Research Article

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

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Abstract

Prevalence of overweight and obesity and its associated risk factors among primary public school students (10-14) years old in arkaweet-khartoum-sudan

Background: childhood obesity is one of the most serious health challenges of the 21st century. The problem is global and the prevalence is increasing at an alarming rate.

Objectives: to determine the prevalence and associated risk factors of overweight and obesity among primary public school children (10-14) years old in arkaweet-khartoum-sudan

Materials and Methods: a descriptive cross sectional school based study was conducted among primary schools student's males and females in arkaweet, Khartoum, Sudan. Simple random sampling was used. The data was collected through a self administered questionnaire. Height and weight of the subjects were measured and body mass index (BMI) was calculated, using growth charts of center of disease and control (CDC)

Results: A total of 161 children between ages of 10 and 14 were involved in the study. The prevalence of overweight and obesity was 34% and 4.97% respectively. Females had a higher prevalence of overweight 38.3%when compared to males 30%. Obesity also was highly prevalent in females (7.4%) than in males (2.4%.) the majority of subjects studied healthy- weight (50.9%).

The mean weight is 48.1, mean height is 141.2

There was signifince association between educational level of father(p value=0.000), educational level of mother (p value=0.000),job of mother(p value=o,o46), physical activities(p value=0.034), watching TV(p value=0.04) and playing video games(p value=0.000) for long hours per day, number of daily meals (p value=0.002), type of food, fast food(p value=0.032) and soft drinks consumption (p value=0.000)and family size (p value =0.003)

There was obvious psychological impact among overweight and obese students, as they suffer a lot from their classmate bulling

Conclusion: The results of the current study provide alarming evidence based data on the considerable prevalence of childhood overweight and obesity among primary public school students in arkaweet-khartoum-sudan.

Keywords: Overweight; Obesity; Risk Factors; Children

Introduction

Background information

Obesity is the most common nutritional disorder in developed countries and is becoming significant in the developing countries [1].

Globally, nearly 1 billion people are classified as overweight, 300 million of them being clinically obese [2]. Worldwide, the prevalence of overweight and obesity combined rose by 47.1% for children between 1980 and 2013 [3].

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WHO recommended body mass index as the anthropometric methods to assess the weight of children and adolescents. The 85th and 95th percentiles of BMI are frequently used to define overweight and obesity respectively [4].

Obesity is a condition characterised by abnormal fat accumulation in adipose tissue that results in an excess of body weight and significant impairment of health. Obesity is the consequence of a long-term imbalance between energy intake and energy expenditure, determined by food consumption and physical activity and influenced by biological and environmental factors. Potential risk factors for obesity in early life include genetic factors, lifestyle, and physical, health, and environmental conditions, which can all in turn be influenced by the family context and socio-economic factors [5].

Childhood obesity is a risk factor for several chronic diseases such as hypertension, type 2 diabetes, respiratory disease such as sleep-apnoea, and hepatic abnormalities and coronary heart diseases during adulthood. Additionally, overweight and obesity affect self esteem of children and impair social development [6]. More over there are serious problems that can come from being obese as a child, including hip and other bones problems, early puberty, reproductive problems and some types of cancer [4].

Problem statement

Childhood obesity has become a public health concern in many countries due it's Significant medical, psychological, and economic consequences [3]. Childhood obesity is a serious problem, the rate of over weight and obese children and adolescents has doubled over the last two decades. Children in Sudan like the other children in developed and developing countries are increasingly engaging in sedentary behaviour, spending less time exercising outdoors and more time watching television and playing video games [7].

Justification

Few studies were conducted in this area, and there is lack of data about the current situation. More over schools are a potential setting to target both children and adolescent population for obesity prevention. So this research aim to reflect the data about situation to educational and health sectors in order to improve the situation and to get health generation.

The research objectives

General objective

To study the prevalence of obesity and overweight, and its predisposing factors among primary school children in Arakweet-Khartoum state 2017.

