How to Cite:
Elfaki, B. A. (2023). Factors contributes to overweight and obesity among young adults. *International Journal of Health Sciences*, *7*(S1), 698–709.
https://doi.org/10.53730/ijhs.v7nS1.14260

Factors contributes to overweight and obesity among young adults

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***Abstract*---**Background: Obesity is a major public health problem in both developed and developing countries and it became an important public health problem in developing countries like Sudan. Study purpose: The purpose of this study was to identify obesity and overweight and determine factors that contribute to obesity and overweight among young adults. Methods: A descriptive quantitative study was conducted in Sudan, Khartoum. The sample size was amounted to 180 collected with convenient techniques and selected according to criteria. Data was obtained through a self-administered questionnaire and was analyzed by (SPSS) version 22.0, descriptive statistics, cross tabulation were made. Results: 103 (57.2%) of participants were females and 77 (42.8%) were males. Most of the participants' 90(50.0%) ages ranged from 18–23 years. More than half of participants, 104 (57.7%) with university and post-university education, and 54.4% had an average monthly income. Obesity and obesity were 13.9% and 22.2%, respectively. Obesity was insignificantly high among females (15.5%), and overweight was higher among males (23.4%), a p-value of 0.860. Obesity and overweight are caused by a variety of factors, including hereditary and eating foods containing fat, cholesterol, and sodium. While overweight was higher among students who chose food that contained fat and cholesterol, meal size, sodium, and calories, which were 33.3%, 31.9%, 28.6%, and 20.4%, respectively, with a P-value of 0.003. Also, overweight was 42.1% higher in students who used computers while eating food, not exercising, sleeping during the day and night, and sleeping eight hours or more. Conclusions: the study discovered high levels of overweight and obesity, which should be considered a public health concern. Many factors significantly contribute to obesity and overweight. There is a need for interventional programs and strength knowledge to change lifestyle to maintain ideal body weight.

***Keywords*---**factors contribute, overweight, obesity, young adults.

Introduction

Obesity and overweight are major causes of non-communicable diseases. Obesity is a problem in both developed and developing countries. In Africa, 8% of adults over the age of 20 are obese and 27% are overweight. (1) By 2030, 1 in 13 men and 1 in 5 women in Africa and 1 in 3 adults in South Africa are projected to be obese. (2) The World Health Organization (WHO) now estimates that over 1.9 billion adults over the age of 18 are overweight. Of these, more than 650 million adults were obese, and 39% are overweight (39% of men and 40% of women). (3). In addition, WHO estimates that more than 40 million years of disability-adjusted life expectancy are lost each year in this region due to dietary risks. (4) The World Health Organization (WHO) defines overweight and obesity as abnormal or excessive fat accumulation that poses a health risk. (5). Another WHO definition of overweight is a body mass index (BMI) of 25 or greater, and obesity is a BMI of 30 or greater. (6)

Obesity can occur at any age. Previous studies examining obesity trends have found that obesity is increasing indiscriminately in both adults and children of all ages, geographic location, ethnicity or socioeconomic status. (5) Young adulthood is considered an influential period for excessive weight gain and unhealthy weight-related behaviors. This age group has the highest lifetime weight gain rate. (7) Many young people are undergoing major lifestyle changes such as, they leave home, go to college, find a job, build relationships, and experience pregnancy and child-rearing. These transitional periods are seen as periods of movement, in which young people feel a sense of 'loss' and 'identity discontinuity' as they leave their familiar surroundings and take on new ventures. These milestones in life predispose young adults to energy imbalances that often lead to weight gain that may not be a problem at the time, but accumulates later. (8)

For both men and women, the greatest increase in obesity occurs during childhood and early adulthood. Weight gain then continues until middle age. (9) Obesity is a complex condition in which excess body fat increases the risk of hypertension, diabetes, metabolic syndrome, stroke, certain cancers, dyslipidemia, gallbladder disease, sleep apnea, osteoarthritis, and all may cause increased mortality, emotional distress, and social stigmatization (10) and is a major contributor to the global burden of chronic disease and disability. (11). Obesity is also associated with an increased risk of all-cause mortality and cardiovascular mortality. (12). Obesity rates among young people in developing countries range from 2.3% to 12%, and overweight is 28.8%, and in the UK current estimates range from 22% to 35%. (8) Due to inherent hormonal differences, women are more likely to be obese than men. (13)

