

Obesity, Physical Activity and Dietary Habits and Their Relationship with Academic Achievement among Female Students in the Fifth and Sixth Grades of Primary School in Salah Al-Din Governorate

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ABSTRACT

Background: The current study intended to determine the relationship between obesity and academic achievement of female students studying in the fifth and sixth grades in the primary schools of Salah Al-Din Governorate. In addition to that, this study included the evaluation of the connections between physical activity and eating habits and academic achievement.

Methods: Descriptive correlational design was used in the research because it corresponded with the objectives of the study. Sixty participants were chosen in the current study; 30 were in each grade. The students were selected purposely from a number of public schools located in Salah Al-Din Governorate. The indicators of obesity were measured by means of BMI, academic achievement was measured through grades from the official records, while physical activity and eating habits were determined by means of questionnaire.

Results: The results showed a moderate statistically significant negative correlation between obesity and academic achievement ($r=-0.42$, $p=0.001$). In addition, there was a moderate positive correlation between physical activity and academic achievement ($r=0.38$, $p=0.003$) and between eating habits and academic achievement ($r=0.35$, $p=0.007$). The analysis conducted during the research found statistically significant differences in academic achievements in relation to physical activity, breakfast intake, and food types. Multiple regression analysis showed that the studied variables explained 47% of the variance in academic achievement.

Conclusions: Thus, obesity, physical activity, eating habits, and academic achievement are interconnected.

Keywords: Obesity; Academic Achievement; Physical Activity; Dietary Habits; Female Students; Salah Al-Din Governorate.

INTRODUCTION

Education is considered one of the primary ways to develop people holistically in terms of cognitive and emotional growth and physical health, which allows people to operate effectively in society (Benningfield et al., 2015; Kemp & Baker, 2022). At the same time, educational institutions are faced with increasing problems that may obstruct this goal. One of these is the problem of obesity and being overweight, which can negatively affect the physical and mental well-being of a person and, thus, the performance in education (Benningfield et al., 2015; Kemp & Baker, 2022).

The causes of childhood obesity can be different, but the main of them are limited nutritional knowledge, unhealthy food, and sedentary lifestyle. As stated by the Public Authority for Applied Education and Training (2009), obesity is caused by poor nutrition, overeating, and the lack of physical activity.

This problem is addressed by many scientific articles. For instance, Bener (2006) studied the prevalence of underweight, overweight, and obesity among the youth in Qatar, Al-Isa (2004) researched obesity rates among the intermediates in Kuwait, Magbool (1993) conducted research related to obesity rates among children in Saudi Arabia, and Nabag (2009) assessed the nutritional and health status of schoolchildren in Sudan.

Obesity is a significant health issue that influences the lives of children worldwide. It can limit physical activity and make it difficult for children to concentrate on educational activities and, as a result, perform well academically (Emon et al., 2024; Hassink et al., 2008; Martí-Nicolovius, n.d.). Childhood is a vital stage of developing physical and mental capabilities; however, overweight can be influenced by psychological and social factors such as loneliness and reduced self-confidence that may affect academic achievements as well (Alfaro-Chaverri et al., 2025; de Jesus et al., 2021).

There are many health issues that people with obesity can experience. Obesity is often associated with the presence of excess fat in different body systems and increased risks of developing diseases. For example, as indicated by Hijazi (2003), children with obesity are more likely to have problems with breathing, cardiovascular system, rheumatism, and joint friction. Moreover, genetics can influence the rate of metabolism, which increases the risks of obesity.

From the above introduction, the current study will attempt to examine the connection between obesity and the level of academic performance for the female students at the primary education level of Salah Al-Din Governorate. The objective of this is to find out the degree of connection that exists between dietary practices and physical exercises and how this affects the students' academic performance. The other objective of the current study is to offer scientific data that will help in formulating prevention programs within the education institutions.

Research Problem

Obesity has been identified as a global public health problem that is detrimental to children in many aspects of physical, psychological, and educational well-being. The problem of obesity has raised the question regarding the association between obesity and academic achievements especially due to the rise of obesity cases among children during their school age and due to low physical activities, self-esteem and effects of obesity on health can affect the academic results. Obesity problem exists among female students of fifth and sixth grades of primary schools in Salah Al-Din Governorate, so there is a need to investigate the association between obesity and their academic achievements.

Main Research Question

What is the association between obesity and academic achievements among female students of fifth and sixth grades of primary schools in Salah Al-Din Governorate?

Objectives of the Research

1. Determining the relationship between obesity and academic performance among females studying in the fifth and sixth grade of primary schools in Salah Al-Din Governorate.
2. Finding out the relationship between physical activity, nutrition habits, and academic performance of females in the fifth and sixth grade of primary schools.
3. Detecting the difference in academic performance based on physical activity, eating breakfast, and food type among females.