Specific objectives:

1. To measure the prevalence of obesity and overweight among primary school children by using body mass index

2. To identify the predisposing factors of obesity among primary school children.

3. To determine the psychological impact of obesity on primary school children.

4. To determine the effect of obesity on the academic achievement of primary school children.

Literature review

Definition

The words "overweight" and "obesity" are ways to describe having too much body fat. The most commonly used measures of weight status today is the body mass index or BMI. BMI uses a simple calculation based on the ratio of individual height and weight (weight/height2) [8].

- In children and adolescents age 2 to 20 years old, BMI less than 5th percentile are considered underweight

- BMI equal to 5th percentile to less than 85th percentile are considered healthy weight

- BMI equal to 85th percentile to less than the 95th percentile are considered overweight.

- BMI equal to or greater than the 95th are considered obese [9]

Epidemiology

Worldwide, at least 2.8 million people die each year as a result of being overweight or obese, and an estimated 35.8 million (2.3%) of global DAYLs are caused by overweight or obesity. in 2008, 35% of adults aged20+ were overweight (34% men and 35% women). The worldwide prevalence of obesity has nearly double between

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1980 and 2008. In 2008, 10% of men and 14% of women in the world were obese, compared with 5% for men and 8% foe women in 1980. An estimated 205 million men and 297 million women over the age of 20 were obese – a total of more than half a billion adults worldwide. The prevalence of overweight and obesity were highest in the WHO regions of the Americas and lowest in the WHO region for south East Asia. In the WHO region for Europe and the WHO region for the eastern Mediterranean and Americas over 50% of women were overweight. In all WHO regions women were more likely to be obese than men [10].

Causes of obesity

Obesity doesn`t happen overnight. It develops gradually overtime, as a result of poor diet and lifestyle choices, such as:

- Unhealthy diet and eating habits.

- Weight gain is inevitable if you regularly eat more calories than you burn [11].

- Eating large amounts of processed or fast food that`s high in fat and sugar [12].

- Drinking too much alcohol- alcohol contains a lot of calories, and people who drink heavily are often overweight [12].

- Eating out a lot – you may be tempted to also have a starter or dessert

- In a restaurant and the food can be higher in fat and sugar [12].

- Eating large portions than you need – you may be encouraged to eat too much if your friends or relatives are also eating large portions [12].

- Lack of physical activity – lack of physical activity is another important factor related to obesity. Many people have jobs that involve sitting at desk for most of the day. They also rely on their cars, walking or cycling. For relaxation, many people tend to watch TV, browse the internet or play computers games, and rarely take regular exercise [12].

Genetic causes

Science shows that genetics play role in obesity. Genes can directly cause obesity in disorder such as Bardet biedl syndrome. In some cases multiple genes may increase one`s susceptibility for obesity and require outside factors; such as abundant food

supply or little physical activity. It is now well established that overweight and different forms of obesity are conditions tending to concentrate within a family history as opposed to a person with no family history of obesity, and even higher risk is observed in cases of severe obesity [13].

Complications

Obesity is associated with many medical complications that can reduce a person`s quality of life and in some cases shorten a person`s life.

- **Diabetes:** Obesity is the number one risk factor for type 2 diabetes. It also raises the risk of prediabetes. The link between obesity and diabetes appears to be insulin resistance, in which the body cannot use insulin efficiently to admit glucose into cells, where it be used of stored for energy [14].

- **Sleep Apnea:** Obstructive sleep apnea – in which breathing is repeatedly interrupted during sleep because the tissues in the back of the throat fail to keep the airway open-, is associated with obesity [14].

- **Cardiovascular:** Obesity is associated with increased risk of both non-fatal and fatal myocardial infarction. Although these outcomes occur in adults, it is clear that the process of atherosclerosis begins in childhood and is progressive. There is strong association between overweight and the increased presence of atherosclerotic lesions in both the aorta and coronary arteries. Increased weight during childhood was the strongest predictor of coronary calcium later in life. Coronary calcium has been shown to be a marker for plaque formation in the coronary arteries and is associated with increased risk of myocardial infarction. Obesity is quite important in the pathogenesis of hypertension [15].

