

## Research Article

# The Effect of Breakfast on Academic Performance among High School Students in Abu Dhabi

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### Abstract

**Background:** The claim that breakfast is the most important meal of the day has an abundance of sound science behind it. Breakfast is continually suggested to be a critical feature of eating regimens since it is associated with a healthier intake of nutrients, BMI and lifestyle. Several studies have shown the importance of having breakfast to the body's performance. Moreover, recent studies have demonstrated that breakfast enhances intellectual capacity, concentration, attention and academic performance. However, there is a paucity of studies which examine the relationship between breakfast consumption and academic performance in the UAE. **Objective:** The aim of this study is to examine the effect of breakfast intake on the academic performance of young female students in the emirate of Abu Dhabi. **Methods:** Data was collected through a self-administered questionnaire from 130 female students aged 15-19 years, who were selected from two private schools in Abu Dhabi. The questionnaire was used to explore the students' breakfast consumption habits. The data collected was analyzed to examine the association between breakfast intake and academic performance. Academic performance was assessed according to the average grade for all subjects in the final exam. **Results:** Sixty-two percent of the 130 students eat breakfast regularly. Breakfast consumption is associated with increased academic performance among high school female students. The association of breakfast intake was found to be statistically significant ( $p = 0.00$ ). **Conclusion:** The findings of the current study indicate that there is a positive correlation between breakfast intake and the students' scores. Regular breakfast consumption improves students' academic performance, whereas the performance of students who frequently skip breakfast is lower.

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## 1. Introduction

There has been broad research interest in the possibility that breakfast can affect the learning and academic performance of children and adolescents.



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Despite the fact that the results of these studies were diverse, breakfast intake seems to have a positive short-term effect on intellectual and cognitive performance as compared to breakfast omission in children and adolescents [2].

The definition of the term breakfast is still disputed among researchers and scientists. However, the Department of Agriculture in the United States of America has stated that the breakfast meal should contribute to at least 10% of the RDA for energy and should provide foods from at least two of the following food groups: grains, low fat dairy products, fruits, vegetables, lean meats, and finally nuts, seeds, and legumes (Lauren A. Hasz, Mark A. Lamport, 2012). Moreover, breakfast can be defined as the first meal eaten in the day before performing daily activities and it usually contributes to about 20% - 30% of total daily energy needs (Tanya Zilberter, Eugene Yuri Zilberter, 2014).

Healthy dietary practices are critical determinants of development in children and adolescents including weight status, nutritional status and cognition. One important component of a healthy diet is regular meal consumption; the consumption of breakfast has been of the greatest concern and been studied the most broadly [12].

Importantly, the American Dietary guidelines incorporate the daily consumption of a nutrient rich breakfast due to its considerable benefits [12].

Increasing breakfast consumption could be a useful public health and education enhancing intervention. However, far less research has considered the effects of breakfast on ecologically valid outcomes of academic performance compared with the relatively plentiful publications on cognitive performance. Therefore, assumptions about the benefits of breakfast for schoolchildren's learning are based on evidence demonstrating the acute effects of breakfast on schoolchildren's cognitive test performance from laboratory-based studies. The academic performance outcomes employed by studies included either school grades or standardized achievement tests. Despite the paucity of studies, there was consistent evidence that habitual breakfast consumption has a positive effect on children's academic performance. Increased frequency of habitual breakfast was consistently positively associated with academic performance [1].

The eating behaviour of individuals is affected by a large number of factors including psychological, socio-cultural and educational factors [12].

It is very critical to identify who are at higher risk of breakfast skipping and what the reasons are behind such behaviour.

Previous studies found that students with lower social economic status, lower parental educational level and divorced parents are the most likely to skip breakfast in comparison to other students [12].

Investigations found that the main reasons behind breakfast skipping among students were: not having enough time in the morning, reduced appetite, concerns about weight and body image [3].

Measurements of student performance at school have received substantial attention in earlier research; it is challenging to determine different aspects that might be of significance for student performance. There is no doubt that school performance of students is a very important factor that has a massive effect on their future. Studies found that students' school performance is dependent on a variety of factors, of which some are: quality of education, teaching methods, health and nutrition, ethnic group, age, socioeconomic status, gender, psychological factors, environmental factors and several others. These factors strongly influence student performance, but the extent of the effect may differ from individual to individual and from country to country [7].

