps. In the first step children's anthropometric measurements (height and weight) were taken. In second step, mothers of the children filled up the self-administered questionnaire as provided by class teachers. Then the survey questionnaires were collected and analyzed later.

Variables: The Survey questions asked for 24 hours' movement activity, how many time kids spend for sleeping, screen (mobile, television) and physical activity. Food Frequency questionnaire which provide crude estimates of usual consumption based on participant's self-report of their consumption frequency of pre-listed foods and beverages, which was included. According to ISCOLE (International Study on Childhood Obesity, Lifestyle and Environment) 23 food items divided into 7 frequencies (such as once a week, everyday etc) were included in questionnaire.

Sample size: As this study was conducted on convenient sampling, there were 56 participants from English medium school and 47 from Bangla medium school.

Statistical analyses: Children's weight category (underweight/normal/overweight or obese) was determined based on BMI (Body Mass Index) percentiles. The BMI of a child was calculated by dividing the weight in kilograms by the height in centimeters squared, and then multiplying the result by 10,000. Next, the BMI percentiles were calculated using CDC's LMS parameters as reference [6], which allows for comparison of BMI for children of different ages and gender. Each child was classified into four weight categories according to the guidelines of CDC. Children with BMI less than the 5th percentile are considered underweight; between 5th percentile and to less than 85th percentile are healthy/normal weight; between 85th and less than 95th percentile are overweight, and 95th percentile and above are considered obese. For data analysis SPSS and Microsoft Excel were used.

RESULTS

Table-1: Prevalence of childhood overweight/obesity.

	English Medium preschool	**Bangla Medium preschool**	**Total**
	%, (n)	%, (n)	%,(n)
Actual weight status			
Underweight	5.4(3)	6.4(3)	5.8(6)
Normal	55.3(31)	51.1(24)	53.4(55)
Overweight	21.4(12)	19.1(9)	20.4(21)
Obese	17.9(10)	23.4(11)	20.4(21)
Overweight and obese	39.3(22)	42.5(20)	40.8(42)

Prevalence of childhood overweight/obesity:

Table 1 reports nearly 5.8% of the children were underweight while 40.8% of the children were overweight or obese. The proportions of overweight/obese children in English medium and Bangla medium preschools were 39.3% and 42.5%, respectively. The proportion of healthy weight children was 55.3% and 51.1% in English medium and Bangla medium preschools, respectively (Table 1).

Table-2: 24-hour activities (not meeting guideline as recommended by WHO).

	English Medium school % (n)	**Bangla Medium school %(n)**	**Total ,% (n)**
Sleeping (hours/day)			
Not meeting guideline (<9 hrs./day)	58.9(33)	87.2(41)	71.8(74)
Screen time (hours/day)			
Not meeting guideline (>=2 hrs./day)	78.6(44)	59.6(28)	69.9(72)
Physical activity outside of home)			
Not meeting guideline (<1 hr./day)	46.4(26)	27.7(13)	37.9(39)

Twenty-four hours' movement activities:

Table 2 reports 24-hours movement activities of children who did not meet WHO guidelines. Majority of the children met sleep guideline (71.8%). A higher proportion of the children did not meet screen time guideline (69.9%). 37.9% children did not meet physical activity guideline. 24-hour activities not meeting guideline as recommended by WHO is shown in (Figure 1).

