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Original Research Article

Association between Breakfast Eating With Obesity, Dietary Habits and Physical Activity among Male Middle Schools in Hail Region: Results of a Cross-Sectional Study

Sabry Abd El-Gawad Abd El-Halim[1,2a], Eyad Mohamed Alshammari[2a], Mohammad Matrouk AlShammari[2b], Haitham Furaih Ali AlShuhail[2b]

[a]Assistant Professor, [b]Student;
[1]Department of Nutrition and Clinical Nutrition, Faculty of Veterinary Medicine, Zagazig University, Zagazig, Egypt.
[2]Department of Clinical Nutrition, College of Applied Medical Science, Hail University, Hail, KSA

Corresponding Author: Sabry Abd El-Gawad Abd El-Halim

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ABSTRACT

Background: Due to rapid socio-cultural changes caused by the accelerating economy in the Arabian Gulf region during the last few years that was associated with major changes in the food choices and eating habits which has been claimed for the rising rates of overweight and obesity which were recently observed among Saudi population.
The objectives of the current work were to 1) calculate the prevalence of overweight and obesity in a sample of male middle school students in Hail province and 2) measure the correlation between the students' body weight status and their breakfast frequency, physical activity and eating habits.
Methods: A cross-sectional study was done in Male middle schools at Hail province, Hail Region, KSA during the period from December, 2013 until March, 2014. A Total Number of 200 male students aged from 12 to 14 years old had participated in this study selected, randomly selected from 8 male middle schools in province. Self-reported questionnaire and anthropometric measurements were used for Data collection. Data were analyzed using an interactive calculation tool for chi-square tests of goodness of fit and independence.
Results: The current study indicated that regarding BMI the majority of participant students (31.5%) had underweight in compare with the students had normal weight were (30%). Overweight and obese subjects represented 20% and 18.5% of the students respectively. Regarding WHR indicated that the majority of students were obese in compare with the normal weight students were (55%). there were statistically significant correlations between breakfast frequency with all eating breakfast categories except name of restaurant in which they have eating breakfast (P value < 0.05) but there were no statistically significant correlations between Breakfast Frequency with physical activity and some lifestyle categories (P > 0.05). there were no statistically significant correlations were found between breakfast frequency and anthropometry measures (BMI and WHR), P value > 0.05.
Conclusion: This study concluded that the breakfast frequency has no correlation with overweight and obesity in sample from middle school students in Hail province.

Key words: Breakfast frequency, children, obesity, Eating habits, physical activity.

INTRODUCTION

Obesity is currently recognized as a risk factor for many chronic diseases including cardiovascular disease, type 2 diabetes, stroke and cancer, [1] and is associated with morbidity rates at least as high as poverty, smoking and excessive drinking. [2] Childhood obesity has become a major public health concern in the last four decades, affecting both developed and developing countries globally. It is estimated that worldwide, approximately 1 in 10 children are overweight. [3] The numerous psychological, physical, and economic consequences are well known. Childhood overweight affects self-esteem and has negative consequences on cognitive and social development. [4,5] one of the major causes of obesity is the changes in the diet, in terms of quantity and quality, which has become more Westernized. [6]

The frequency of breakfast consumption is inversely associated with Body Mass Index (BMI) among school going children and adolescents. A systematic review of cross-sectional and longitudinal studies from Europe suggests that infrequent or never breakfast consumers are at higher risk of being overweight and obese. [7] Change in the volume of daily physical activity may account for this apparent discrepancy. Increasingly, leisure time activities are more sedentary, with television watching, video games, and personal computing among the most popular pastimes. Further, people in industrialized countries are expending less energy in activities of daily living, and at work. [8,9] Several studies suggest that an active lifestyle during childhood and adolescence can play an important role in optimizing growth and development. [10,11] The Centers for Disease Control and Prevention recently recommended that comprehensive school and community programs be developed to promote physical activity among children and adolescent. [12] The goals of these programs are to increase knowledge about activity and exercise, develop behavioral and motor skills that promote lifelong activity, and encourage physical activity outside of physical education classes. [13] Reasons individuals give for skipping breakfast commonly includes lack of time for the preparation and consumption of food and concerns about excess body weight. [14-16]

An inverse relationship has been found between BMI and breakfast consumption. [17,18] Breakfast eaters tend to have lower body mass index than breakfast skippers. [19] Several hypotheses have been proposed to explain why breakfast skipping is associated with a decreased ability to lose weight. Breakfast skipping can lead to overeating later in the day for example, having one big meal in the evening. [20,21] In contrast, eating breakfast is associated with increased eating frequency. Increased eating frequency may in turn promote less efficient energy utilization by increasing dietary induced thermogenesis, leading to lower BMI. [22] Benefits of regular breakfast consumption include improved cognitive function and academic achievement, making this behavior especially worthy of study among school children. [23,24]

The aim of this study is to determine 1.The prevalence of obesity among Saudi children in among middle school students in Hail Province. 2. The correlation between the body weight status with the patterns of breakfast eating, physical activity and some life style habits.