- **Gastrointestinal:** A major concern is the development of nonalcoholic fatty liver disease (NAFLD). This disorder is characterized by the accumulation of macro vesicular fat in hepatocytes. Patients can develop non- alcoholic steatohepatitis (NASH) with an inflammatory component that can then progress to hepatic fibrosis and ultimately cirrhosis. Children with type 2 diabetes mellitus are prone to develop NAFLD [15].

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- **Orthopedic:** Excess weight can result in excess stress on the musculoskeletal system. In adults, this can result in osteoarthritis, sometimes requiring joint replacement. The most common orthopedic problems in children include tibia vara and slipped capital femoral epiphysis. Both of these orthopedic problems appear to result from the impact of increased weight on developing skeletal system. Tibia Vera is a mechanical deficiency in the medial tibial growth plate. This causes a bowing of the tibia and an abnormal gait. This occurs most commonly in boys over the age of 9 years who are substantially overweight [15].

Management

Management of obesity can include lifestyle changes, medications, or surgery. The main treatment of obesity consists of dieting and physical exercise.

- **Dieting:** Diets to promote weight loss are generally divided into four categories: low-fat, low-carbohydrate, low-calorie, and very low calorie [16].

- **Exercise:** With use, muscles consume energy derive from both fat and glycogen. Due to the large size of leg muscles, walking, running, and cycling are the most effective means of exercise to reduce body fat. To maintain health, the American heart association recommends a minimum of 30 minutes of moderate exercise at least 5days a week [16].

- **Weight loss programs:** Weight loss programs often promote lifestyle changes and diet modification. This may involve eating smaller meals, cutting down on certain types of food, and making a conscious effort to exercise more. These programs also enable people to connect with a group of others who are attempting to lose weight, in the hopes that participants will form mutually motivating and encouraging relationships [16].

- **Medication:** Several anti-obesity medications are currently approved by FDA for long term use. Orlistat reduces intestinal fat absorption by inhibiting pancreatic lipase. Loracaserin has been found to be effective in the treatment of obesity with weight loss of 5.9 kg at one year. The combination drug PHentermine/topiramate is approved by FDA as an addition to reduced-calorie diet and exercise for chronic weight management [16].

- **Surgery:** The most effective treatment for obesity is bariatric surgery. Surgery is recommended for severely obese people (BMI<40) who have failed to lose weight following dietary modification and pharmacological treatment. Weight loss surgery relies on various principles: the two common approaches are reducing the volume of the stomach, which produces an earlier sense of satiation, and reducing the length of bowel that comes into contact with food, which directly reduces absorption [16].

Prevention

There are a number of steps you can take to help prevent overweight and obesity during childhood and adolescence.

They include:

- Gradually work to change family eating habits and activity levels rather than focusing on weight. Change the habits and the weight will take care of itself.

- Parents who eat healthy foods and are physically activity set an example that increases the likelihood their children will do the same.

- Encourage physical activity Children should have an hour of moderate physical activity most days of the week. More than an hour of activity may promote weight loss and subsequent maintenance.

- Reduce time in front of the TV and computer to less than two hours a day.

- Encourage children to eat only when hungry, and to eat slowly. Avoid using food as a reward or withholding food as a punishment.

- Keep the refrigerator stocked with fat-free or low-fat milk and fresh fruit and vegetables instead of soft drink and snacks high in sugar and fat. Serve at least five servings of fruits and vegetables daily.

- Encourage children to drink water rather than beverages with added sugar, such as soft drinks, sports drinks and fruit juice drinks [17].

Similar studies

- A study on prevalence of overweight and obesity among children aged between (6-18) years, done by Adegoke SA, Olowu WA, Adeodu Elusiyan JB, and Dedeke in south-

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western Nigeria on Jul-Aug 2009. The study was school based cross sectional study of multi-stage random sampling method. The sample size was seven hundred and twenty. The result was found that 0.3% was obese and 2.8% were overweight, females had a higher prevalence of overweight when compared to males. There were a higher proportion of overweight students in the higher social classes when compared with the lower social classes [18].