Research Hypotheses

1. It is evident that there is a statistically significant negative correlation between obesity and academic achievement in female pupils in the fifth and sixth classes in primary schools in Salah Al-Din governorate.
2. It is clear that there is a statistically significant positive correlation between physical exercise, eating habits, and academic achievement in the female pupils.
3. Moreover, there is a statistically significant difference in academic achievement in terms of physical exercise, eating breakfast, and the kind of food taken.

Scope of the Study

1. Human Scope

A number of female students from schools affiliated with the Salah Al-Din Education Directorate.

2. Temporal Scope

From October 1, 2025, to January 15, 2026.

3. Geographical Scope

A number of schools affiliated with the Salah Al-Din Education Directorate.

METHODS

Research Method

The descriptive method using the correlational approach was employed due to its suitability for examining the relationship between obesity and academic achievement among primary school female students in grades 5 and 6 in Salah Al-Din Governorate. This method is appropriate for studying phenomena and relationships among variables as they naturally occur in real-world settings.

Research Sample

The sample for this research was collected through purposive sampling where the researchers selected girls from the fifth and sixth grades in different public schools with the aim of ensuring equitable representation of different educational environments and that the selected girls had the needed characteristics in order to achieve the aims of this research. In the beginning, 65 female students were selected. However, five students were eliminated from the sample because their data did not match the characteristics of the targeted sample; hence, 60 female students participated in the study, half of them from the fifth grade and the other half from the sixth grade.

Selection Criteria for the Sample

1. The student should belong to one of the targeted grades.
2. The student should be a resident of Salah Al-Din Governorate.
3. Parental/guardian approval should be attained.

Tools Used in Collecting Data

1. Medical Scale:

A medical scale was used to measure the body weight of the female students, measured in kilograms.

2. Height Measuring Tape:

A graduated measuring tape was used to measure the height of the female students measured in meters.

3. Body Mass Index (BMI):

BMI was used as an indicator of obesity among the female students which was obtained using body weight and height. BMI was calculated using the following formula:

$$\text{BMI} = \text{Weight (kg)} \div [\text{Height (m)}]^2$$

BMI was used to identify obesity status among the female students according to the criteria of the study.

4. School Grade Records:

The official school records were used to get the students' grades in core subjects which included Mathematics, Arabic Language, English Language, Science, and Islamic Education. The average grade of all the recorded grades was used to indicate the academic achievements of the student.

5. Questionnaire:

A questionnaire consisting of 18 items was used to collect information on eating habits and physical activity among the female students. All items in the questionnaire were subjected to a review of experts in order to fit the study objectives.

Validity

The following measures were taken in order to verify the validity of the research tool:

1. Face Validity:

The research tool was examined by experts in the field of physical education and physical fitness to assure its ability to measure the intended constructs.

2. Content Validity:

All parts of the measurement tool were assessed to make sure that all the required variables are covered based on previous literature and scientific references (Al-Zaidi, 2012).

Reliability

Test-Retest method:

The measurement tool was applied to a small number of samples twice at an appropriate time gap, then the correlation between the two results was calculated to test the reliability.

Objectivity

1. Use of Standardized Research Instruments:

Standardized research instruments have been developed according to established scientific criteria so that the results are not dependent on the researcher's personal judgment.

2. Statistical Data Analysis with Precision:

Statistical data analysis programs such as SPSS were used to maintain objectivity in data analysis.

3. Standardized Research Methods:

Standard methods for data collection and analysis have been used in the research so that the results can be replicated in similar samples.

Fieldwork Procedures

This study made use of a carefully planned fieldwork procedure to make sure that data gathering would be done in an efficient and systematic manner. Such procedures include the following steps:

Pilot Study

This study also made use of a pilot study where a small number of 10 female students were tested who came from the same age group and grade level as those involved in the main study but not part of the latter. The objective of the pilot study was to test the validity of the items in the questionnaire, participants' understanding of the questions, as well as the time needed to complete the survey. Any necessary changes were applied accordingly. The data gathered through the pilot study sample were used to compute the reliability coefficient using the split-half technique.

Main Study

Getting Official Approvals

Contacting the administrative offices of schools in Salah Al-Din Governorate in order to get the official approvals for carrying out the research. Sending official letters to the parents of the students to get their consent regarding their daughters' participation in the study as well as an explanation of the purpose of the study and the confidentiality of the information.

Sample Selection and Data Collection

The sample was purposefully selected based on the set criteria. There were initially 65 female students with 5 students excluded since they did not meet the required criteria. Therefore, the sample included 60 students divided equally between grades 5 and 6 with 30 students from each grade. Students participating in the study were named and a numeric code was assigned to each student in order to ensure the confidentiality of the data.