MATERIALS AND METHODS

Design and sample

A cross-sectional study was done in Male middle schools at Hail province, Hail Region, KSA during the period from December, 2013 until March, 2014. A Total Number of 200 male students aged from 12

to 14 years old had participated in this study selected, randomly selected from 8 male middle schools in province. All the participants were Saudi of the Arabian ethnicity and were chosen by the stratified random sampling method.

The study was approved by the committee of research ethics in Hail University and official permission were obtained from the education authority in Hail Province before visiting the schools.

Data Collection

Self-reported questionnaire and anthropometric measurements were used for Data collection. The questionnaire was designed as shown in Table (2) to study socioeconomic status, breakfast eating habits, and physical activity among middle school students, and its use in that respect had been standardized. [7,25,10]

Before filling out the questionnaire, the students were informed about the study and were given instructions on how to fill out the questionnaire completely and truthfully. Anthropometric measurements including height, weight for calculation the body mass index (BMI), and also waist circumference and hip circumference for calculation the waist hip ratio (WHR).

Body mass index (BMI), which is the ratio of weight in kilogram to height in meter square, was used to assess body weight status. According to the National Institutes of Health (NIH), adults were classified based on their BMI to underweight (BMI < 18.5), normal (BMI = 18.5-24.9), overweight (BMI = 25-29.9), or obese (BMI ≥ 30). The waist hip ratio (WHR) which is the ratio of waist circumference and hip circumference, was used to assess the body fat distribution where male classified according to WHR to normal (WHR < 0.9) or Obese (WHR ≥ 0.9). [26]

Data Analysis

Results were expressed as means ± standard deviations. All of the analyzed variables were non-parametric and were tested by Chi-square tests using an interactive calculation tool for chi-square tests of goodness of fit and independence [Computer software], Available from http://quantpsy.org. [27] Differences were considered statistically significant at P value < 0.05.

RESULTS

Students' characteristics

A total of 200 male students participated in the current study. The mean weight, height, waist circumference, and hip circumference of the students were respectively 57.09 ± 1.55 kg, 152.43 ± 1.27cm, and 82.16 ± 1.21 and 91.40 ± 1.22. The average BMI and WHR of the participants were respectively 23.98 ± 0.80 and 0.89 ± 0.006 Table (1).

Table (1): characteristics of the participants (means± SE):

Variables	Total
Number of Students	200
Weight (kg)	57.09 ± 1.55
Height (cm)	152.43 ± 1.27
BMI (kg/m^2)	23.98 ± 0.80
Waist circumference (W) (cm)	82.16 ± 1.21
Hip circumference (H)(cm)	91.40 ± 1.22
WHR (W/R)	0.89 ± 0.006

Participant's responses for socioeconomics, breakfast habits, physical activity and lifestyle questionnaire are shown in Table (2) where we reported that the majority of them have breakfast (92%) and the most of who have breakfast eating it daily (60%).

Anthropometry

The measurements of BMI indicated that the majority of students (31.5%) had underweight in compare with the students had normal weight were (30%). Overweight and obese subjects represented 20% and 18.5% of the students respectively Table (3). The measurements of WHR indicated that the majority of students were obese in compare with the normal weight students were (55%) as shown in Table (4).

Table (2): Participants Responses For Socioeconomics, Breakfast Habits, Physical Activity And Lifestyle Questionnaire:

