WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 7, Issue 11, 100-106. Research Article ISSN 2277–7105

RISK FACTORS FOR OBESITY IN FEMALE COLLEGE STUDENTS IN UNIVERSITY OF HAIL, SAUDI ARABIA

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Article Received on
13 April 2018,
Revised on 03 May 2018,
Accepted on 24 May 2018
DOI: https://doi.org/10.17605/OSF.IO/8APD7

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ABSTRACT

Background: Because of the increasing obesity rates in populations, population specific causes need to be identified. The present study aimed at determining the contribution of parental socioeconomic variable and life style factors contributing to obesity in female college students in Saudi Arabia. **Methodology**: A cross sectional study was performed using 300 women 18-25 years of age attending University of Hail. To meet the study objectives, information was collected on the demographic parental and lifestyle related variables and anthropometric measurements. **Results**: Around 35% of the study subjects were either overweight or obese and they had a family history of maternal obesity which leads to obesity in the children. Parental income, education, skipping breakfast and physical activity did not have any association with obesity. **Conclusion:** However maternal obesity seemed to be a positive risk factor for obesity in female subjects.

INTRODUCTION

Obesity is a serious public health issue globally.[1-3] Obesity is rising alarmingly in young people[4,5], while socioeconomic, gender and racial ethnicity depend on lifestyle behaviours, physiology and genetics.[6] In Saudi Arabia, is witnessing obesity trends with transition phase in nutrition.[7-10]

Important risk factors which can influence an individual risk for obesity include parental obesity[11], socio economic status[12], and lifestyle factors like physical activity and dietary habits.[13] Identifying precise causes specific for populations can help us with feasible

solutions to the epidemic of obesity which may otherwise cause mortality and morbidity in those populations.

The aim of the present study is to determine independent contribution of parental socioeconomic variables and life style factors to obesity in selected college going female students in Saudi Arabia.

METHODOLOGY

The study was a cross-sectional survey conducted in University of Hail female campus. A random sample of 500 female sample (representing approximately a total population of 10000 with calculated confidence interval of 5.8 and confidence level of 95%) was enrolled in the study from four randomly sampled colleges (College of Medicine, College of Sciences, College of Arts and Humanities and College of Information technology) from a total of 12 colleges of the University of Hail. The research committee approved the study. The inclusion criteria included current students of University of Hail, absence of chronic illness, and acceptance of informed consent form. The exclusion criteria included those with less than 18 years and those who were pregnant or lactating.

Data was gathered by questionnaire method collecting information such height, weight, age parental income and education, genetic history and obesity, lifestyle factors such as physical activity, snacking and breakfast skipping patterns. Body mass index (BMI) was calculated from the height and weight as BMI = weight in kg/ height squared in meters (14). The questionnaire was initially translated into Arabic from English pre-tested for question accuracy and clarity using a pilot sample.

Statistical analyses were performed using the Statistical Package for Social Sciences (version 16.0, SPSS, Inc) software. Descriptive statistics such as means and standard deviations were calculated for the continuous variables and frequencies for qualitative data. Associations were established using chi-square analysis and probabilities using Odd's Ratio. All reported P values were made on the basis of 2-sided tests and compared to a significance level of 5%; differences were considered statistically significant at $P < 0.05$ or $P<0.01$.

RESULTS

Table 1 presents the anthropometric profile of the study subjects (n=500). The total mean age ± SD was 21.24. (range 18-25) and BMI was 24.17 which was within overweight cut off for

BMI of the international range (BMI 24.9 to 30). Nearly 30.4% and 18.6% of study population were overweight and obese respectively according to BMI International cut off.

Table I: Anthropometric parameters of the study subjects.

Parameters	Range	Mean	BMI category	BMI	International cutoff
Age (years	18- 25	21.24	Underweight	15.3	10.7
Height (m)	140 - 180	153.25	Normal	35.7	57.0
Weight (kg)	45 - 115	63.28	Overweight	30.4	25.3
BMI	13.1 - 40.6	24.17	Obese	18.6	7.0

Table 2 shows the association of obesity with socioeconomic variables and life style factors among the study population. The median family income of the study subjects was 7000 Saudi Riyals (range 5000 – 12000) which was used as a cut off to divide the study subjects into two income groups. Similarly the educational status of father and mother education status was used to divide study population into two groups: educated and non educated parents. Subjects were also divided on the basis of parental genetic history for obesity, physical activity habit, snacking pattern and habit of skipping breakfast. Pearson Chi-square analysis identified significant association of obesity with presence of family history of maternal obesity. Odd's ratio suggest 1.3 times higher risk for obesity in female subjects with mothers being obese.

Table II: Socioeconomic and lifestyle behaviors of the study subjects.