Measurement of Physical Data

1. Height and weight of each student were measured using the relevant tools.
2. Body Mass Index (BMI) was calculated using the formula.
3. Participants were classified as having normal weight, being overweight or obese according to WHO criteria.

Assessment of Academic Performance

Students' grades in Mathematics, Arabic Language, English Language, Science and Islamic Education were obtained. Average academic performance of each student was determined using the official records of the school.

Administration of Questionnaires

Questionnaires of research were provided to the students with the help of the research team. Questions in the questionnaire included those regarding students' diet, physical activity, psychological and social factors and the effect of obesity on academic performance. Detailed guidelines were provided to participants in order to assist in answering the questions.

Handling of Challenges

The challenge of students' absences arose during the process of data collection which was solved through additional appointments for collecting the required measures.

The research team was provided with guidelines concerning how to answer students' questions.

Statistical Analysis

The data was carefully checked before it was inputted into the statistical system to ensure that it was accurate and complete. The data was inputted into and analyzed using SPSS.

Data Collection

The data collection exercise involved the use of a field team who carried out the measurement of the height and weight of students as well as distribution of questionnaires and assistance in completing the same. The field team was trained before hand to ensure accurate data collection.

RESEARCH RESULTS

Presentation of Descriptive Statistics Results for Physical Activity

Table 1. Shows the differences in academic achievement according to the level of physical activity among the study sample.

Physical Activity Level	Percentage (%)	N	Mean	Standard Deviation
Low (1–2 times/week)	40%	24	72.3	7.8
Moderate (3–4 times/week)	35%	21	78.6	6.2
High (5+ times/week)	25%	15	85.4	5.2
One-Way ANOVA	—	60	—	F = 17.97, p < 0.001

Presentation of the Results of Dietary Habits

Table 2. Shows the differences in academic achievement according to some dietary habits among the study sample.

Variables	Category	Academic Achievement Mean	Standard Deviation	t-value	Sig.
Breakfast Consumption	Consume breakfast	80.2	6.1	3.89	0.002
	Do not consume breakfast	70.8	8.3		
Type of Food	Healthy	82.4	5.7	4.02	0.001
	Unhealthy	74.6	7.9		

Presentation of the Correlation Coefficients

Table 3. Shows the correlation coefficients between obesity, physical activity, dietary habits, and academic achievement.

Relationship	Correlation Coefficient (r)	95% Confidence Interval	Significance	Correlation Strength
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Obesity – Academic Achievement	-0.42	[-0.58, -0.23]	0.001	Moderate
Physical Activity – Academic Achievement	0.38	[0.19, 0.54]	0.003	Moderate
Dietary Habits – Academic Achievement	0.35	[0.15, 0.51]	0.007	Moderate

Presentation of the Results of Multiple Regression Analysis

Table 4. Shows the results of the multiple regression analysis for predicting academic achievement.

Variables	B Coefficient	Standard Error	t-value	Sig.	VIF
Constant	82.4	3.2	25.75	0.000	—
Obesity	-0.38	0.09	-4.22	0.001**	1.12
Physical Activity	0.31	0.08	3.87	0.002**	1.08
Dietary Habits	0.29	0.07	4.14	0.001**	1.05

Model Indicators: $R^2 = 0.47$, $F = 18.36$, $p < 0.001$.

DISCUSSION

The research discovered the statistical differences in the academic achievement depending on the level of physical activity of female pupils in the fifth and sixth grades of primary school. The academic achievement was higher in students who had high physical activity compared to those students with moderate and low physical activity. It could be due to the fact that physical activity is connected with the development of some cognitive abilities, such as attention, concentration, and executive functioning that play an important role in the learning process. Moreover, regular physical activity of children is connected with a wide variety of physical, psychological, and cognitive effects which could influence academic achievement (Tompsonowski et al., 2011; WHO, 2020).

The findings showed the statistical difference in the academic achievement according to the presence or absence of breakfast consumption in female students. In other words, the academic achievement was higher in girls who ate their breakfast compared to girls who did not consume it. It might happen because the breakfast provides the energy and nutrients which are needed for mental activities during the early school time. Some scientific reviews have provided evidence of the positive impact of breakfast consumption on cognitive performance in children and adolescents in comparison to skipping breakfast (Adolphus et al., 2016).

Moreover, the statistical differences in the academic achievement depending on the diet type were revealed. It was discovered that the mean score of academic achievement was higher in those girls who had a healthy diet compared to girls who followed the unhealthy diet. It could be explained by the fact that healthy diet ensures the intake of the necessary nutrients for body growth and brain functioning, while unhealthy diet usually involves the consumption of nutritionally poor products. The literature proves the link between diet quality and specific cognitive performance among children and adolescents (Adolphus et al., 2016).