Questions asked	Answer levels	Total (%)
Q1. The average monthly income of the father / head of household	less than 5 thousand riyals. 5-10 thousand riyals. more than 10 thousand riyals.	N= 56 (29%) N= 65 (34%) N = 70 (37%)
Q2. The level of education of the Mother:	A. uneducated B. primary C. Middle D. secondary E. university Including Postgraduate	N= 59 (31%) N= 43 (22%) N = 21 (11%) N = 30 (16%) N = 39 (20%)
Q3. The level of education of the Father:	A. uneducated B. primary C. Middle D. secondary E. university Including Postgraduate	N= 28 (15%) N= 28 (15%) N = 30(16%) N = 48 (25%) N = 58 (30%)
Q4. Do you take breakfast?	A.Yes B. No	N= 184 (92%) N= 16 (8%)
Q5. How often do you eat breakfast in the week?	A. daily B. Five or Six times per week C. three or Four per Week D. once or twice in Week	N= 111 (60%) N= 23 (12%) N = 37 (20%) N = 14 (8%)
Q6. Is the habit of eating the parents to have breakfast at home?	A.Yes B. No	N= 181 (91%) N= 17 (9%)
Q7. How many times eating the parents to have breakfast at home a week?	A. daily B. Five or Six times per week C. three or Four per Week D. once or twice in Week	N= 117 (64%) N= 26 (14%) N = 27 (15%) N = 12 (7%)
Q8. If you are taking your breakfast, where usually eat?	At home At school canteen At Restaurant	N= 111 (62%) N= 46 (26%) N = 23 (13%)
Q9. If you're having breakfast in the restaurant,how many times a week?	Three times B. Twice C. Once	N= 14 (50%) N= 5 (18 %) N = 9 (32%)
Q10. If you're having breakfast in / from the restaurant, what is the name of this restaurant?	A. McDonald's B. Kudo C. Harvey D. Other	N= 17 (63%) N= 4 (15%) N = 1 (4%) N = 5 (19%)
Q11. How many meals do you eat per day , except for breakfast?	A. One meal B. Two meals C. Three meals D. Four Meals	N= 37 (19%) N= 72 (37%) N = 65 (34%) N = 20 (10%)
Q12. Does your breakfast contain:	A. Milk and cheeses B. vegetables C. Fruits D. Meats E. bread and cereals (cornflakes) F.Other	N= 107 (57%) N= 5 (3%) N = 12 (6%) N = 16 (9%) N = 39 (21%) N = 8 (4%)
Q13. Do you Make exercise regularly?	A.Yes B. No	N= 111 (56%) N= 88 (44%)
Q14. If you play sports regularly,what kind of sport that is practiced?	A. Severe Exercises B. Medium Exercises C. Mild Exercises	N= 56 (49%) N= 42 (37%) N = 16 (14%)
Q15. How many hours watching TV or sitting at the computer or playing electronic games a day?	A. Less than an hour B. One or Two Hour C. Three or Four hours D. Five or Six hours	N = 48 (24%) N = 67 (34%) N = 45 (23%) N = 40 (20%)
Q16.The nature of sleep	A. Regular B. Irregular	N = 124(63%) N = 73 (37%)
Q17. Average hours of sleep per day:	A. less than Six hours B. Six to Eight hours C. More than Eight hours	N = 49 (25%) N = 92 (46%) N = 58 (29%)

Table (3): Correlations between BMI Categories and Socioeconomics, Breakfast Habits, Physical Activity And Lifestyle:

Questions asked**	Answer level**	BMI Categories				Total (%)	X^2	P-Value
		Underweight N=63(31.5%)	normal N=60(30%)	overweight N=40(20%)	obese N=37(18.5%)			
Q1.		25 (39.6%)	18 (30%)	3 (7.5%)	10 (27%)	N= 56 (29%)	14.24	0.027*
		20 (31.7%)	16 (26.6%)	17 (42.5%)	12 (32.4%)	N= 65 (34%)		
		16 (25.3%)	22 (36.6%)	19 (47.5%)	13 (35.1%)	N = 70 (37%)		
Q2.	A.	27 (42.8%)	15 (25%)	6 (15%)	11 (29.7%)	N= 59 (31%)	18.82	0.093
	B.	14 (22.2%)	13 (21.6%)	8 (20%)	8 (21.6%)	N= 43 (22%)		
	C.	7 (11.1%)	3 (5%)	7 (17.5%)	4 (10.81%)	N = 21 (11%)		
	D.	7 (11.1%)	8 (13.3%)	9 (22.5%)	6 (16.2%)	N = 30 (16%)		
	E.	7 (11.1%)	18 (30%)	8 (20%)	6 (16.2%)	N = 39 (20%)		
Q3.	A.	11 (17.4%)	9 (15%)	2 (5%)	6 (16.2%)	N= 28 (15%)	37.843	0.000*
	B.	18 (28.5%)	6 (10%)	3 (7.5%)	1 (2.7%)	N= 28 (15%)		
	C.	9 (14.2%)	15 (25%)	5 (12.5%)	1 (2.7%)	N = 30(16%)		
	D.	14 (22.2%)	9 (10%)	15 (37.5%)	10 (27%)	N = 48 (25%)		
	E.	10 (15.8%)	18 (30%)	14 (35%)	16 (43.2%)	N = 58 (30%)		
Q4.	A.	60 (95.2%)	57 (95%)	35 (87.5%)	32 (86.4%)	N= 184 (92%)	4.26	0.235
	B.	3 (4.7%)	3 (5%)	5 (12.5%)	5 (13.5%)	N= 16 (8%)		
Q5.	A.	42 (66.6%)	36 (60%)	16 (40%)	17 (45.9%)	N=111 (60%)	16.40	0.059
	B.	10 (15.8%)	4 (6.6%)	6 (15%)	3 (8.1%)	N= 23 (12%)		
	C.	6 (9.5%)	14 (23.3%)	8 (20%)	9 (24.3%)	N = 37 (20%)		
	D.	2 (3.1%)	3 (5%)	6 (15%)	3 (8.1%)	N = 14 (8%)		
Q6.	A.	58 (92%)	55 (91.6%)	34 (85%)	34 (91.8%)	N=181 (91%)	3.158	0.368
	B.	3 (4.7%)	5 (8.3%)	6 (15%)	3 (8.1%)	N= 17 (9%)		
Q7.	A.	40 (63.4%)	36 (60%)	23 (57.5%)	18 (48.6%)	N=117 (64%)	9.225	0.417
	B.	9 (14.2%)	5 (8.3%)	5 (12.5%)	7 (18.9%)	N= 26 (14%)		
	C.	5 (7.9%)	12 (20%)	3 (7.5%)	7 (18.9%)	N = 27 (15%)		
	D.	5 (7.9%)	2 (3.3%)	3 (7.5%)	2 (5.4%)	N = 12 (7%)		
Q8.		40 (63.4%)	42 (70%)	18 (45%)	11 (29.7%)	N=111 (62%)	19.321	0.004*
		14 (22.2%)	11 (18.3%)	8 (20%)	13 (35.1%)	N= 46 (26%)		
		3 (4.7%)	5 (8.3%)	9 (22.5%)	6 (16.2%)	N = 23 (13%)		
Q9.	A.	3 (4.7%)	1 (1.6%)	5 (12.5%)	5 (13.5%)	N= 14 (50%)	9.473	0.149
	B.	0 (0%)	2 (3.3%)	3 (7.5%)	0 (0%)	N= 5 (18 %)		
	C.	4 (6.3%)	2 (3.3%)	1 (2.5%)	2 (5.4%)	N = 9 (32%)		
Q10.	A.	5 (7.9%)	0 (0%)	6 (15%)	6 (16.2%)	N= 17 (63%)	19.03	0.025*
	B.	0 (0%)	3 (5%)	1 (2.5%)	0 (0%)	N= 4 (15%)		
	C.	1 (1.5%)	0 (0%)	0 (0%)	0 (0%)	N = 1 (4%)		
	D.	0 (0%)	2 (3.3%)	2 (5%)	1 (2.7%)	N = 5 (19%)		
Q11.	A .	10 (15.8%)	10 (16.6%)	8 (20%)	9 (24.3%)	N= 37 (19%)	3.83	0.922
	B.	20 (31.7%)	24 (40%)	15 (37.5%)	13 (35.1%)	N= 72 (37%)		
	C.	23 (36.5%)	19 (31.6%)	12 (30%)	11 (29.7%)	N = 65 (34%)		
	D.	9 (14.2%)	5 (8.3%)	3 (7.5%)	3 (8.1%)	N = 20 (10%)		
Q12.	A.	33 (52.3%)	37 (61.1%)	22 (55%)	15 (40.5%)	N=107 (57%)	31.627	0.007*
	B.	3 (4.7%)	1 (1.6%)	0 (0%)	1 (2.7%)	N= 5 (3%)		
	C.	9 (14.2%)	1 (1.6%)	1 (2.5%)	1 (2.7%)	N = 12 (6%)		
	D.	2 (3.1%)	3 (5%)	3(7.5%)	8 (21.6%)	N = 16 (9%)		
	E.	12 (19%)	13 (21.6%)	10 (25%)	4 (10.8%)	N = 39 (21%)		
	F.	1 (1.5%)	3 (5%)	1 (2.5%)	3 (8.1%)	N = 8 (4%)		
Q13.	A.	51 (80.9%)	37 (61.6%)	12 (30%)	11 (29.7%)	N=111 (56%)	37.091	0.000*
	B.	12 (19%)	23 (38.3%)	28 (70%)	25 (67.5%)	N= 88 (44%)		
Q14.	A.	27 (42.8%)	19 (31.6%)	6 (15%)	4 (10.8%)	N= 56 (49%)	28.82	0.000*
	B.	20 (31.7%)	15 (25%)	6 (15%)	1 (2.7%)	N= 42 (37%)		
	C.	3 (4.7%)	3 (5%)	2 (5%)	8 (21.6%)	N = 16 (14%)		
Q15.	A.	21 (33.3%)	12 (20%)	8 (20%)	7 (18.9%)	N = 48 (24%)	8.232	0.511
	B.	20 (31.7%)	20 (33.3%)	14 (35%)	13 (35.1%)	N = 67 (34%)		
	C.	9 (14.2%)	14 (23.3%)	10 (25%)	12 (32.4%)	N = 45 (23%)		
	D.	13 (20.6%)	14 (23.3%)	8 (20%)	5 (13.5%)	N = 40 (20%)		
Q16.	A.	39 (61.9%)	40 (66.6%)	26 (65%)	19 (51.3%)	N = 124(63%)	2.67	0.445
	B.	21 (33.3%)	20 (33.3%)	14 (35%)	18 (48.6%)	N = 73 (37%)		
Q17.	A.	22 (34.9%)	11 (18.3%)	5 (12.5%)	11 (29.7%)	N = 49 (25%)	12.48	0.052
	B.	26 (41.2%)	33 (55%)	17 (42.5%)	16 (43.2%)	N = 92 (46%)		
	C.	15 (23.8%)	15 (25%)	18 (45%)	10 (27%)	N = 58 (29%)		

* Indicate statistically significant correlation at P< 0.05.