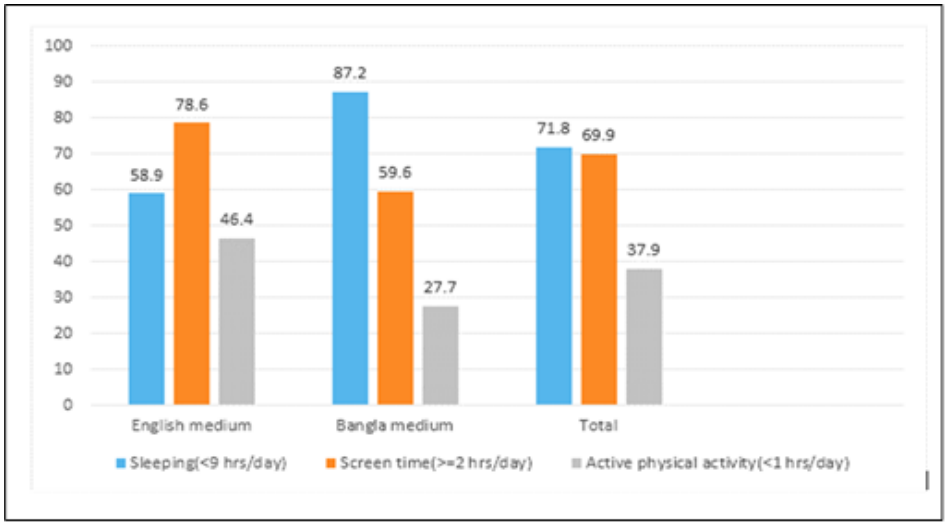

Figure-1: 24-hour activities (not meeting guideline as recommended by WHO).

Dietary Pattern

In food frequency questionnaire 23 food items which were divided into7 frequencies were answered by participants. Nutritional foods like fruits, vegetables, milk, and egg are well consumed by children. 35.9% eat fruits once a day, every day. A good number of students take vegetables every day, more than once; once a day, every day; 2-4 days a week. 44.7% kids drink milk once a day, every day. Meat alternatives (egg, bean) are consumed by 47.6% children once a day, every day. Packed and processed food like potato chips, soft drink, cake, candy etc are also consumed by a large number of students frequently. 17.5% kids eat candy, chocolate once a day, every day and 31.1% eat 2-4days a week. Potato chips are consumed by 35% child 2-4days a week. 33% participants drink soft drink once a week and 21.4% 2-4 days a week. 26.2% children eat cake, pastry 2-4 days a week. A higher frequency was found for junk foods (fried food, pizza, french fry etc) consumption (Figure 2). 37.9% kids take french fry once a week. 34% students eat ice cream once a week. Fried food like chicken fry was consumed by 25.2% 2-4days a week, 11.7% once a day, every day. Fast food like pizza, burger is consumed by 5.8% everyday, 13.6% consume 5-6 days a week and 20.4% eat 2-4 days a week. In this study we also found higher consumption of junk food in OWOB group.

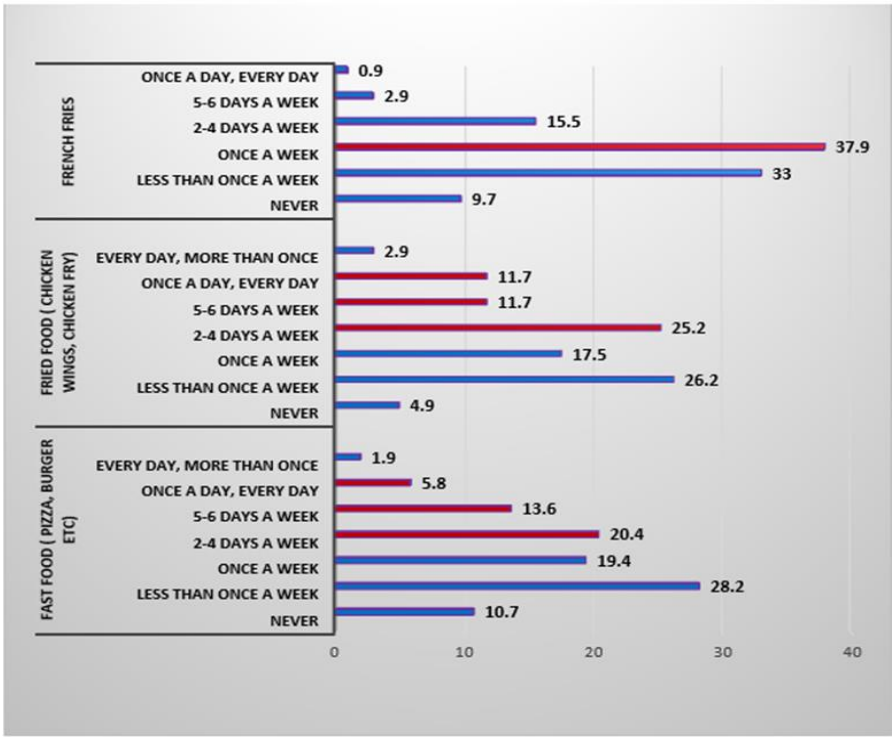

Figure-2: Junk food consumption frequency.