- A study on Alarming high prevalence of overweight/ obesity among Sudanese children aged between (10-18) years, done by, Nagwa M A, Abdelrahim Mohamed Elhussei, Azza M and Naserldin Hussein Abdulhadi inKartoum state schools on November 2010. The study was school based multi-stage random sampling technique. The sample size was1138 students. The result was found that prevalence of overweight and obesity was 10.8 and 9.7% respectively; in boys and girls was 9.9, 11.4% and 11.6, 8.2% respectively. Also the highest prevalence of overweight and obesity was observed among the higher SEC class whereas the lowest prevalence observed among the lower SEC [19].

- A study on prevalence of overweight and obesity in primary school children aged between (6-12) years, done by, Nora El-said, beer Abo barakat and Haitham Mohamed in port said – Egypt on January 2013. The study was school based-cross sectional study of multi-stage random sampling technique. The sample size was eight hundred and fifty two students. The result was found that out of 852 17, 7% were overweight, 13.5% were obese and 68.8% were normal and underweight. Frequency of overweight among males was 18.4% compared to 17.1% among females, while the frequency of obesity among females was 14% compared to 13% among males. Also found that faulty dietary habits, having more fast food and carbonated beverage lead to higher BMI, while having more fresh fruits and vegetables had lower BMI, also playing any kind of sport regularly is strongly associated with fewer incidences of overweight and obesity [20].

- A study on prevalence of overweight and obesity among Saudi primary school students aged between (6-13) years, done by, Waleed El-enazy, Salem Khalil and Ibrahim Alhariri, in Tabuk, Saudi Arabia on July 2014.the study was school

based stratified sampling technique. The sample size was three hundred and thirty one students. The result was found that prevalence of overweight and obesity was9.7 and 19% respectively. Also found overweight and obesity more prevalent among student living with both parents, with high educated parents, with history of maternal obesity, with working mother and with smaller family size. whereas there was no significant association with age, gender, time spent watching TV and using A the computer or playing video games, and duration of sleep per day [21].

- Previous case control study conducted to assess the risk factors associated with overweight and obesity among urban school children and adolescents in Bangladesh. 198 children: 99 cases, 99 controls were enrolled. data analysis revealed that having at least one overweight parent (OR = 2.8, p = 0.001) and engaging in sedentary activities for >4 hours a day (OR = 2.0, p = 0.02) were independent risk factors for childhood overweight and/or obesity while exercising ≥ 30 minutes a day at home was a protective factor (OR = 0.4, p = 0.02). There were no significant associations between childhood overweight and sex, maternal education or physical activity at school [1].

- In the Mediterranean region in Jordon, a cross sectional study conducted among school children, aimed to assess the prevalence of short stature, underweight, overweight, and obesity. 2702 subjects aged 6–17 years were enrolled. For each participating subject, anthropometrics were obtained. SS, underweight, overweight and obesity were defined using Center of Disease Control's (CDC) growth charts. Median Z-scores for each region, age and gender were calculated. the data analysis revealed 17.3% of the participant were overweight, and 15.7%, were obese.(???)

- Locally, a cross sectional study, conducted among the female students in basic school levels in Omdurman- Sudan, where 80 female students, age 5-13 years from grade 1st; 4th; 5th; and 7th during the academic year 2006-2007 were included in the study which aimed to define obesity and overweigh among this population. The result revealed the percentage of obesity and overweight among school girls were 26.32%, 39.47% and 43.48% in age groups of 5-7 years, 8-10 years, and 11-13 years respectively [5].

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- Also previous study conducted to determine the prevalence of obesity related to TV viewing among children at three schools in Khartoum state. The study revealed, 34%of children were found to be at risk for overweight (85th –95th), and 7% were found to be overweight or obese (>95th). The results showed that, BMI percentile>95th was positively correlated with children number of hours spend/day in watching TV (1--2hours, 3-4hours, Morethan4hours), (R=.622**P=.000) (R=.531**=P.000) and (R=.711**P=.000) respectively. It was also observed that BMI percentile(85th –95th) was positively correlated with the number of hours spend/day for watching T.V, (1--2hours,3-4hours, More than 4hours), (R=.456**, P=.000, R=.478, P=.000, R=.631**, P=.000), respectively [7].