** Questions asked and answer levels were presented in Table 2.

Table (4): Correlations between WHR Categories and Socioeconomics, Breakfast Habits, Physical Activity And Lifestyle :

Questions asked**	Answer levels**	WHR Categories		Total (%)	X^2	P-Value
		Normal N=90(45%)	Obese N=110(55%)			
Q1.	A. B. C.	29 (32.2%) 25 (27.7%) 32(35.5%)	27 (24.5%) 40 (36.3%) 38 (34.5%)	N= 56 (29%) N= 65 (34%) N= 0 (37%)	2.179	0.336
Q2.	A. B. C. D. E.	28 (31.1%) 20 (22.2%) 9 (10%) 11 (12.2%) 17 (18.8%)	31 (28.1%) 23 (20.9%) 11 (10%) 19 (17.2%) 22 (20%)	N= 59 (31%) N= 43 (22%) N= 21 (11%) N= 30 (16%) N= 39 (20%)	1.058	0.901
Q3.	A. B. C. D. E.	11 (12.2%) 18 (20%) 16 (17.7%) 18 (20%) 25 (27.7%)	17 (15.4%) 10 (9.0%) 14 (12.7%) 30 (27.2%) 33 (30%)	N= 28 (15%) N= 28 (15%) N = 30(16%) N= 48 (25%) N= 58 (30%)	6.52	0.164
Q4.	A. B.	81 (90%) 9 (10%)	103 (93.6%) 7 (6.3%)	N=184 (92%) N= 16 (8%)	0.889	0.346
Q5.	A. B. C. D.	52 (57.7%) 9 (10%) 14 (15.5%) 6 (6.6%) (9)	58 (52.7%) 14 (12.7%) 23 (20.9%) 8 (7.2%) (7)	N= 111 (60%) N= 23 (12%) N = 37 (20%) N = 14 (8%)	1.422	0.700
Q6.	A. B.	80 (88.8%) 9 (10%)	101 (91.8%) 8 (7.2%)	N= 181 (91%) N= 17 (9%)	0.48	0.488
Q7.	A. B. C. D.	55 (61.1%) 12 (13.3%) 8 (8.8%) 5 (5.5%)	62 (56.3%) 18 (16.3%) 15 (13.6%) 7 (6.3%)	N= 117 (64%) N= 26 (14%) N = 27 (15%) N = 12 (7%)	2.769	0.429
Q8.	A. B. C.	57 (63.3%) 13 (14.4%) 8 (8.8%)	54 (49.0%) 33 (30%) 15 (13.6%)	N= 111 (62%) N= 46 (26%) N = 23 (13%)	7.847	0.02*
Q9.	A. B. C.	4 (4.4%) 1 (1.1%) 4 (4.4%)	10 (9.0%) 4 (3.6%) 5 (4.5%)	N= 14 (50%) N= 5 (18 %) N = 9 (32%)	1.044	0.593
Q10.	A . B. C. D.	6 (6.6%) 2 (2.2%) 0 (0%) 1 (1.1%)	11 (10%) 2 (1.8%) 1 (0.9%) 4 (3.6%)	N= 17 (63%) N= 4 (15%) N = 1 (4%) N = 5 (19%)	1.429	0.699
Q11.	A . B. C. D.	15 (16.6%) 35 (38.8%) 30 (33.3%) 8 (8.8%)	22 (20%) 37 (33.6%) 35 (31.8%) 12 (10.9%)	N= 37 (19%) N= 72 (37%) N = 65 (34%) N = 20 (10%)	0.902	0.825
Q12.	A. B. C. D. E. F.	46 (51.1%) 3 (3.3%) 8 (8.8%) 5 (5.5%) 18 (20%) 1 (1.1%)	61 (55.4%) 2 (1.8%) 4 (3.6%) 11 (10%) 21 (19.0%) 7 (6.3%)	N= 107 (57%) N= 5 (3%) N = 12 (6%) N = 16 (9%) N = 39 (21%) N = 8 (4%)	7.407	0.192
Q13.	A. B.	62 (68.8%) 28 (31.1%)	50 (45.4%) 60 (54.5%)	N= 111 (56%) N= 88 (44%)	10.629	0.001*
Q14.	A. B. C.	34 (37.7%) 25 (27.7%) 3 (3.3%)	22 (20%) 17 (15.4%) 13 (11.8%)	N= 56 (49%) N= 42 (37%) N = 16 (14%)	9.541	0.01*
Q15.	A. B. C. D.	24 (26.6%) 35 (38.8%) 15 (16.6%) 16 (17.7%)	24 (21.8%) 32 (29.0%) 30 (27.2%) 24 (21.8%)	N = 48 (24%) N = 67 (34%) N = 45 (23%) N = 40 (20%)	4.782	0.188
Q16.	A. B.	58 (64.4%) 30 (33.3%)	66 (60%) 43 (39.0%)	N = 124(63%) N = 73 (37%)	0.599	0.439
Q17.	A. B. C.	23 (25.5%) 46 (51.1%) 21 (23.3%)	26 (23.6%) 46 (41.8%) 37 (33.6%)	N = 49 (25%) N = 92 (46%) N = 58 (29%)	2.809	0.245

