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EXPLORATORY SOCIO-SPATIAL DISTRIBUTION OF OVERWEIGHT AND OBESITY AMONG FEMALE COLLEGES IN THE FACULTY OF ARTS AND HUMANITIES, KING ABDUL AZIZ UNIVERSITY, JEDDAH GOVERNORATE, KSA IN 2013

KATIBAH AL MAGHRABI

Department of Medical Geography, King Abdul Aziz University Hospital, Jeddah, Saudi Arabia

ABSTRACT

In the present study, we study socio-spatial distribution of overweight and obesity among female colleagues in the faculty of arts and humanities, King Abdul Aziz University, Jeddah, KSA. A cross-sectional study is conducted on female colleges in different majors (Arabic, English, European Languages, French, Psychology, Information Technology, Islamic Studies, Geography, History, and Media). A total of 525 colleges are included, and asked to answer a pre-designed validated questionnaire. Their body mass index (BMI) is calculated by measuring their individual weight and height. Then, based on their BMI, they are placed in the following categories: underweight; normal weight; overweight and obesity. 111 colleges are placed in the underweight category (21.1%), 286 (54.5%) are found to have a normal weight and 128 (24.4%) are overweight. We observe a significant correlation between increased age and the number of individuals in the "overweight and obese" category. The prevalence of overweight and obese subjects is significantly higher among married colleges and those who have children.

KEYWORDS: Medical Geography, Obesity, Overweight

INTRODUCTION

Obesity is one of the world's epidemics, the causative agent of several chronic diseases including metabolic syndrome, type 2 diabetes, cardiovascular diseases, hypertension, and various others [1-3]. The World Health Organisation has linked 5% of deaths worldwide to overweight and obesity [4]. Unfortunately, there has been a significant rise in obesity in developed and developing countries [5]. In fact, different studies conducted in 1980 and 2008 have proven that the prevalence of obesity has almost doubled within that period. Additionally, 50% of women in the areas of Europe, Eastern Mediterranean and the Americas are overweight [6]. Obesity is due to an increase in calorie intake accompanied by reducing physical activity. Therefore, demographics and economics are important factors as they can be correlated to the nutritional transition [7]. While Saudi Arabia does indeed have some studies regarding the prevalence of overweight and obesity among individuals, there are scarce amounts of data which can relate such results to regional variation [8]. These studies are normally conducted in order to introduce new methods of intervention and prevention, that is why regional variation is an important factor [9-10]. Moreover, there is a scant amount of researches that pinpoint the roles of socio-economic characteristics and geographic domain in obesity [8]. Hence, our study identifies several factors in determining the variation of obesity including socio-spatial variation, lifestyles, dietary and snacking practices. The hypothesis states that socio-spatial variations do indeed have an impact on obesity as a result of an unequal distribution of its causes in a heterogeneous population. Our study aims to: (i) determine the prevalence of overweight and

obesity among the study group; (ii) analyse the socio-spatial variations of overweight and obesity among the study group; and (iii) identify lifestyles and dietary practices contributing to obesity.

MATERIAL AND SUBJECTS

Study Area

Jeddah Governorate is the area where the study is conducted. It is a city on the west coast of the Kingdom of Saudi Arabia, and is considered as a metropolitan city as it is one of the most commercially active cities and the main seaport. Its urban area is 1,765 km^2, which lies between (39°. 15′; 40°. 35′E), and (22°. 5′; 20°. 30′N). It has a population of 3,000,000.

Population of the Study

The current study targeted university colleges of different majors in the Faculty of Arts and Humanities in King Abdulaziz University as a greater portion of them are married. This would allow a larger sample size to be chosen, but still have the diversity as different majors are included. Their estimated total number accounted for 3,330.

Sampling

Due to the assumption that states that the prevalence of obesity among our investigated colleagues is about 25%, with a confidence interval of ±2.5% and the power of 80%, the appropriate sample size would be 525. In order to ensure that all of the subjects would respond, each one is approached individually. The sampling method used is a random sampling. Afterwards, the responses are inputted into the Statistical Package for the Social Sciences (SPSS), and the different factors assessed.