Furthermore, studies concluded that children who are undernourished appeared to have increased absence from school and diminished attention, as well as encountering more health problems in comparison with well-nourished children, all of which would indeed affect performance at school [8].

Given the lack of studies in this area in the UAE, and due to the common practice of skipping breakfast among the young generation, more research is required in this area. Results will be valuable for health providers to develop policies and programs that focus on improving students' health and nutritional status.

Therefore, the objectives of this study were to examine the effect of breakfast intake on the academic performance of female students, to investigate some factors that lead to breakfast-skipping behaviour and to suggest possible recommendations that might encourage breakfast consumption.

## 2. Methods

This is a cross-sectional study where convenience sampling technique was used to select the study population. Initially a total of 150 participants, all females between the ages of 15 and 19 years, were recruited from two private schools in Abu Dhabi.

The study protocol was approved by the Research Ethics Committee at Zayed University and permission was obtained from the Abu Dhabi Education Council. Informed consent was obtained from all the students prior to their participation in the study.

Data was collected using a self-administered questionnaire to study the correlation between breakfast consumption and academic performance.

The questionnaire was developed and refined on the basis of the contents of peer review journals. It was prepared in Arabic, then translated into English and then back into Arabic and reviewed by professionals for consistency. It elicited information about breakfast intake, frequency of intake, anthropometric measurements and some demographic factors. The questionnaire was pretested and then revised to enhance its clarity and comprehension.

In order to reduce bias and ensure that the results would be as accurate and precise as possible, we chose two private the schools with the same studying hours – 7:30 in the morning to 2:30 in the afternoon – and both with the same curriculum assigned by the UAE Ministry of Education.

Out of 150 female students who agreed to participate in the study, a total of 130 were included in the study and completed the questionnaire. 9 students were excluded as they had health problems or provided incomplete answers.

The exclusion criteria included disorders or health problems that affect cognition and performance. The most common health problem that was found among students was migraines.

The academic performance of students was assessed via the grades they scored in the final exams of the first semester of the 2015-2016 academic year. As the students were studying a combination of different subjects, academic performance was assessed according to the average grade of all the subjects studied.

Data was analyzed descriptively and inferentially using the SPSS 21 software version 21 to ascertain the association between breakfast intake and academic performance. Correlation and regression were calculated and interpreted to look for any statistical significance between the variables at  $\leq 0.05$ .

### 3. Results

The study sample consisted of 130 female students from the 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> grades in two schools. Their ages ranged from 15 years to 19 years, with the mean age being 16 years. Their weight ranged from 37 kg to 89 kg, with an average of 56.2 kg. Their height ranged from 145 cm to 174 cm. with an average of 160.21 cm. Body mass index (BMI) was calculated for all study subjects using appropriate formula and classification. Out of a total of 81 students who consume breakfast at least 5 times a week, 8 students were found to be underweight, 62 were within the normal weight range, 7 were overweight and 1 was obese. On the other hand, out of 49 students who regularly skip breakfast or consume it fewer than 5 times a week, 5 were found to be underweight, 32 were

Variables	N (%)
<b>Gender</b>	
Female	130 (100)
<b>Age</b>	
15	36 (27.6)
16	43 (33.1)
17	40 (30.8)
18	8 (6.2)
19	3 (2.3)
<b>BMI</b>	
Underweight	20 (15.4)
Normal weight	89 (68.5)
Overweight	19 (14.6)
Obese	2 (1.5)
<b>Breakfast</b>	
Eat (> 5 times a week)	81(62.3)
Skip (<5 times a week)	49 (37.7)
<b>Class</b>	
10 <sup>th</sup>	46 (35.3)
11 <sup>th</sup>	37 (28.5)
12 <sup>th</sup>	47 (36.2)
<b>Mean (SD)</b>	
Age (years)	(16.2) 0.998
Weight (kg)	56.22 (9.42)
Height (cm)	160.21 (5.46)
BMI	21.79 (3.36)

TABLE 1: Descriptive characteristics of the study sample

within the normal weight range, 11 were overweight and 4 were obese. Accordingly, the average BMI for the study subjects was 21.79 (Table 1).