* Indicate statistically significant correlation at P< 0.05.
** Questions asked and answer levels were presented in Table 2.

Correlations between anthropometry and socioeconomics, breakfast habits, physical activity and lifestyle:

Correlating students' anthropometric measurements with their socioeconomics, breakfast habits, physical activity and lifestyle Tables (3 and 4) revealed that both BMI had significant correlations with the average monthly family income, level of Father education, place of breakfast eating, name of restaurant in which they have breakfast, types of food in breakfast, exercise practice and the kind of exercise that was practiced (P value < 0.05).

But, WHR had significant correlations with place of breakfast eating, exercise practice and the kind of exercise that was practiced (P value < 0.05).

Correlations between Breakfast Frequency with socioeconomic Status and Anthropometry

Table (5) shows the Correlations between Breakfast Frequency and socioeconomic status and indicated statistically significant correlations for breakfast frequency with education level of the mother (P< 0.05).

But there were no statistically significant correlations were found between breakfast frequency and anthropometry measures (BMI and WHR), P value > 0.05 as shown in Table (6).

Table (5): Correlations between Socioeconomic Status And Breakfast Frequency:

Questions asked**	Answer level**	Breakfast frequency					Total (%)	X^2	P-Value
		Daily (n=111)	5-6 times per week (n= 23)	3-4 times per week (n= 37)	1-2 time(s) per week (n= 14)	Never (n=15)			
Q1.	A.	35 (31.5%)	5(21.7%)	11(29.7%)	3(21.4%)	2(13.3%)	N=56 (29%)	15.31	0.053
	B.	41 (27.9%)	3 (13.0%)	13(35.1%)	3(21.4%)	5(33.3%)	N=65 (34%)		
	C.	30 (36.0%)	14 (60.8%)	11(29.7%)	8(57.1%)	7(46.6%)	N=70 (37%)		
Q2.	A.	36(32.4%)	3(13.0%)	13(35.1%)	6(42.8%)	1(6.7%)	N=59 (31%)	26.393	0.049*
	B.	26(23.4%)	4(17.3%)	5(13.5%)	2(14.2%)	6(40%)	N=43 (22%)		
	C.	11(9.9%)	2(8.6%)	6(16.2%)	1(7.1%)	1(6.7%)	N=21 (11%)		
	D.	19(17.1%)	7(30.4%)	1(2.7%)	2(14.2%)	1(6.7%)	N=30 (16%)		
	E.	15(13.5%)	5(21.7%)	11(29.7%)	3(21.4%)	5(33.3%)	N=39 (20%)		
Q3.	A.	19(17.1%)	2(8.6%)	4(10.8%)	1(7.1%)	2(13.3%)	N=28 (15%)	19.703	0.234
	B.	18(16.2%)	2(8.6%)	5(13.5%)	2(14.2%)	1(6.7%)	N=28 (15%)		
	C.	17(15.3%)	1(4.3%)	8(21.6%)	3(21.4%)	1(6.7%)	N= 30(16%)		
	D.	30(27.02%)	5(21.7%)	7(18.9%)	2(14.2%)	4(26.6%)	N=48 (25%)		
	E.	21(18.9%)	11(47.8%)	12(32.4%)	9(64.2%)	5(33.3%)	N=58 (30%)		

* Indicate statistically significant correlation at P< 0.05.

** Questions asked and answer levels were presented in Table 2.

Table (6): Correlations between Breakfast Frequency and BMI and WHR:

BMI and WHR Categories	Breakfast frequency					Total (%)	X^2	P-Value*
	Daily N=111 (55.5%)	5-6 times per week N= 23(11.5%)	3-4 times per week N= 37(18.5%)	1-2 time(s) per week N=14(7%)	Never N=15 (7.5%)			
1. Body Mass Index (BMI = Kg/m^2):								
a. Underweight	42(37.8%)	10(43.4%)	6(16.2%)	2(14.2%)	3(20%)	N=63(31.5%)		
b.Normal weight	36(32.4%)	4(17.3%)	14(37.8%)	3(21.4%)	3(20%)	N=60 (30%)	19.89	0.069
c. Overweight	16(14.4%)	6(26.0%)	8(21.6%)	6(42.8%)	4(26.6%)	N=40 (20%)		
d. Obese	17(15.3%)	3(13.0%)	9(24.3%)	3(21.4%)	5(33.3%	N=7(18.5%)		
2. Waist Hip Ratio (WHR):								
a. Normal	52(46.8%)	9 (39.1%)	14(37.8%)	6(42.8%)	9(60%)	N =90(45%)	2.63	0.622
b. Obese	59(53.2%)	14(60.8%)	23(62.1%)	8(57.1%)	6(40%)	N=110 (55%)		

* No statistically significant correlations were found (P > 0.05).

