

Childhood Obesity and Academic Performance at School

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Abstract

Children who are obese are above the normal weight for their age and height. Childhood obesity increases the risk of adulthood obesity and obesity-related diseases such as hypertension, diabetes, and dyslipidemia. Successful academic performance is important during the school years and is also a strong predictor of occupational and social success in adult life. Therefore, the main objective of this study is to examine the association between children's overweight status and their academic performance. Primary data were obtained from a cross-sectional survey conducted through a structured questionnaire. This study was selected 80 students using simple random sampling techniques as the sample in Attanagalla Divisional Secretariat. Descriptive statistics, correlation analysis, and logistic regression analysis were used to analyze data. Overweight students both girls and boys achieved lower average marks for math and language than their non-overweight peers. It was identified that obesity is negatively associated with academic performance in both genders at school. Age, gender, mother's BMI, father's BMI, skipping breakfast, eating fast foods, and snacks have been identified as the key determinant for the development of obesity. The overweight students also demonstrated significantly more detentions, worsened school attendance, and less participation in the school athletic team.

Keywords: *Academic performance, Childhood obesity, Logistic regression, Sri Lanka*

1.0 Introduction

Childhood obesity is a serious medical condition that affects children and adolescents. Everyone has a body shape that is just right for him or her but sometimes we can store excessive body fat. Obesity is defined as abnormal or excessive fat accumulation that may impair health (Mohamed, 2015). Obesity has reached epidemic levels in developed countries during the last quarter of the 20th century. It continues to be an issue of great concern. Now we are facing the emergence of obesity as a worldwide phenomenon (Popkin & Doak, 1998). The highest prevalence rate of childhood obesity has been observed in developed countries; however, its prevalence is increasing in developing countries as well. In children between 5 to 19 years, obesity refers to Body Mass Index (BMI= weight in kg/height in meters²) for age more than 2 standard deviations above the WHO growth reference median (Ministry of Health, 2016).

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Childhood obesity is also linked to eating disorders. Dietary intake, physical inactivity, and secondary behaviors well-known risk factors for childhood obesity, and it is moderated by factors such as age, gender, family characteristics, parent's lifestyle (Naticchioni, 2013). Environmental factors such as school policies, demographics, and parent's work relate demand further influence eating and activity behaviors. Genetics is one of the biggest factors that can play a role in the development of obesity (Mohamed, 2015).

Obviously through, student's own actions will also determine their level of success in school. Obese children tend to miss significantly more school which has an impact on academic performance (Bagully, 2006). Bullying, peer rejection, lack of friends and lack of self-confidence could be seen at school and low job opportunities and lack of companionship later in life (Wickramasinghe, 2016). Academic performance is generally considered related to cognitive and memory functions. Psychological factors such as altered peer relationship and poor self-esteem influenced for the poor performance of overweight or obese children in school (Kim & Wi-young, 2013).

1.1 Problem Statement

Childhood obesity is one of the most serious public health challenges of the 21st century. The problem is global and is steadily affecting many low and middle income countries, especially in urban section. In 2014, the numbers of overweight children under the age of five is estimated to be over 41 million and almost a half of these children were estimate to be living in Asia. Also, childhood obesity is associated with poor academic performance and a lower quality of life experienced by the child. According to the world bank income group countries with upper middle income have shown the highest prevalence of obesity of 7% and it has become a big problem in Sri Lanka too (Ministry of Health, 2016). Therefore, the research question of this research was, "Is there any relationship between childhood obesity and academic performance among students at school?"

1.2 Objectives

As the rate of childhood obesity continue to rise, whether cognitive abilities are affected by this epidemic has been questioned. Therefore, the main research objective was to examine the association between children's overweight status and their academic performance. Also, working objectives were to identify, the impact of demographic factors, genetic factors and socio economic factors on obesity.

2.0 Literature Review

When considering about literature, many research have been done in developed countries. Naticchioni (2013) said that, children who are overweight scored lower on math and reading tests when compared to their non-overweight peers. Contributing factors to poor nutrition were numerous, including the consumption of fast food. Both young and adolescents who are obese earn lower test scores than students who are of average weight. They also display shorter attention spans, decreased mental flexibility and lower intellectual functioning. He said that obese females were more likely to report repeating a grade and considering them poor students. Also, obesity students display delays in social development and psychological impairments (Naticchioni, 2013).

According to Mohamed(2015) genetics, age, gender, birth weight, dietary patterns: eating fast food and snacks, skipping breakfast and behavioral characteristics : sedentary activities, physical activity patterns, sleeping hours were well known factors to obesity and it caused to non-communicable diseases and psychological health problems among children. Taras (2005) examined the association between physical activity among school-aged children and academic outcomes. Then he mentioned that, students involved in both sports and other extracurricular activities had the highest chances of doing homework than obese students. Also, physical activities programs help children to develop social skills, improve mental health, and reduce risk-taking behaviors.

3.0 Methodology

A cross sectional study was conducted to test the relationship between childhood obesity and academic performance at school. Therefore, this research was based on primary and secondary data. Primary data were obtained through a structured questionnaire and interviews. This study was selected 80 students using simple random sampling techniques as the sample from number of students in the Attanagalla divisional secretariat which is the population of this study. High prevalence of obesity can be identified in the Western province and many researchers selected urban government divisions in Colombo district for their study. According to the research gap Gampaha district was selected for the current study. Data were statistically analyzed to succeed the objectives. Student's weight statuses were identified by measuring their true weight and height. Academic performance was calculated by getting student's term test marks for math and language at school. Data analysis was included descriptive statistics, frequency analysis, and percentage, range, chi square test, correlation analysis and logistic regression. SPSS and MS-Excel were used to analyze data. Students who are from 5 to 18 years considered for

the sample and above 18 years, long term ill, mental illness students and who declined to participate were excluded from the sample.

