
Risk Factors for Obesity among Saudi Female College Students

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Abstract

Obesity is alarmingly raising in young people necessitating for identification of precise causes specific for populations. The aim of the present study is to determine independent contribution of parental socioeconomic variables and self-life style factors to obesity in Saudi female college students. We performed a cross-sectional study using a random selection of 300 women aged 18–26 years recruited from the female campus of University of Hail, Saudi Arabia and collected self-reported information to meet study objectives. Around 32 % of females were either overweight or obese and the study subjects with a family history of maternal obesity and habit of limited snacking had higher odds for obesity. No associations were found between obesity and parental income and education status; and skipping breakfast and physical activity behaviours of the subjects. Maternal obesity could be a considerable risk factor for obesity in female subjects.

Keywords: Obesity; Females; Saudi Arabia

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1. Introduction

Globally, obesity has reached epidemic proportions and is considered as the most serious public health issue affecting all age groups [1- 3]. Obesity epidemic is perpetually rising in young people [4, 5] while affecting racial/ethnic, socio economic, gender groups with disparity depending on multifarious influencing effects of life style behaviours, physiology and genetics [6]. Arabian Gulf countries particularly Saudi Arabia is also witnessing this globesity trends with nutrition transition phase [7- 9].

Recent research is emphasising interest in understanding the disease aetiology with in a life course frame work [10]. Important risk factors which can influence an individual risk for obesity within a life course frame work 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 otherwise can bleed nations for its potential mortality and morbidity effects.

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

2. Methodology

2.1. Design and Sample

The study was designed as a cross-sectional survey and was conducted in University of Hail (UOH), female campus during the winter semester 2012 -13. A random sample size of 300 female sample (representing approximately a total population of 10000 with calculated confidence interval of 5.6 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 UOH. University of Hail research committee approved the study. No personal identification details were collected protecting privacy and allowing for anonymous and voluntary participation. The inclusion criteria included current registration with UOH as students, absence of chronic illness, and knowledge of their height, weight information and acceptance of informed consent form. The exclusion criteria included those with less than 18 years and those who are following any special diets, pregnant and lactating mothers.

2.2. Data Collection

Data was gathered by questionnaire method requesting information related to self-reported height, weight, age, parental socio economic variables (parent income, parent education status), parental genetic history for obesity and self-lifestyle factors (physical activity, snacking and breakfast skipping patterns). Body Mass Index (BMI) was calculated as the ratio of weight (kilograms) to the square of height (meters). Weight status was classified into four categories: underweight (BMI \leq 18.5), normal weight (BMI between 18.5 – 24.9), overweight (BMI between 25–29.9), and obese (BMI \geq 30) and also according to Asian cut off as underweight (BMI \leq 18.5), normal weight (BMI between 18.5 – 22.9), overweight (BMI between 23–27.49), and obese (BMI \geq 27.5) [14].

2.3. Validation of the Questionnaire

For content validity (back to back translation), the questionnaire was initially translated into Arabic from English and then converted back to English and pre-tested for question accuracy and clarity using a pilot sample of 10 which were not included in the study results.

2.4. Data Analysis

Statistical analyses were performed using the Statistical Package for Social Sciences (version 16.0, SPSS, Inc) software. The data set was cleaned and edited for inconsistencies. Missing data were not statistically computed. 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 $P < 0.01$.

3. Results

Table 1 presents the demographic and anthropometric profile of the study subjects (n=300). The total mean age \pm SD was 20.12 ± 1.83 years (range 18-26) and mean \pm SD BMI was 23.49 ± 4.41 which was within normal cut-off for BMI of the international range (BMI 18.5 to 25) and above normal cut off according to Asian cut off (BMI 18.5 to 23). Table 1 also presents BMI group distribution according to both International and Asian BMI cut off. Nearly 25.3 % and 7.0 % of study population were overweight and obese respectively according to BMI International cut

off whereas around 31.7 % and 16.7 % of study population were overweight and obese respectively according to BMI Asian cut off.

Table 1. Demographic and anthropometric profile of the study population

Variables	Minimum	Maximum	Mean	Standard Deviation
Age (years)	18	26	20.12	1.827
Weight (kg)	39	110	58.17	11.515
Height (cm)	135	185	157.43	8.046
BMI (kg/m ²)	14.02	44.62	23.49	4.412
BMI (%)	Underweight	Normal	Overweight	Obese
International cut off	10.7	57.0	25.3	7.0
Asian cut off	10.7	41.0	31.7	16.7

Table 2 presents the association of obesity with parent socioeconomic variables and self-life style factors among the study population. The median family income of the study subjects was 8000 Saudi Riyals (range 5000 – 15000) which was used as a cut off to divide the study subjects into two income groups. Similarly father and mother education status was used to divide study population into two groups: literate parents and illiterate 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 associations of obesity with presence of maternal family history of obesity and snacking habit. Odd's ratio suggest 1.2 times higher risk for obesity in female subjects with mothers being obese and 1.3 times higher risk for obesity in female subjects with less frequency of snacking habit.