Correlations between Breakfast Frequency with eating habits and physical activity

Table (7 and 8) shows the Correlations between Breakfast Frequency with eating habits and physical activity where found that there were statistically significant correlations for breakfast frequency with all eating breakfast categories except name of restaurant in which they have eating breakfast (P value < 0.05).

But, there were no statistically significant correlations between Breakfast Frequency with physical activity and some lifestyle categories (P > 0.05).

Table (7): Correlations between Breakfast Habits And Breakfast Frequency:

Questions asked**	Answer levels**	Breakfast frequency					Total (%)	X^2	P-Value
		Daily N=111 (55.5%)	5-6 times per week N= 23(11.5%)	3-4 times per week N=37(18.5%)	1-2 time(s) per week N=14(7%)	Never N=15 (7.5%)			
Q7.	A.	87(78.4%)	6(26.0%)	12(32.4%)	6(42.8%)	6(40%)	N=117 (64%)	53.318	0.000*
	B.	5(4.5%)	10(43.4%)	7(18.9%)	3(21.4%)	1(6.6%)	N= 26 (14%)		
	C.	11(9.9%)	2(8.6%)	10(27.0%)	2(14.2%)	2(13.3%)	N = 27 (15%)		
	D.	3(2.7%)	4(17.3%)	3(8.1%)	1(7.1%)	1(6.6%)	N = 12 (7%)		
Q8.	A.	80(72.1%)	12(52.1%)	16(43.2%)	3(21.4%)	0(0%)	N=111 (62%)	52.883	0.000*
	B.	24(21.6%)	10(43.4%)	7(18.9%)	4(28.5%)	1(6.6%)	N= 46 (26%)		
	C.	4(3.6%)	0(0%)	12(32.4%)	7(50%)	0(0%)	N = 23 (13%)		
Q9.	A.	3(2.7%)	0(0%)	11(29.7%)	0(0%)	0(13.3%)	N= 14 (50%)	19.138	0.004*
	B.	1(0.9%)	0(0%)	1(2.7%)	3(21.4%)	0(0%)	N= 5 (18 %)		
	C.	3(2.7%)	1(4.3%)	0(0%)	5(35.7%)	0(0%)	N = 9 (32%)		
Q10.	A.	3(2.7%)	1(4.3%)	8(21.6%)	5(35.7%)	0(0%)	N= 17 (63%)	6.604	0.678
	B.	0(0%)	0(0%)	2(5.4%)	2(14.2%)	0(0%)	N= 4 (15%)		
	C.	1(0.9%)	0(0%)	0(0%)	0(0%)	0(0%)	N = 1 (4%)		
	D.	2(1.8%)	0(0%)	2(5.4%)	1(7.1%)	0(0%)	N = 5 (19%)		
Q11.	A.	13(11.7%)	6(26.0%)	8(21.6%)	6(42.8%)	4(26.6%)	N= 37 (19%)	21.541	0.043*
	B.	41(36.9%)	7(30.4%)	13(35.1%)	3(21.4%)	8(53.3%)	N= 72 (37%)		
	C.	38(34.2%)	9(39.1%)	13(35.1%)	2(14.2%)	3(20%)	N = 65 (34%)		
	D.	17(15.3%)	1(4.3%)	1(2.7%)	1(7.1%)	0(0%)	N = 20 (10%)		
Q12.	A.	59(53.1%)	14(60.8%)	26(70.2%)	6(42.8%)	2(13.3%)	N=107 (57%)	43.643	0.002*
	B.	4(3.6%)	0(0%)	1(2.7%)	0(0%)	0(0%)	N= 5 (3%)		
	C.	11(9.9%)	0(0%)	0(0%)	0(0%)	1(6.6%)	N = 12 (6%)		
	D.	5(4.5%)	1(4.3%)	4(10.8%)	6(42.8%)	0(0%)	N = 16 (9%)		
	E.	27(24.3%)	7(30.4%)	3(8.1%)	2(14.2%)	0(0%)	N = 39 (21%)		
	F.	4(3.6%)	1(4.3%)	3(8.1%)	0(0%)	0(0%)	N = 8 (4%)		

* Indicate statistically significant correlation at P< 0.05.