- Another cross sectional studies conducted in Karari locality in Khartoum state of Sudan to measure the prevalence of obesity among adults and it is associated risk factors. Data from 283 adults aged 20-45 years was collected and analysed. The analysis of the data revealed the following: more than half of the respondents were females (53.4%) and 46.6% were males. (36.4%) were overweight and (14.5%) were obese. Only (28.3%) of the respondents were suffered from chronic diseases. The majority of respondents suffered from diabetes (43.7%) followed by hypertension (42.5%). Male adults were statistically significant more practiced for physical activity once per week compared to females [2].

- Similar descriptive cross sectional study was conducted among primary school students in althawra 21 omdorman locality _khartoum in three schools (one public school for boys, other public school for girls and third private school mixed) 2016-2017to measure prevalence of overweight and obesity among students and the associated risk factors, the result was a total of 174 were involved in the study using simple random sampling, the prevalence of overweight and obesity was 9.2% and 6.6% respectively, females had higher prevalence of overweight68.8% when compared to males 31.2%. obesity was equally prevalent in males 50% and females 50%.the majority of subjects studied healthy –weight58%, overweight and obesity were more prevalent among students joined governmental school when compared to private one.

- There was significant association between fruits intake, soft drinks consumption and obesity, strong association between obesity and family history.(???)

Research Methodology

Study design

This is descriptive cross sectional inistitutional based study (school based).

Study setting

This study will be conducted at Arkaweet – Khartoum state primary schools, namely 50 east primary school for boys 134 students (6th,7th and 8th grade) and om aatia alansaria primary school for girls 136 students (6th,7th and 8th grade)

- Arakweet is an urban area of high income families belong to Khartoum locality surrounded by El-firdos and El-mamora areas. There are four public primary schools and two private schools.

Study population

Primary school children. Age group 10-14years.

Inclusion criteria

Primary school children age group 10-14 years old who are attending schools during the study period and whose parent agree to participate in the research.

Exclusion criteria

Primary school children from other schools rather than arkaweet and whose parent refused to participate in the research.

Sampling

- Sampling technique: simple random sampling
- Sample frame: primary school children in arkaweet 10-14years old

Sample size

By using the formula;

n=N/(1+ND2)

n= number of sample size

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N=number of total population

d=constant of 0.05

n=270/(1+270*0.05*0.05)=161

Data collection

Data was collected through interviewed questionaire to the students.

Measurement of weight in kilograms by using portable scale which was standardized to zero daily. Children were weighed barefoot, wearing light clothes. Measurements were rounded to the nearest 0.1 kg. Height was measured with the children barefoot, by using measuring tape. Measurements were rounded to the nearest 0.5 cm.

Calculation of BMI was by using this formula

BMI = weight (kilogram)/ height (meters) 2

BMI percentiles for each age and sex group were calculated.

Study variables

- Dependant variables: Weight, height.
- Indepenant variables: Ethnicity, School performance,

Gender

- Confounding variables: Age, gender, socioeconomic status.

Data management and analysis plan

The data generated on the questionnaires and measuring of the body weight and height will be numbered and validated manually for errors and entered for analysis using SPSS (version20). Data analysis will carried out using SPSS (version 20) software package on the computer. Simple descriptive statistics: frequencies, means, and percentages will be used to describe the study findings.

Qui square test will be used to detect the association between variables p value less than0,05 will be taken as significant.

Ethical consideration

Ethical approval was obtained from ERB department of community medicine university of Khartoum, also a verbal consent was obtained from parents of the enrolled subjects.

No information that can lead to identification will be taken

Results

A cross sectional school based study was conducted on 161 students in arkaweet, 81 females and 80 males

| | Obese | | | | | | Total | |
	Under weight		Normal		Over weight		Obese			
Male	7	8.8%	47	58.8%	24	30%	2	2.4%	80	49.7%
Female	9	11.1%	35	43.2%	31	38.3%	6	7.4%	81	50.3%
Total	16	9.9%	82	50.9%	55	34.2%	8	5%	161	100%

Table 1

P value = 0.180

Figure 1

Citation: Huda Abbass Alhadi. "Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum". *Acta Scientific Paediatrics* 2.5 (2019): 15-41.