Studies show that the prevalence of overweight and obesity in the Sudan is increasing. According to Abu Aisha et al, a survey conducted in Khartoum police households found that the prevalence of overweight and obesity was 45.8%. Another study found that Sudan's overweight and obesity rates were 30 percent and 19.2 percent respectively. (14) In rural Sudan, the prevalence of overweight and obesity was 31.70 and 9.40 percent, respectively. (15) Obesity is primarily caused by modifiable risk factors such as diet, exercise, sleep and stress. (16). Factors that may contribute to excessive weight gain in adults and adolescents

include genetics, food type and amount and drink consumed, level of physical activity, and time spent in sedentary activities, watching TV, working on a computer, calling or texting her, sleeping habits, illness, and medication. (17)

Being overweight or obese can have a significant impact on a person's life. It can affect a person's health and well-being. (9) Overweight and obesity are among the most preventable causes of morbidity and mortality, and are the fifth leading cause of death worldwide. To take appropriate measures to manage overweight and obesity, it is important to examine an individual's lifestyle patterns, eating patterns, and physical activity, which may be the most common causes of this problem.(7). The purpose of this study is to identify the extent of obesity and overweight among young people and to identify factors that contribute to these serious health problems.

Methodology

Study design

Descriptive, quantitative study

Study Area

The study was conducted in Khartoum, Sudan, among 180 young adults in the age group between 18 and 35 years.

Body mass index

Body mass index (BMI) is calculated by dividing weight (in kilograms) by height (in meters) squared. For adults, current guidelines from the U.S. Centers for Disease Control and Prevention (CDC) and WHO define a normal BMI range as 18.5 to 24.9, with a BMI of 25 kg/m2 considered overweight, and a BMI ≥ 30 kg /m2 is classified as overweight. Severe obesity is defined as a BMI of 40 kg/m2. (5)

Data Collection

The data was obtained through a self-administered questionnaire. The questionnaire contains questions about personal data such as gender, age, social status, education level, and monthly income. The second part contains height and weight measurements, and the third part contains questions about the factors that contribute to overweight and obesity. The convenience sampling technique was used to collect data online (18,19), and the total number of respondents was 180, which was considered the sample size of the study.

Data Analysis methods

Descriptive analysis was performed on the collected data using the Social Science Statistics Package (SPSS) for Windows version 22.0. Data were presented in the form of frequency and percentage tables and graphs. Obesity and overweight were estimated using BMI and compared with participant information such as age,

gender and monthly family income. In addition, factors contributing to obesity and overweight were cross tabulated and analyzed and compared with participants' BMI. A chi-square test with a p-value of 0.05 was also used to check the relevance and validity of the test.

Ethical approval

The study was conducted in accordance with the Helsinki Declaration of Ethical Standards for Research Involving Human Subjects Participants were informed and consent obtained before participating in the study, they were given the freedom to withdraw from the study, and the information obtained was treated with complete confidentiality. (20)

Results

Table-1: Partiepants background information. (n=180)

Participants information		Frequency	Percentage
Gender	Male	77	42.8
	Female	103	57.2
Age/Year	18-23	90	50.0
	24-29	73	40.6
	30-35	17	9.4
Education Level	Illiterate	16	8.9
	Primary/basic school	23	12.8
	Secondary school	37	20.6
	University/post University	104	57.7
Marital status	Married	30	16.7
	Not married	150	83.3
Residence	Khartoum	103	57.2
	Omdurman	44	24.4
	Bahri	33	18.3
Origin	Northern Sudan	54	30.0
	Southern Sudan	18	10.0
	Western Sudan	27	15.0
	Central Sudan	75	41.7
	Other nationality	6	3.3
Month income	High	65	36.1
	Average	98	54.4
	Low	17	9.4

Table 1 shows more than half of study participants 103(57.2) were female and 77(42.8%) were male, 90 (50%) ages ranged from 18–23 years, more than half of the 104 (57.7%) have university or post-university education levels, and 57.2% were residing in Khartoum town, 24.4% were from Omdurman, and 18.3% were residing in Bahri town. About 41.7% of them are from central Sudan, 30% from the north, 15% from the west, and a few (3.3%) from other nationalities. In

addition, 54.4% of the participants had an average monthly income, 36.1% had a high income, and 9.5% had a low monthly income.