** Questions asked and answer levels were presented in Table 2.

Table (8): Correlations between Breakfast Frequency and physical activity and lifestyle:

Questions asked**	Answer levels**	Breakfast frequency					Total (%)	X^2	P-Value*
		Daily N=111 (55.5%)	5-6 times per week N=23(11.5%)	3-4 times per week N= 37(18.5%)	1-2 time(s) per week N=14(7%)	Never N=15 (7.5%)			
Q13.	A.	66(59.5%)	13(56.5%)	18(48.6%)	10(71.4%)	4(26.7%)	N=111(56%)	6.969	0.138
	B.	45(40.5%)	10(43.4%)	19(51.4%)	4(28.5%)	10(66.6%)	N= 88 (44%)		
Q14.	A.	36(32.4%)	6(26.0%)	7(18.9%)	4(28.5%)	3(20%)	N= 56 (49%)	5.917	0.657
	B.	25(22.5%)	5(21.7%)	8(21.6%)	3(21.4%)	1(6.6%)	N= 42 (37%)		
	C.	8(7.2%)	1(4.3%)	2(5.4%)	3(21.4%)	2(13.3%)	N = 16 (14%)		
Q15.	A.	32(28.8%)	4(17.3%)	6(16.2%)	3(21.4%)	3(20%)	N = 48 (24%)	16.60	0.165
	B.	40(36.0%)	9(39.1%)	8(21.6%)	4(28.5%)	6(40%)	N = 67 (34%)		
	C.	16(14.4%)	5(21.7%)	16(43.2%)	5(35.7%)	3(20%)	N = 45 (23%)		
	D.	23(20.7%)	5(21.7%)	7(18.9%)	2(14.2%)	3(20%)	N = 40 (20%)		
Q16.	A.	77(69.3%)	15(65.2%)	19(51.4%)	6(42.8%)	7(46.6%)	N = 124(63%)	6.679	0.154
	B.	34(30.6%)	8(34.8%)	18(48.6%)	8(57.2%)	5(33.3%)	N = 73 (37%)		
Q17.	A.	26(23.4%)	6(26.0%)	8(21.6%)	5(35.7%)	4(26.7%)	N = 49 (25%)	8.251	0.409
	B.	50(45.0%)	13(56.5%)	21(56.7%)	4(28.5%)	4(26.7%)	N = 92 (46%)		
	C.	34(30.6%)	4(17.3%)	8(21.6%)	5(35.7%)	7(46.6%)	N = 58 (29%)		

* No statistically significant correlations (P > 0.05).

** Questions asked and answer levels were presented in Table 2.

DISCUSSION

The purpose of this study was to assess overweight and obesity rates among male middle school students in in Hail Province, KSA and to correlate their body mass index (BMI) and waist hip ratio (WHR) with their breakfast eating habits, physical activity and lifestyle behaviors and also correlation between the breakfast frequencies with body weight status and some breakfast eating patterns and physical activity. The current data demonstrated that of BMI indicated that the majority of students (31.5%) had underweight in compare with the students had normal weight were (30%). Overweight and obese subjects represented 20% and 18.5% of the students respectively, and the measurements of WHR indicated that the majority of students were obese (45%) in compare with the normal weight students were (55%). These findings were consistent with the results of similar studies in other Middle East and some Western countries. An important finding was that 60% of these school students in Hail province consume breakfast daily and 16% never consume breakfast. In this study, we found that there were no correlation between breakfast frequency and overweight and obesity and these results disagree with several other studies undertaken across the world which found that. [14,16,1821]

In our study also we found that there were statistically significant correlations for breakfast frequency with all eating breakfast categories like habit of eating breakfast with parents at home, place in which they eating breakfast, frequency of eating breakfast in a restaurants and type of breakfast (P value <0.05), where the more common breakfast type was milk and cheeses eaters (57% of all breakfast types) followed by the breads and cereals (cornflakes) (39% of all breakfast types) But, there were no statistically significant correlations between Breakfast Frequency with physical activity and some lifestyle categories (P > 0.05). Our study reiterates findings reported in other studies from developed countries, [28,29] and highlights the importance of parental attitudes and behaviors in creating healthy lifestyle habits such as breakfast consumption in their children as well as the ability of peers to influence dietary behaviors of adolescents.

CONCLUSION

This study concluded that the breakfast frequency has no correlation with overweight and obesity in sample from middle school students in Hail province.

We found that BMI had significant correlations with the average monthly family income, level of Father Education, place of breakfast eating, name of restaurant in which they have breakfast, types of food in breakfast, exercise practice and the kind of exercise that was practiced. But, WHR had significant correlations with place of breakfast eating, exercise practice and the kind of exercise that was practiced.

There were statistically significant correlations between breakfast frequency with breakfast patterns except name of restaurant in which they have eating breakfast. But, we weren't found statistically significant correlations between Breakfast frequency with physical activity and some lifestyle categories.

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