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Age in years

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
10 and below 11	5	18.5%	15	55.6%	5	18.5%	2	7.4%	27	16.8%
11 and below 12	11	13.1%	42	50%	29	34.5%	2	2.4%	84	52.2%
	0	0.0%	22	56.4%	14	35.9%	3	7.7%	39	24.2%
12 and below 13 13 and below 14	0	0.0%	3	27.3%	7	63.6%	1	9.1%	11	6.8%
Total	16	9.9%	82	50.9%	55	34.2%	8	5%	161	100%

Table 2

P value = 0.056
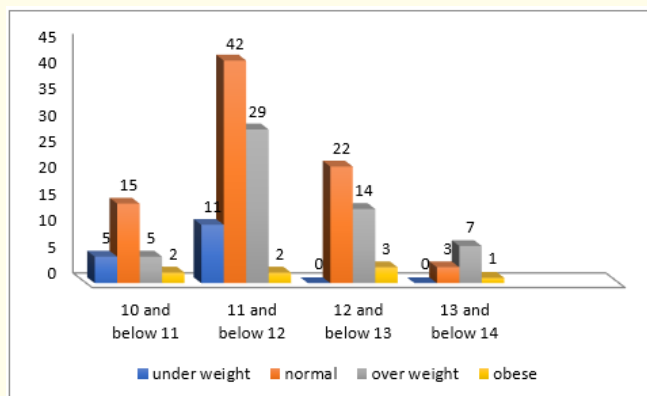
Figure 2

Educational level of the father

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
Illiterate	0	0.0%	1	16.7%	2	33.3%	3	50%	6	3.7%
Khalwa	0	0.0%	2	28.6%	4	57.1%	1	14.3%	7	4.3%
Primary	1	8.3%	1	8.3%	7	58.3%	3	25%	12	7.5%
Secondary	1	3.4%	16	55.3%	11	37.9%	1	3.4%	29	18%
University	11	14.9%	40	54.1%	23	31.1%	0	0.0%	74	46%
higher university (master or md)	3	9.1%	22	66.7%	8	24.2%	0	0.0%	33	20.5%
Total	16	9.9%	82	50.9%	55	34.2%	8	5%	161	100%

Table 3

P value = 0.000

Citation: Huda Abbass Alhadi. "Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum". *Acta Scientific Paediatrics* 2.5 (2019): 15-41.

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Figure 3

Job of the father

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
Unemployed	0	0.0%	1	33.3%	2	67.7%	0	0.0%	3	1.9%
Worker	3	6.5%	24	52.2%	17	37%	2	4.3%	46	28.6%
Employee	13	14.1%	44	47.8%	32	34.8%	3	3.4%	92	57.1%
Trader	0	0.0%	10	76.9%	1	7.7%	2	15.4%	13	8.1%
Other(specify)	0	0.0%	3	42.9%	3	42.9%	1	14.2%	7	4.3%
Total	16	9.9%	82	50.9%	55	34.2%	8	5%	161	100%

Table 4

P value = 0.226

Figure 4

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum
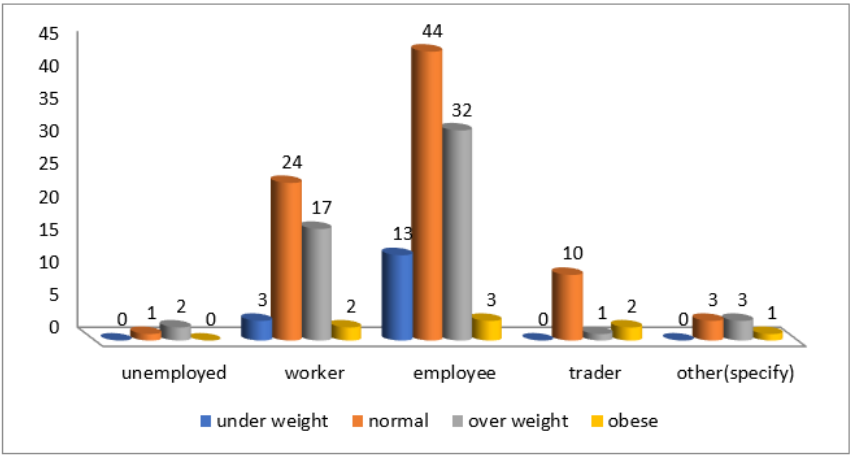
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Educational level of the mother