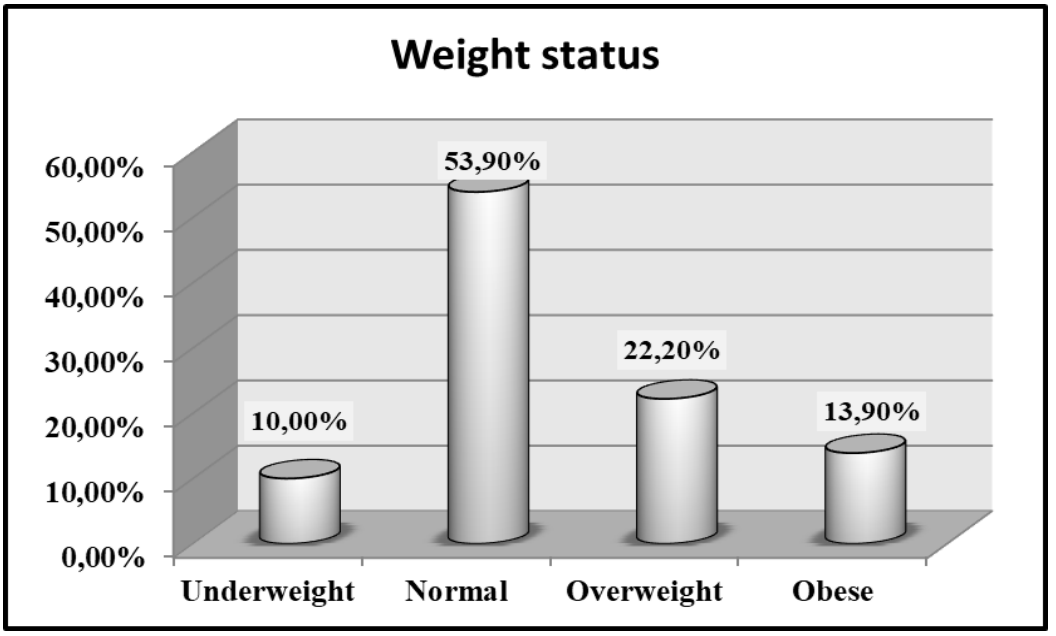

Figure: I- weight status among study participants based on body mass index. (n=180)

The figure shows participants' weight status according to body mass index. Obesity was found to be (13.9%), overweight (22.2%), normal weight (53.9%), and underweight (10%).

Table: 2: Cross tabulation of obesity and overweight among the participants in relation to non-modifiable contributed factors. (n=180)

Contributed factors		Body Mass Index (BMI)				
		Underweight	Normal	Overweight	Obese	P-value
Gender	Male	9.1%	55.8%	23.4%	11.7%	0.860
	Female	10.7%	52.4%	21.4%	15.5%	
Age groups/Year	18-23	14.4%	53.3%	18.9%	13.3%	0.002
	24-29	5.5%	57.5%	24.7%	12.3%	
	30-35	5.9%	41.2%	29.4%	23.5%	
Monthly income	High	15.4%	47.7%	24.6%	15.3%	
	Average	6.1%	56.1%	22.4%	12.3%	
	Low	11.8%	64.7%	11.8%	11.8%	
Hereditary	Hereditary	2.6%	53.2%	27.3%	16.9%	0.020
	None-hereditary	15.5%	54.4%	18.4%	11.7%	

Table 2 displays participants' weight status in relation to non-modifiable contribution factors. In comparison to men (11.7%), women had a significantly

greater rate of obesity (15.5%), while men had a higher rate of overweight (23.4%) than women (21.4%). Participants' rates of obesity and overweight were considerably higher between the ages of 30 and 35; these rates were 23.5% and 29.4%, respectively (p-value equivalent to 0.002). Additionally, the rates of obesity and overweight were higher among those with higher monthly incomes in comparison to men (11.7%); women had a significantly greater rate of obesity (15.5%), while men had a higher rate of overweight (23.4%) than women (21.4%). Participants' rates of obesity and overweight were considerably higher between the ages of 30 and 35; these rates were 23.5% and 29.4%, respectively (p-value equivalent to 0.002). Additionally, the rates of obesity and overweight were higher among those with higher monthly incomes (15.4% and 24.6%, respectively) than among those with low incomes, with an equal proportion of both overweight and obesity (11.8%). Additionally, with a P-value of 0.020, it was discovered that participants with genetic variables were more likely to be overweight and obese (16.9% and 27.3%, respectively) than those without genetic factors (18.4% and 11.7%, respectively).