Tools of the Study

The assessed BMI of the study group:

- The weight and height of colleges are accurately measured using a standard scale.
- The BMI are calculated for each colleague using the formula: weight in Kilogram divided by the height in metre squared.
- The BMI are then compared to the values set by the Disease Control and Prevention Centre (CDC).
- Based on the found values, different categories are assigned:
  - Underweight: below 18.5, exclusive
  - Normal: between18.5 and 24.9, inclusive
  - Overweight and Obese: above 25, inclusive

RESULTS

Out of 525 university female colleges enrolled in King Abdulaziz University's Faculty of Arts and Humanities, there are 128 (24.4%) considered to belong to the "overweight & obese" category as shown in Table 1. The prevalence found to be significantly higher among colleges whose age is more than 24 (22, 39.3%) than those of younger ages, 12.7% (21) and 28.1% (85) for age groups 18-20 and 21-23, respectively, as shown in Table 2. Additionally, it is found that being

married is significantly correlated with being "overweight & obese" (27, 35.1%) compared to those who are unmarried (101, 22.5%). Also, having children seems to be significantly related to being "overweight & obese with 45.5% (20), while only 22.5% (108) of childless individuals (see Table 2). Upon cross-referencing the values of married individuals who have kids, there is indeed a significant result, where 46.5% of married colleges with children belong in the "overweight & obesity" category compared to 20.6% for those who are not married.

Surprisingly, the work status either parent seems to have no impact on being overweight & obese (see Table 2). What are even more unexpected that snacking during university hours and the frequency of intake of chips do not have any significant results. In fact, over half of the study group exhibit a normal BMI as shown in Table 2 and Table 3. Additionally, there is no significance related to the area of residence as illustrated by Figure 1, or even the colleagues' fields of study as shown in Figure 2. The method of transportation used to get to the university and the place of residence played no significant role in determining the prevalence of obesity as shown in Table 4.