In connection with obesity, the findings point out the existence of a moderate inverse relationship between obesity and academic performance, which means that increased rates of obesity may lead to decreased academic performance on the part of female students. The reasons why this correlation exists can be seen in the potential relationship between obesity and various behavioral and health factors (e.g. reduced physical activity and unhealthy dietary behavior), which can affect school performance. In this respect, this finding can be partially confirmed by the previous findings about the relationship between obesity and academic performance in children (Santana et al., 2017). However, according to the evidence presented, this relationship

can be mediated by other factors, and therefore, obesity should not be considered a cause of poor academic performance.

When it comes to correlation coefficients, it can be noted that there is a moderate positive correlation between physical activity and academic performance and there is a moderate positive correlation between dietary habits and academic performance. This finding means that the female students who have an active lifestyle and consume healthy food may experience health and behavioral factors which help them concentrate during classes. The previous literature proves that physical activity and healthy nutrition are important for healthy development of children, but it also states that the correlation does not necessarily mean causation (Tompsonski et al., 2011; WHO, 2020).

According to the multiple regression analysis, the studied variables can explain 47% of the variability of academic performance. Obesity had a negative impact on academic performance, while physical activity and dietary habits had a positive impact. It means that academic performance may be determined by a set of health and behavioral factors, but not by one. Besides, low values of VIF indicate the absence of significant multicollinearity among the independent variables.

The research reveals an interconnection between obesity, physical exercise, nutritional practices, and academic performance in young women at the level of 5th and 6th grade of primary school. The findings coincide with scientific literature emphasizing the significance of engaging in physical exercises and eating healthy food for children, whereas the relationship between obesity and academic performance seems to be more complicated. Therefore, the findings of the current paper have to be perceived as correlational rather than causal (Santana et al., 2017; Tomporowski et al., 2011).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. From the results of the study, there was an evident statistical difference in academic achievements according to the level of physical activity among female students of the fifth and sixth grades of primary school. One-way analysis of variance (ANOVA) showed $F = 17.97$ with $p < 0.001$. From descriptive statistics, the best academic achievements came in case of students having high physical activity, followed by moderate physical activity and finally low physical activity.
2. Statistical difference was also observed in academic achievements in terms of breakfast consumption where the mean score of academic achievement was 80.2 for students having breakfast compared to 70.8 for those who do not have breakfast. In t-test, the value was $t = 3.89$ at $p = 0.002$.
3. In the same way, there was a significant difference in academic achievements according to food type. In this regard, the mean score was 82.4 for healthy food and 74.6 for unhealthy food. In t-test, $t = 4.02$ at $p = 0.001$.
4. From Pearson correlation analysis, a moderate and statistically significant inverse relationship was found between obesity and academic achievement where $r = -0.42$ and $p = 0.001$. Moreover, in addition to that, there were moderate and statistically significant positive relationships between academic achievements and physical activity ($r = 0.38$, $p = 0.003$) and between academic achievements and nutrition ($r = 0.35$, $p = 0.007$).
5. Multiple regression analysis showed that obesity, physical activity and nutrition predict the academic achievements collectively where $R^2 = 0.47$. All the regression coefficients for the three predictors in this analysis were statistically significant; $B = -0.38$ for obesity, $B = 0.31$ for physical activity and $B = 0.29$ for nutrition.
6. All in all, this study has shown statistically significant associations and differences in relation to obesity, physical activity, dietary habits and academic achievements among female students of the fifth and sixth grades of primary school in Salah Al-Din Governorate. This means that

the importance of taking into account these variables in the study of academic achievements is highlighted in this group of population.

Recommendations

First: Recommendations for Schools

1. Create awareness of the importance of health and nutrition in girls and focus on the issue of preventing obesity among girls.
2. Involve the curriculum of physical education and create opportunities for physical activities for the girls.
3. Develop the program of detecting early stages of obesity and overweight and offer follow up for those who need counseling and advice.

Second: Recommendations for Families

1. Encourage physical activities for the girls.
2. Provide the girl with balanced nutrition and a healthy breakfast.
3. Cooperate with the school in monitoring the healthy lifestyle of the girls.

Third: Recommendations for Girls

1. Continue being physically active and do sports.
2. Pay attention to the right nutrition and eat breakfast regularly.
3. Change unhealthy eating habits.

Fourth: Recommendations for Research

1. Carry out longitudinal research to explore the relationship between obesity and academic performance.
2. Use the sample that would be larger and more diverse geographically.
3. Study the relationship between obesity and academic performance considering other variables, such as sleep, psychological health, and family support.

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