Table: -3: Cross tabulation of obesity and overweight among the participants in relation to modifiable contributed factors; attitude, types of food and eating patterns. (n=180)

Types of food and eating patterns		Body Mass Index (BMI)				
		Underweight	Normal	Overweight	Obese	P-Value
Meals / day	One meal	23.5%	41.2%	29.4%	5.9%	0.471
	Two meals	9.1%	55.6%	20.2%	15.2%	
	Three meals	7.8%	54.7%	23.4%	14.1%	
Eating between meals	Yes	10.1%	51.9%	22.8%	15.2%	0.061
	No	9.9%	55.4%	21.8%	12.9%	
The types of foods chosen	Fat content and cholesterol	4.8%	33.3%	33.3%	28.6%	0.003
	Meal size	8.5%	42.6%	31.9%	17.0%	
	Calories	14.8%	53.7%	20.4%	11.1%	
	Carbohydrate	9.8%	74.5%	9.8%	5.9%	
	Sodium	.0%	42.9%	28.6%	28.6%	
Eating when with no hunger	Yes	6.3%	51.9%	25.3%	16.5%	0.051
	No	12.9%	55.4%	19.8%	11.9%	
Fruits and vegetables taken per week	Always	6.2%	43.8%	35.4%	14.6%	0.013
	Sometimes	9.5%	60.0%	16.8%	13.7%	
	Rarely	10.3%	55.2%	17.2%	17.2%	
	Never	37.5%	37.5%	25.0%	.0%	
Sweetened, coffee, drinks: etc. taken /week	Every day	10.1%	18.8%	53.6%	17.4%	0.001
	A few times a day	6.1%	59.1%	24.2%	10.6%	
	A bout once times a month	16.2%	48.6%	21.6%	13.5%	
	Rarely or never	12.5%	37.5%	37.5%	12.5%	
Eat fast food /week	Every day	9.5%	42.9%	23.8%	23.8%	0.001
	A few times a day	9.4%	54.7%	22.6%	13.2%	

	A bout once times a month	10.8%	52.7%	24.3%	12.2%	
	Rarely or never	9.7%	64.5%	16.1%	9.7%	

Table 3 shows that obesity levels were significantly higher (15.2%) among participants who ate two meals per day and significantly lower (5.9%) among those who only had one meal per day. With a p-value of 0.471, it is high (29.4%) among people who only eat one meal each day. Additionally, participants who ate between meals had an insignificantly higher rate of overweight and obesity (15.2% and 22.8%, respectively) compared to those who did not (12.9% and 21.8%). The p-value of 0.003 indicates that participants substantially increased their weight (31.9%, 33.3%, 28.6%, and 20.4%, respectively) and their percentage of obesity (17.0%, 28.6%, and 11.1%, respectively) when they consumed large meal portions and foods high in fat, cholesterol, sodium, and calories.

Table-4: Cross tabulation of obesity and overweight of the participants in relation to physical activity levels, sleep routines, and social determinants of health. (n=180)

Contributed factors		Body Mass Index				
		Underweight	Normal	Overweight	Obese	P-Value
Use of the computer during eating food	Yes	7.9%	36.8%	42.1%	13.2%	0.010
	No	10.6%	58.5%	16.9%	14.1%	
Read, study or do homework during eating food	Yes	4.5%	52.3%	31.8%	14.4%	0.371
	No	11.8%	54.4%	19.1%	11.7%	
Talk on/listen to the phone	Yes	12.7%	50.9%	21.8%	14.5%	0.861
	No	8.8%	55.2%	22.4%	13.6%	
Exercise per week	Zero times	11.6%	18.8%	52.2%	17.4%	0.754
	Once or twice	7.6%	53.2%	26.6%	12.7%	
	Three or more time	12.5%	59.4%	18.8%	9.4%	
Sleeping hours per day	Less than five hours	22.7%	45.5%	22.7%	13.9%	
	Five to seven hours	12.9%	51.6%	22.2%	17.7%	0.179
	Eight hours or more	10.0%	53.9%	17.7%	9.1%	

Table 4 revealed that participants who ate while using a computer or watching television were significantly more likely to be overweight and obese (42.1% and 14.2%, respectively) than participants who did not eat while using a computer or watching television, with proportions of 16.9% and 13.1 and a p-value of 0.010. While obesity was higher among participants who had read, studied, or completed homework (31.8%), overweight and obesity were higher among those who had done so (31.8% and 14.4%, respectively), with a P-value of 0.371. With a P-value

of 0.861, it was shown that overweight students were more likely to be obese (14.5%) than those who talked on the phone or listened to iPods (22.4%).

Discussion

Obesity is an urgent problem that needs proper addressed, especially in children. Public and global health policymakers and decision makers need timely, reliable and quantitative information to design effective interventions. (21) This study aimed to identify obesity and overweight and assess contributed factors among young adults. The study enrolled 180 participants, more than half were females and ages ranged from 18-23 years, more than half of them have university/post-university education level, and were residing in Khartoum town. In addition to that they had an average monthly income. Obesity is a complex condition with serious social and psychological dimensions, affecting virtually all ages and socioeconomic groups. (11).