Table 2. Obesity and lifestyle factors among study population

Variables		BMI		Total	Pearson Chi-Square (p value)	Odds Ratio (95 CI)
		Non Obese	Obese			
Family Income	< 8000 SAR	117 (68.8)	53 (31.2)	170 (100.0)	0.240	0.921
	> 8000 SAR	86 (66.2)	44 (33.8)	130 (100.0)	(0.624)	(0.663-1.279)
Father Education Status	Illiterate	31 (57.4)	23 (42.6)	54 (100.0)	3.168	1.416
	Literate	172 (69.9)	74 (30.1)	246 (100.0)	(0.075)	(0.984-2.037)
Mother	Illiterate	79 (64.2)	44 (35.8)	123 (100.0)	1.127	1.195

Education status	Literate	124 (70.1)	53 (29.9)	177 (100.0)	(0.288)	(0.862-1.657)
Physical Activity	Yes	127 (68.3)	59 (31.7)	186 (100.0)	0.084	0.956
	No	76 (66.7)	38 (33.3)	114 (100.0)	(0.772)	(0.704-1.297)
Father Obesity	Yes	48 (76.2)	15 (23.8)	63 (100.0)	2.648	0.903
	No	155 (65.4)	82 (34.6)	237 (100.0)	(0.104)	(0.806-1.013)
Mother Obesity	Yes	57 (58.2)	41 (41.8)	98 (100.0)	6.008	1.246
	No	146 (72.3)	56 (27.7)	202 (100.0)	(0.014)*	(1.029-1.508)
Skipping Breakfast	Yes	55 (68.8)	25 (31.3)	80 (100.0)	0.059	0.982
	No	148 (67.3)	72 (32.7)	220 (100.0)	(0.809)	(0.850-1.135)
Snacking	None or Once daily	63 (31.0)	140 (69)	203 (100.0)	8.576	1.338
	> once daily	47 (48.5)	50 (51.5)	97 (100.0)	(0.003)*	(1.080-1.657)

4. Discussion

World is witnessing obesity in epidemic proportions while evidence suggest prevalence of large disparities among populations for associated 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 transition towards fast foods from traditional foods and technological shifts resulting in reduced physical activity [16]. However, population heterogeneity needed further explanations and researchers have associated with individual, family, and environmental characteristics including parental fatness, race/ ethnicity, family socio economic conditions, and neighborhood characteristics [17-19].

In the present study we considered parental obesity, income and education as variables influencing obesity of the Saudi female students aged 18–26 years along with their individual lifestyle factors. The main findings of this study were that around 32 % of females were either overweight or obese and the study subjects with a family history of maternal obesity and habit of limited snacking had higher odds for obesity. Our study couldn't find any associations between obesity and parental income, education status and skipping breakfast and physical activity behaviour's of the subjects.

A recent review about rising obesity epidemic in Arabian Gulf countries has pointed out alarmingly raising obesity levels in Saudi Arabians in all age groups and especially among females [8]. Latest studies also underscore the importance of young adult stage, a transition period adulthood is characterized by increasing obesity incidence [20, 21]. Our study findings also raise the alarm bells for immediate necessity to identify preventive measures for soaring 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 undermining exploration of other important factors. Parental and offspring association for BMI is one such interesting phenomena reported by some studies [22,23] with a suggestion towards stronger influence of mother's obesity on offspring's obesity. In our study we found that female offspring obesity is highly associated with mother's obesity but not with father'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 (girls 41%, $P < 0.001$) or sixfold greater (boys 18%, $P < 0.05$) if the same-sex parent was obese and they concluded by pointing to environmental, possibly behavioural influence—the mother acting as role-model for her daughter, and the father for his son as the possible cause rather than genetic factors. They also suggested possibly these associations were new signifying environmental factors that were earlier either not present or much weaker. 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 effected prior generations which were exposed to sudden environmental changes due to changing technology. There is need for more studies in this area to come to conclusive evidence from different populations.

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 relationship for snacking with obesity. These results suggest the role of nibbling healthy snacks as beneficial as compared to gorging meal pattern. However caution is implied to the application of this result since we didn't explore the snack food choices. 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. Young adulthood is a transition phase from adolescence to adulthood. It is difficult to adequately capture traditional socioeconomic status specifications in this transition phase and hence a stable parental socioeconomic status has been used as a construct to identify the associations between obesity and socio economic status. While

parental background can have a strong influence on the socioeconomic status of young adult offspring, the study results suggest studying young adult socioeconomic status independent of parents probably could have led to some conclusions specifically relevant to the complex young adult age range.

The present study has several limitations. Being a cross sectional study establishing causal relations could be difficult. Self-reported BMI has been used as proxy for identifying obesity. Several previous studies suggest using actual measurements for height and weight could be more accurate than using self-reported values. Furthermore, exploratory research is required to identify and find solutions to the unique problems of understudied young adult period.

5. Conclusion

Mother's obesity had a strong association with female young adults obesity while 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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