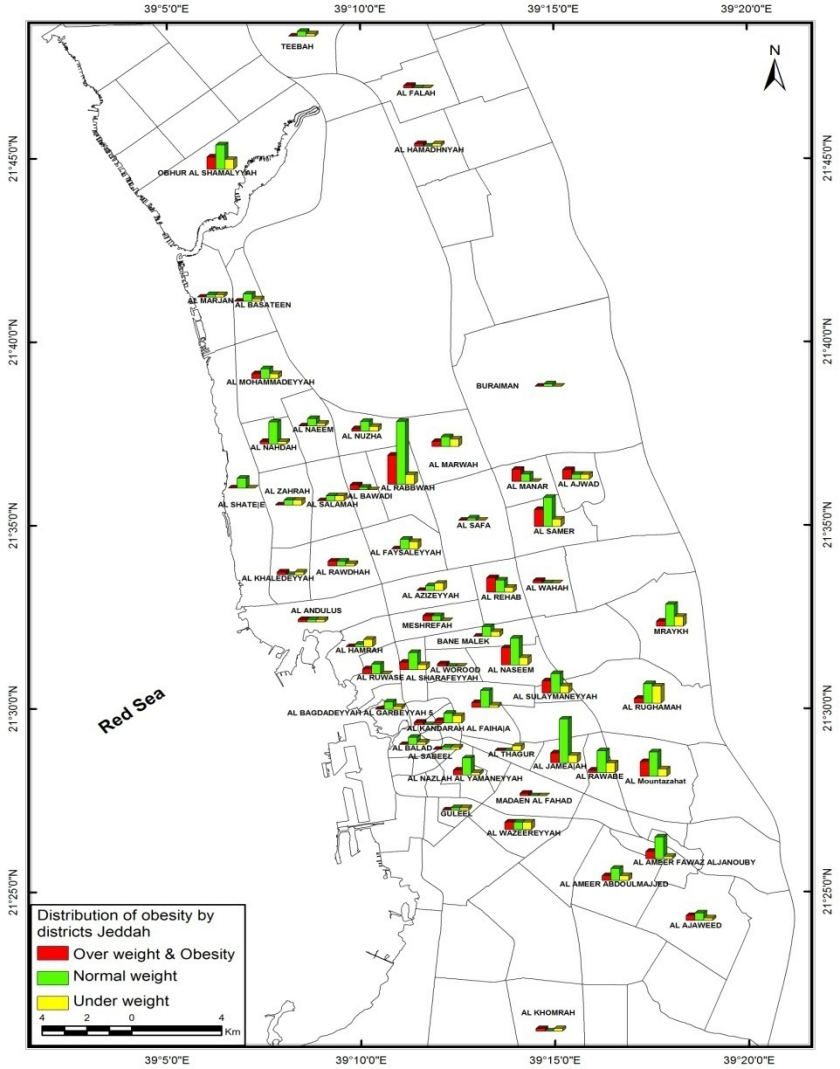

Figure 1: Patterns of BMI & Obesity in Arts and Humanities Female Students (2013)

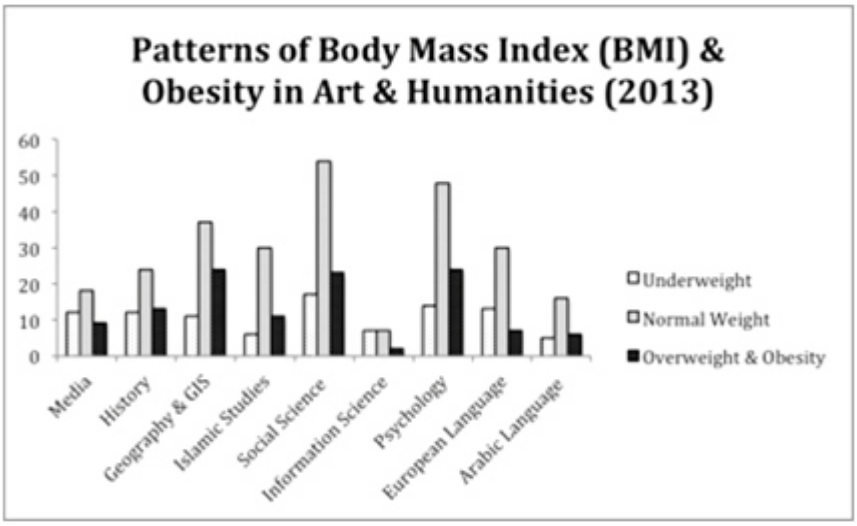

Figure 2: Patterns of Body Mass Index (BMI) & Obesity in Arts & Humanities Female Students (2013)

Table 1: BMI Categories of the Study Samples

Range	Class	Frequency	Percent
< 18.5	Underweight	111	21.1
18.5 – 24.99	Normal weight	286	54.5
25.00 – 29.99	Over weight	105	20
> 30	Obesity	23	4.4
	Total	525	100

Table 2: Prevalence of Overweight and Obesity According to Demographic Characteristics of the Colleagues

Characteristics	BMI Categories						chi2	P
	Underweight		Normal Weight		Overweight & Obesity			
	No	%	No	%	No	%		
Age								
18-20	44	26.5%	101	60.8%	21	12.7%	26.99	<0.001
21-23	64	21.1%	154	50.8%	85	28.1%		
24 or more	3	5.4%	31	55.4%	22	39.3%		
Type of Housing								
Villa	39	22.7%	87	50.6%	46	26.7%		
Apartment	57	20.3%	154	54.8%	70	24.9%	4.923	0.554
Public house	15	22.1%	42	61.8%	11	16.2%		
Other	0	0%	3	75.0%	1	25.0%		
Marriage								
Married	12	15.6%	38	49.4%	27	35.1%	5.987	0.05
Unmarried	99	22.1%	248	55.4%	101	22.5%		
Having Kids								
Yes	3	6.8%	21	47.7%	20	45.5%	13.81	0.001
No	108	22.5%	265	55.1%	108	22.5%		
Rank within Brothers								
1st	23	25.6%	42	46.7%	25	27.8%		
2nd	20	25.6%	42	53.8%	16	20.5%	11.466	0.075
3rd	13	14.4%	63	70.0%	14	15.6%		
4th	45	22.0%	111	54.1%	49	23.9%		