The correlation between breakfast intake and student score was calculated to find if there is any significant association between the two variables. The Pearson correlation coefficient was found to be 0.455. The positive value suggests that as breakfast consumption increases, the school scores increase too. The results were found to be highly significant  $p < 0.001$  (Table 2).

Results of correlations		
Variables	P-value	Pearson correlation
Score	0.00	0.445
Breakfast	0.00	0.445

TABLE 2: The relationship between breakfast and school scores. Correlation is significant at the 0.01 level (2-tailed).

	B	Std-error	P value	95 % confidence interval for B
<b>Class</b>	0.416	1.358	0.760	(-2.272 – 3.103)
<b>Age</b>	-1.369	1.168	0.244	(-3.681 – 0.944)
<b>BMI</b>	-1.554	1.045	0.140	(-3.623 – 0.515)
<b>Breakfast</b>	6.567	1.317	0.00	(3.960 – 9.173)

TABLE 3: ANOVA test.

The results of further analysis based on the ANOVA test (table 3) showed that breakfast intake has a significant association with the scores as compared to other independent variables ( $B = 6.567$ ). The association was found to be highly significant ( $p = 0.00$ ) and it falls within the range of confidence interval (3.960 – 9.173).

As the academic performance of the study subjects was assessed via the grades they scored on the final exams, they were categorised into two groups: breakfast eaters and breakfast skippers. The grades scored by the students in the breakfast eaters group were as follows: 51.28% of the students scored A, 41.02% scored B, 7.69% scored C and 1.28% scored D. By contrast, 30.76% of the breakfast skippers group scored A, 30.76% scored B, 28.84% scored C and 9.61% scored D. None of the students in either of the groups scored F (Figure 1).

Students were asked to state the reasons that led them to skip breakfast. Many students skipped breakfast due to lack of time in the morning (37%). Other reasons for skipping breakfast reported by students were not feeling hungry (33%), not having breakfast prepared at home (15%), wanting to avoid excess weight gain (7%) and disliking the food prepared at home for breakfast (5%) (Figure 2).

## 4. Discussion

Recent studies revealed that breakfast consumption is highly associated with nutrition adequacy among children and adolescents [5, 9, 10]. The results of the current study provide evidence for the association between breakfast consumption and the academic performance of high school students in Abu Dhabi.

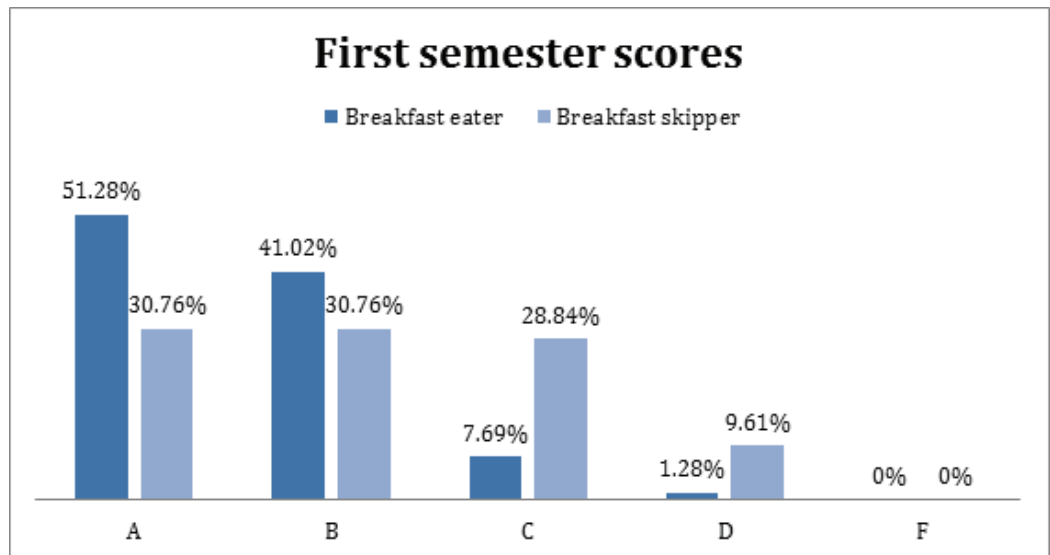


Figure 1: First semester scores.