DISCUSSION

The prevalence of overweight and obesity was found quite high in this study. It is demonstrated that several risk factors such as high levels of sedentary activities, less sleep, higher energy intake from carbohydrate and fast/processed food habit are major underlying elements for increasing prevalence of childhood overweight and obesity among primary school children in Dhaka, Bangladesh. The prevalence of overweight children in Dhaka, in our study, was found to be 40.8%, which was, very similar to the finding of another study in Dhaka, done among the school children (6-13 years) [7]. Another meta-analysis on India, Bangladesh and Pakistan showed that the prevalence of OWOB was 2-6% among rural children and adolescents, 16-18% in average urban settings (non-affluent) and 23-36% among affluent urban children [8]. The rates of OWOB in wealthy countries are generally higher in rural areas and among the people of lower socioeconomic class but the reverse scenario is observed in lower-income countries [3]. However, it is different from other countries. Studies from Turkey, found this rate to be 9 to 12% for underweight [10]. The reasons for these observations might be manifold where most are associated with unplanned urbanization. Firstly, maximum families in Dhaka are nuclear in nature. To survive in a highly competitive environment, many families in Dhaka city are over-loaded with responsibilities, meeting deadlines and suffer from severe time-constraints, which is typical of urban families. Busy mothers of these families might often find it difficult to plan, shop and cook healthy, nutritious meals. Because of higher purchasing capacity, expansion of international brands and easy availability, these rich families might prefer fast foods and snacks. Furthermore, many schools are far from home. So, out of necessity many children are habituated to use vehicles instead of walking to go to schools. Many parents have simply very little time to spare for walking their children to school. Besides, due to lack of open spaces/parks as well as lack of safety, children could not play outside and burn excess calorie. So they have no choice but to stay indoors and watch television or play on computers or mobile phones. Ultimately, these children became habituated to an inactive lifestyle which might be linked with obesity. Although our study participants were pre-primary and primary aged children, they also face academic pressure since education is important for survival in resource-limiting urban areas like Dhaka. Unhealthy diet pattern which included sugar-sweetened drinks, fast foods, ice cream, fried food, French fries, potato chips, and cakes. At the same time, unhealthy food items are consumed by OWOB group frequently. Obese children do tend to eat higher calorie foods, like high fat foods, processed and sugary food, beverage. Sports drink, energy drinks are not consumed by children in these schools. The major contributors to the development of overweight and obesity are carbohydrate, protein and fat. In the present study, carbohydrate and protein intake were significantly higher among the overweight and obese children compared to normal and underweight children. Fast food which include oversized portions, high energy density, highly processed, high fat content and large amounts of refined starch and added sugars. The results provide evidence of association between fast food consumption and obesity. Interventions to improve diet quality should aim to decrease intakes of sugary, energy-dense foods and increase intakes of fruit and vegetables. Parental involvement is key to success in improving children's diets [9].

LIMITATIONS

The findings based on the data collected from only 2 preschools in Dhaka city will not be suitable for generalization. The dietary patterns may differ from one urban area to another.

CONCLUSION

The study provides baseline data regarding the status of childhood obesity in pre-primary and primary school children aged 4 to 11 years in Dhaka. It was observed that a significant number of students are overweight and obese which is too much alarming for our country. This study also demonstrated association among obesity, 24-hours activity and dietary pattern. Higher tendency of eating junk food and processed food among OWOB children were found in this study. Preventing childhood obesity is complex as it involves many factors. A variety of physical activities and healthy dietary practices should be encouraged. Parental involvements, training of mothers could be priority for preventing childhood obesity in Bangladesh. The result of the current study may provide the foundation of awareness to develop policies in order to address the childhood obesity and to modify their eating habit and lifestyle.

Conflict of Interest: None.
Source of Fund: Nil.

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Ethical Approval

Ethical approval for this study was obtained from the Ethical Review Board of Biomedical Research Foundation, Bangladesh (Memo no: BRF/ERB/2018/003). Informed consent was taken prior data collection.

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