Table 2: Contd.,

Work Status of the Mother							1.565	0.457
Has a job	29	25.0%	62	53.4%	25	21.6%		
Jobless	82	20.0%	224	54.8%	103	25.2%		
Work Status of the Father							0.529	0.768
Has a job	36	19.5%	102	55.1%	47	25.4%		
Jobless	75	22.1%	184	54.1%	81	23.8%		

Table 3: BMI Categories According to Habits of Taking Snacks to the School and Consuming Fast Foods

Characteristics	BMI Categories						chi2	P
	Underweight		Normal Weight		Overweight & Obesity			
	No	%	No	%	No	%		
Taking Snacks to the University							1.459	0.425
Yes	20	22.7%	43	48.9%	25	28.4%		
No	91	21.1%	240	55.6%	101	23.4%		
Eating Chips Per Day							7.29	0.121
0	25	14.8%	98	58.0%	46	27.2%		
1 to 2	78	24.1%	173	53.6%	72	22.3%		
3 or more	8	24.2%	15	45.5%	10	30.3%		

Table 4: BMI Categories According to Place of Residence and Used Methods for Transportation of the Colleagues

Characteristics	BMI Categories						chi2	P
	Underweight		Normal Weight		Overweight & Obesity			
	No	%	No	%	No	%		
Ownership of Private Car							0.89	0.641
Yes	110	21.3%	282	54.5%	125	24.2%		
No	1	12.5%	4	50.0%	3	37.5%		
Methods of Transportation							1.863	0.761
Walking	0	0%	2	100.0%	0	0%		
Public buses	44	22.1%	106	53.3%	49	24.6%		
Private cares	67	20.7%	178	54.9%	79	24.4%		

DISCUSSIONS

The current world is plagued by obesity, which is considered a complex condition which is affected by a range of conditions, both of genetic and non-genetic origin, with the interactions between them [11]. A similar research was conducted by Shagrawi et al [12] including the same inclusion criteria. The results obtained showed that the prevalence of overweight and obesity was 20.9%, which is close to our results obtained by the current research (24.4%). The small difference between the two values can be due to the difference in sample size; where Shagrawi et al had 460 female university colleges, as opposed to the 525 in our study. Additionally, the research was conducted in 1994, where the car usage, incomes, and availability of fast food were not as abundant as nowadays. There is a substantial increase in the economy in the countries belonging to the Eastern Mediterranean Region, which can be associated with the change in the recent diets, which mostly contain unhealthy energy sources, such as saturated fat, refined carbohydrates and cholesterol. All are low in polyunsaturated fatty acids and dietary fibre. This is further augmented by the sedentary life and stress. All of these factors therefore account to the increased prevalence of obesity [13-14].

Several studies reported the nutritional transition in the high income countries in the Arab Gulf Countries [14-15]. Our research assumes the level of social status is related to the district of residence and the type of housing. But the results showed that there is no significant effect related to the social status, in contradictory to the results obtained by Al-Shargawi et al. This may be attributed to the fact that most of our colleges in the university are exposed to the same form of fast food available all over the university campus. Also, the fact that the unhealthy snacks such as chips are not exclusive for a certain status. With respect to the level of the underweight population, 21.1%, the reason was previously interpreted by another research [16]; the modern western thin body image was a strong factor amongst all individuals, including those belonging to the normal weight category (54.5%).

In a research conducted in the Gassim region of Saudi Arabia in 1998 [17] showed the same correlation when it came to age; as the age of the individuals increased, so did the BMI, therefore leading to a higher prevalence of obesity in the older individuals. This might be attributed to the reduced level of physically activity and the reduction of muscle mass due to ageing. This can also be related to the fact that most of the women belonging to the 24+ age group are married and have children. This can also be further related to grand multiparty, which is a common phenomenon in Saudi Arabia with a reduced time between each pregnancy, therefore reducing the amount of time available for females to lose the weight gained during pregnancies [18]. In conclusion, obesity still remains an international problem that requires immediate attention. This research attempted to expose the most important factors that affect obesity among educated individuals. Age, marriage, and conception remain to be the strongest risk factors in females, while surprisingly geographical distribution and social status did not express a significant result.

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