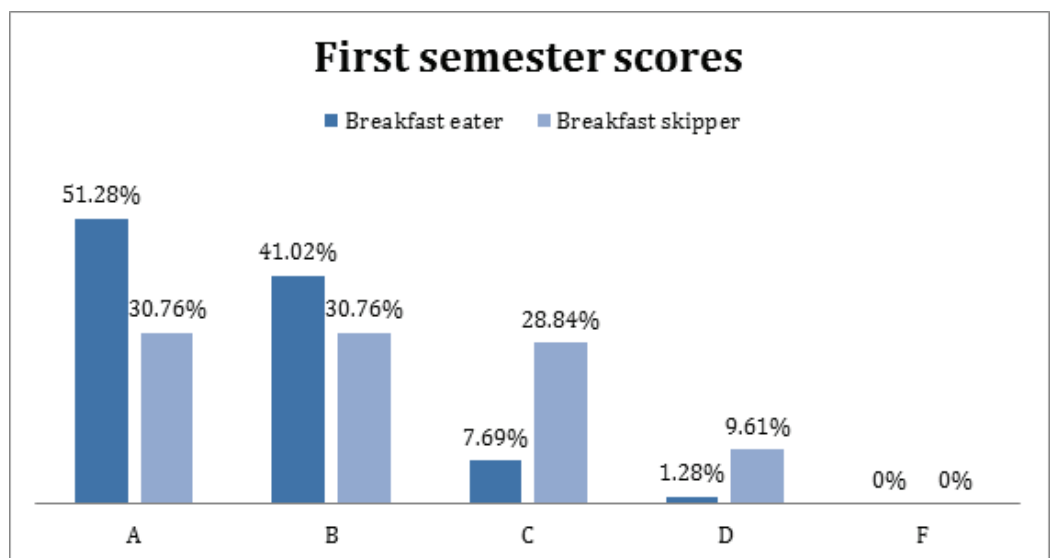


Figure 2: Reasons for breakfast skipping.

These results support the outcomes of a study that was conducted in South Korea to examine the effect of breakfast on the academic performance of both male and female adolescents from the 7<sup>th</sup> to the 12<sup>th</sup> classes. The researchers in the South Korea study were able to identify a strong link between breakfast skipping and obesity. Obesity is related to reduction in cognition and memory due to its effect on the structure of the brain. Therefore, skipping breakfast was found to be a cause for obesity, which is indeed related to lower academic performance [9].

The results of the current study also support the outcomes of the Norwegian study, which investigated the effect of a regular meal pattern on the academic performance of students. It found that the regular consumption of breakfast as well as increased

intake of healthy foods are associated with increased learning outcomes and high school achievements, particularly in female students [10].

However, the association between breakfast consumption and academic performance that was revealed by the current study does not coincide with the outcomes of the study by Adolphus et al., who examined the relationship between frequency of breakfast consumption and the academic performance of male and female adolescents in the United Kingdom. The study results show no association between breakfast consumption, cognitive ability and the academic performance of students [1]. The authors justified the discrepancy of their findings from other studies with the fact that the method used to assess the school performance of the students was based on reasoning tests (Cognitive Abilities Test). However, school grades were used by the majority of other studies that investigated the association between breakfast consumption and performance including the current study.

Basch studied the negative effect of breakfast skipping on the academic performance of students. The results revealed an association between skipping breakfast and low academic performance [4].

The current study found that the most common reason for skipping breakfast was lack of time, followed by reduced appetite and not feeling hungry. These results support Affinata's results regarding the factors that might lead to breakfast skipping [3].

## 5. Conclusion

To conclude, the present study provided substantial evidence that breakfast consumption is associated with an improvement in students' academic performance. In drawing conclusions from this study, the Abu Dhabi Education Council and the Health Authority of Abu Dhabi should emphasize the importance of developing and implementing strategies that focus on promoting healthy eating among school-age youths and provides nutrition education guidelines for a comprehensive school health program.

These programs should target schools, parents and students with the aim of increasing knowledge of the importance of breakfast consumption and its effect on academic performance and general health. Moreover, schools and parents should look for strategies that would encourage breakfast consumption among students.

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