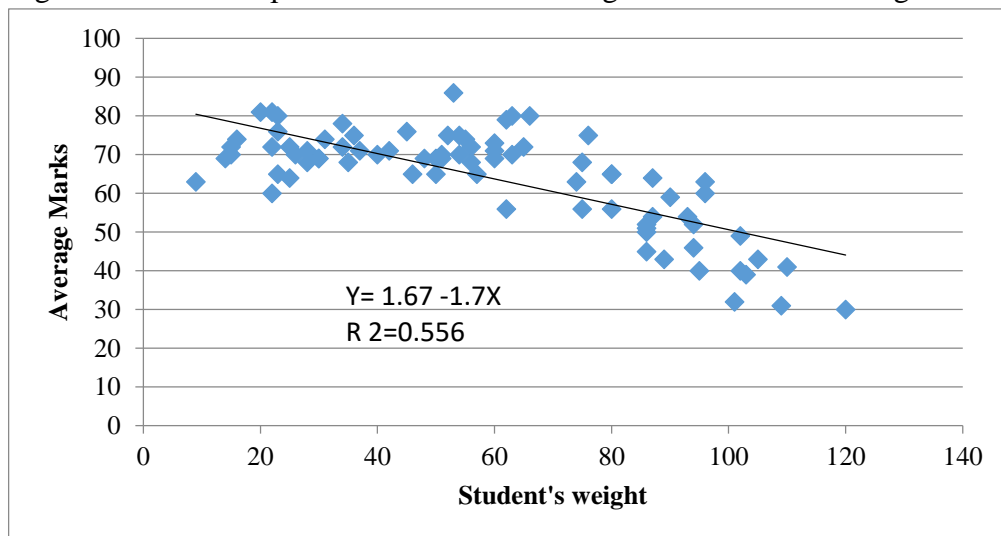
4.0 Analysis

According to the second objective of the study, which is to identify the relationship of obesity with demographic factors; one in five female students have obesity and majority of obesity suffered were females. 6.25% of students who are more than 14 years old have obesity than other agers. One in twenty children who are between 5 to 8 years old has obesity. According to the economic factor, 18.75% of children of parents earning more than Rs. 40000 are obese. No child in a low income family (less than 10000) is obese.

When considering about genetic factors, there was a moderate positive linear relationship between son’s or daughter’s BMI value and their father’s BMI value ($R=0.472$) and adjusted R square equals 0.423 and 42.3% of the variance in son’s or daughter’s BMI is accounted by their father’s BMI. Hence, it is assumed that there is a statistically significant relationship between son’s or daughter’s BMI and father’s BMI ($X^2=0.165, p=0.000$). The results lead to conclude that, when father’s BMI value increases it may cause to increase their son’s or daughter’s BMI value. It can be concluded that, genetic factors can create a huge impact on BMI level of a child.

The main objective of the current study was analyzed by using regression analysis and further analyzed by using a logistic regression.

Figure1: Relationship between student’s average marks and their weight status



Source: Sample Survey (2019)

According to figure 1, there was a negative linear relationship between student's average marks and their weight status. According to Beta value of student's weight (-1.7) significant value for student's weight is $p=0.003$. Hence it is assumed that there is a statistically significant relationship between student's average mark and their weight status. The results lead to conclude that, when weight of children increases it may cause to decrease their average marks.

Equation1: Factors affecting obesity among students at school

$$P(Y) = 1.423 + 0.150X_1 + 0.167X_2 + 0.224X_3 + 0.342X_4 + 0.063X_5 + 0.059X_6 + 2.786X_7$$

Se	(2.054)	(0.069)	(0.662)	(0.614)	(1.148)	(1.216)	(0.769)	(0.671)
P	(0.489)	(0.028)	(0.007)	(0.0015)	(0.040)	(0.023)	(0.000)	(0.027)

X1= Gender -Female

X2=Age – more than 14

X3=Less than Average Marks-Yes

X4= Mother's presence of obesity Yes

X5= Father's presence of obesity Yes

X6= Skipping breakfast- Yes

X7= Eating fast food - Yes

Source: Sample survey (2019)

According to above binary logistic regression analysis, females were 0.150 times more likely to suffer from obesity than male students. Students who are above 14 years old 0.167 times more likely to exhibit obesity than other age groups. Students who get less average marks for math and language 0.224 times more likely to exhibit obesity than other students. Students who skipped breakfast and eat fast food 0.059 and 2.786 times more likely to exhibit obesity than others. Then these results cast a new light on genetic factors and food patterns of students.

5.0 Conclusion

Age, gender, father's BMI, skipping breakfast, eating fast foods and snacks have identified as key determinant for the development of obesity. Overweight students both girls and boys achieved lower average marks for math and language than their non-overweight peers. The overweight students also demonstrated significantly more detentions, worsened school attendance and less participation on school athletic team. Obesity is negatively associated with academic performance in both genders at school.

6.0 Recommendation

School-based programs have great opportunity to promote healthy nutrition and physical activity because most children attend school and a child spends more than half of his/her waking hours at school on any given school day. Therefore, School authorities should incorporate nutritious meal choices in to school lunches. School administration must provide healthful food options along with physical activity in the school days. Parental initiative is necessary to succeed the home-based strategies influencing the diet and physical activity among children. Therefore, parents must aware about what type of food should they give for their children and they should encourage the children to have regular meals including breakfast at home, because children who take part in family meals are also more likely to eat fruits, vegetables, and grains and less likely to snack on unhealthy foods. As children, they must develop healthful lifestyle choices at a young age.

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