The prevalence of obesity and overweight in this study was determined based on body mass index (22). The prevalence of obesity and overweight was found to be 13.9% and 22.2%, respectively. this result is disagree with the prevalence estimated by Abdalla and Nafeisa, 2016 in the urban community in Jabra area, Khartoum State found overweight and obesity (33.7% and 25.6%), respectively (15) This study documented high result than that documented by the study in Saudi Arabia 2021, which reported 9.0% equal prevalence for both obesity and overweigh. (23), and other study conducted in Egypt revealed that 31.3% of Egyptian adults are overweight and 10.3 % of them are obese.(7

Women are more likely to become obese than men because they have a lower muscle mass and tend to burn fewer calories at rest (24).This is agree with the finding of this study which found that the prevalence of obesity was insignificantly high among females (15.5%), while the prevalence of being overweight was higher among males (23.4%); p-value > 0.005. it's similar to studies among Indian, Egyptian and Ugandan females showed significantly higher levels of overweight and obesity. (8) When comparing the overweight and obesity with participants' age, and monthly income, participants' rates of overweight and obesity were considerably higher between the ages of 30 and 35, and with higher monthly incomes. These agree with reported by Ogden, et al, 2017. (25)

Regarding the factors that contribute to obesity and overweight, the study found that obesity and overweight were found to be significantly higher among participants who had genetic factors (16.9% and 27.3%) respectively and a P-value less than 0.005. However, there is increasing evidence indicating that an individual's genetic background is important in determining obesity risk. Research has made important contributions to our understanding of the factors associated with obesity. (13)

Based on the literature, overweight and obesity are associated with many health problems, but this study found obesity and overweight can occur among healthy people or those without suffering from any health problems. The study also revealed that obesity level is significantly higher among participants who ate two meals per day, and lower among those who only had one meal per day.

Additionally, participants who ate between meals had an insignificant higher rate of overweight and obesity compared to those who did not. Also, participants substantially increased their weight and their percentage of obesity when they consumed large meal portions and foods high in fat, cholesterol, sodium, and calories. Environmental factors; while extensive television viewing and the use of other electronic media has contributed to the sedentary lifestyles, other environmental factors have reduced the opportunities for physical activity. Opportunities to be physically active and safe environments to be active in have decreased in the recent years. (13)

The study demonstrated that as appear by cross tabulation, participants who ate while using a computer or watching television were significantly more likely to be overweight and obese than those who did not eat while using a computer or watching television, While obesity was higher among participants who had read, studied, or completed homework or talked on the phone or listened to iPods. On the other hand obesity and overweight were significantly higher among participants who exercised zero times per week, while a low prevalence was found among students who exercised three or more times per week. So exercise seems to have had a positive effect on reducing obesity and overweight. World Health Organization (WHO) recognizes the critical importance of reducing unhealthy diet and physical inactivity to prevent obesity and overweight. (23)

Both obesity and overweight were significantly higher among participants who slept during the day and night while obesity was higher among students who slept eight hours or more. Maintaining a healthy body weight through proper nutrition and regular physical activity can help decrease a person's risk of developing serious health conditions such as high blood pressure, high cholesterol, diabetes, heart disease, stroke, and cancer. These activities can have a positive impact on overall well-being through better management of existing health conditions and improved quality of life. Several factors, such as access to healthy foods and safe places to engage in physical activity, affect a person's ability to eat a healthy diet, stay physically active, and achieve or maintain a healthy weight. (7)

Conclusion

The rates of obesity and overweight in this study were higher in this study, habits and sedentary behavior as concerns among participants. Many factors contribute significantly to overweight and obesity, including: genetic or hereditary factors; foods high in fat, cholesterol, sodium; computer use during meals; phone use or I-Pod use during meals; Use is a major cause of obesity and overweight. However, several factors contributed slightly to the increase in overweight and obesity rates, including: high monthly income, eating while watching TV, snacking when not hungry, eating fruits and vegetables a week, and drinking sugary coffee and other beverages a week.

Recommendations

Research findings recommend promoting lifestyle changes and adherence to healthy eating habits, as well as implementing structured exercise programs in

public communities, such as walking, football and sports. In addition, the Action Plan pays particular attention to the burden of NCDs and proposes goals, priority areas and actions. Member States are approached to adapt their national nutrition strategies; taking into account the identified priority intervention areas. Create a healthy environment for eating and drinking. Promote the benefits of a healthy diet throughout life, especially for the most vulnerable. Strengthen health systems to promote healthy eating.

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