Variables		BMI		Total	Pearson's correlation	Odd's ratio 95% CI
		Obese	Non obese			
Family income	<7000	115 (68.8)	55 (31.2)	170 (100)	0.244 (0.624)	0.925(0.664-1.276)
	>7000	82(66.2)	48 (33.8)	130 (100)		
Father's education	Yes	170 (69.9)	746 (30.1)	246 (100)	3.169 (0.075)	1.417 (0.182 – 2.038)
	No	30 (51.4)	24 (42.6)	54 (100)		
Mother's education	Yes	125 (70.1)	52 (29.9)	177 (100.0)	(0.289)	(0.862-1.657)
	No	78 (64.2)	45 (35.8)	123 (100.0)	1.127	1.195
Physical activity	Yes	129 (68.3)	57 (31.7)	38 (33.3)	0.084 (0.772)	0.957 (0.704 – 1.297)
	No	79 (66.7)	35 (33.3)	114 (100.0		
Father obesity	Yes	48 (76.2)	15 (23.8)	63 (100.0)	2.648 (0.104)	0.903 (0.805-1.012)
	No	158	79 (34.6)	237		

		(65.4)		(100.0)		
Mother's obesity	Yes	59 (58.2)	39 (41.8)	98 (100.0)	6.009 (0.014)* (68.8) 0.059	1.248 (1.029-1.508)
	No	149 (72.3)	53 (27.7)	202 (100.0)		
Skipping breakfast	Yes	50 (0.809)	30 (31.3)	80 (100.0)	0.056 (0.809)	0.981 (0.854-1.138)
	No	149 (67.3)	71 (32.7)	220 (100.0)		
Snacking	None or Once daily	65 (31.0)	138 (69)	203 (100.0)	8.578 (0.003)*	1.339 (1.084-1.656)
	> once daily No	49 (48.5)	48 (51.5)	97 (100.0)		

DISCUSSION

Obesity is in epidemic proportions while evidence suggests prevalence of large differences among populations for certain reasons[15] prompting the necessity to increase research focus on understanding population/region specific reasons. Researchers, in quest of elucidation for raging unabated obesity rates, have evaluated trends of nutrition. There is a transition towards fast foods from traditional foods and technological shifts resulting in reduced physical activity.[16] However, population disparity needed further explanations and researchers have associated them with individual, family and environmental characteristics including parental fatness, race/ ethnicity, family socio economic conditions and neighborhood characteristics.[17-19]

Latest studies also pinpoint the importance of young adult stage, a transition period to adulthood, which is characterized by increasing obesity incidence.[20,21] Our study findings also raise the seriousness for the necessity to identify preventive measures for the obesity epidemic since the study reports higher prevalence rates of obesity in females.

Obesity research was mainly focused around excess consumption of energy as promoted by market driven forces and reduced physical activity. The importance of other factors such as genetic reasons have been undermined. Parental and offspring association for BMI is one such interesting character reported by some studies[22,23] with a suggestion towards a strong influence of mother's obesity on offspring's obesity. In our study we found that female offspring obesity was highly associated with mother's obesity. A recent study has reported similar results in children from a longitudinal study in UK.[24] According to this study, the risks of obesity at 8 years of age were 10-fold greater in girls 41%, (P<0.001) six fold greater

inboys 18%, (P<0.05) if the same-sex parent was obese and they concluded by pointing to environmental, possibly behavioural influence, rather than genetic factors.

However a recent review suggest there could be possibly epigenetic events which can influence obesity risk even from utero[15] or even possibly from two generations back when oocytes were formed in the grandmother.[25] Thus the raising obesity we are witnessing today could be a result of environmental changes that affected prior generations which were exposed to sudden environmental changes due to changing technology. There is need for more studies in this area.

Findings of the current study also suggest habit of frequent snacking behavior inverse association with obesity. A recent study[26] which was done on male Saudi college students also indicated similar association between snacking and obesity. These results suggest the role of nibbling healthy snacks as beneficial as compared to gorging meal pattern. This could be explained to increased metabolism during snacking and low metabolism during fasting. It is a general concern that snacking is preferred from baked foods, sweets and beverages along with chocolates and chips in young adults.[27] Healthy choices may definitely be helpful as compared to energy dense foods. Our study however couldn't establish the association of obesity with other lifestyle factors viz., physical activity and skipping of breakfast.

Our study couldn't establish associations for obesity with socioeconomic status as measured by parental income and education. Furthermore, exploratory research is required to identify and find solutions to the unique problems of young adult period.

CONCLUSION

Maternal obesity had a strong association with female young adults obesity while small snacking had inverse association.

Further research is needed to assess behavioral factors which bring disparity between families with obese parents and non-obese parents. Studies are also required to analyze gender based associations in the study population.

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