	Obese							Total	
	Under weight		Normal		Over weight		Obese		
Illiterate	0	0.0%	0	0.0%	4	80%	1	20%	5	3.1%
Khalwa	0	0.0%	1	50%	1	50%	0	0.0%	2	1.2%
Primary	0	0.0%	5	27.8%	7	38.9%	6	33.3%	18	11.2%
Secondary	5	12.5%	22	55%	12	30%	1	2.5%	40	24.8%
University	9	11.7%	41	53.2%	27	35.1%	0	0.0%	77	47.8%
Higher university (master or md)	2	10.5%	13	68.4%	4	21.1%	0	0.0%	19	11.8%
Total	16	9.9%	82	50.9%	55	34.2%	8	5%	161	100%

Table 5

P value = 0.000
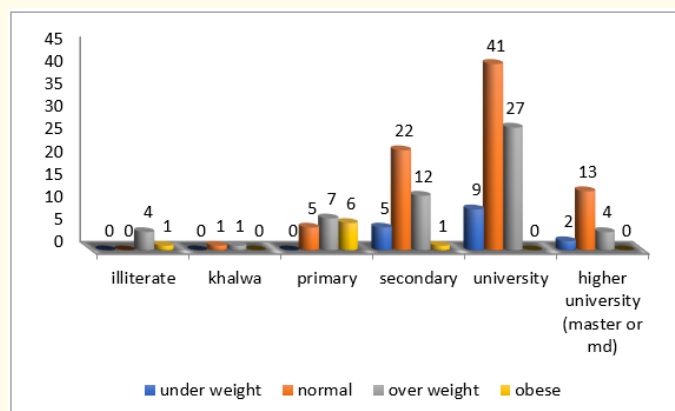
Figure 5

Job of the mother

	Obese				Total	
	Under weight	Normal	Over weight	Obese		
Housewife	12 11.2%	53 49.5%	37 34.6%	5 4.7%	107	100%
Worker	0 0%	7 41.2%	10 58.8%	0 0%	17	100%
Employee	4 11.4%	21 60%	8 22.9%	2 5.7%	35	100%
Other(specify)	0 0%	1 50%	0 0%	1 50%	2	100%
Total	16 9.9%	82 50.9%	55 34.2%	8 4.9%	161	100%

Table 6

P value = 0.046

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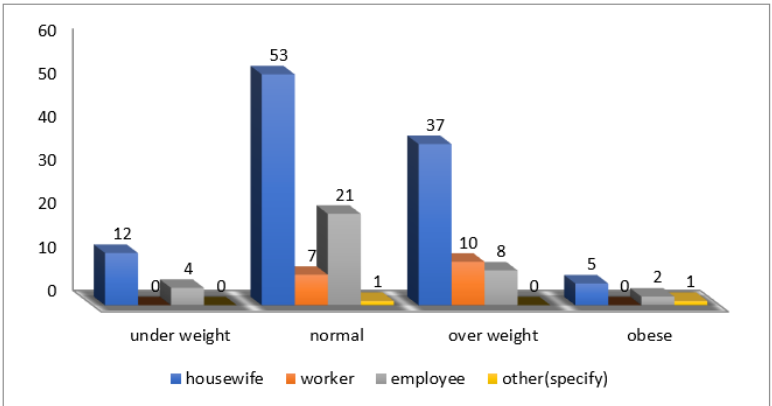
Figure 6

How are you coming to school

	Obese				Total	
	Under weight	Normal	Over weight	Obese		
On foot	9 14.3%	37 58.7%	16 25.4%	1 1.6%	63 100%	
School bus	3 8.3%	17 47.2%	13 36.1%	3 8.3%	36 100%	
Private car	0 0%	11 40.7%	14 51.9%	2 7.4%	27 100%	
Raksha	4 11.4%	17 48.6%	12 34.3%	2 5.7%	35 100%	
Total	16 9.9%	82 50.9%	55 34.2%	8 4.9%	161 100%	

Table 7

P value = 0.210

Figure 7

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

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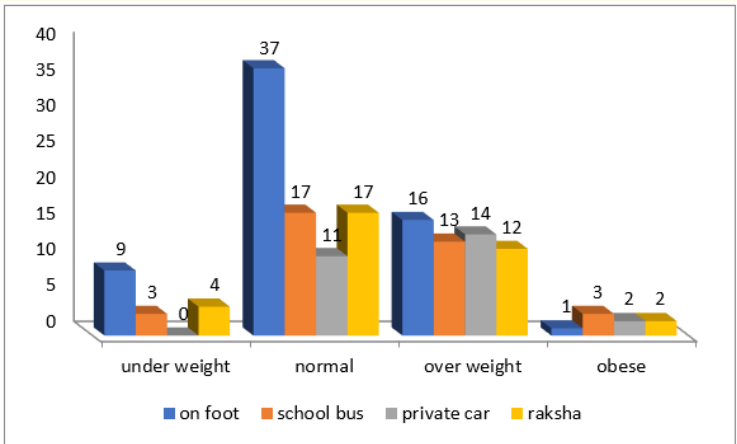
Do you have physical education or sports in the school time table?

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
Yes	8	13.3%	32	53.3%	20	33.3%	0	0%	60	100%
No	8	7.9%	50	49.5%	35	34.7%	8	7.9%	101	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 8

P value = 0.034
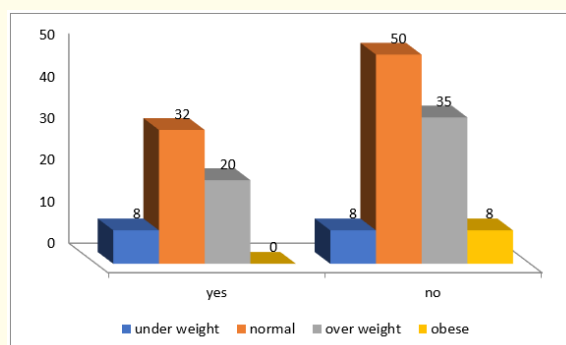
Figure 8

Do you practice sports at home\outside school?

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
Yes	5	9.1%	38	69.1%	10	18.2%	2	3.6%	55	100%
No	0	0%	2	25%	5	62.5%	1	12.5%	8	100%
Sometimes	11	11.2%	42	42.9%	40	40.8%	5	5.1%	98	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 9

P value = 0.018

Figure 9

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

27
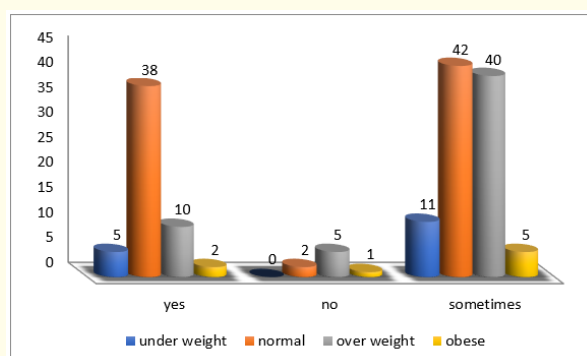
If your answer for the above question is yes or sometimes so, what type of sports do you practice?

	Obese				Total	
	Under weight	**Normal**	**Over weight**	**Obese**		
Foot ball	5	7%	41	57.7%	22	30.9%	3	4.2%	71	100%
Swimming	2	20%	3	30%	5	50%	0	0%	10	100%
Jumping over rod	4	11.1%	20	55.6%	11	30.6%	1	2.8%	36	100%
Riding bicycle	3	23.1%	7	53.8%	3	23.1%	0	0%	13	100%
Walking	0	0%	5	50%	4	40%	1	10%	10	100%
Other (specify)	2	15.4%	4	30.8%	5	38.5%	2	15.4%	13	100%
Total	16	10.5%	80	52.3%	50	32.7%	7	4.6%	153	100%

Table 10

P value = 0.482
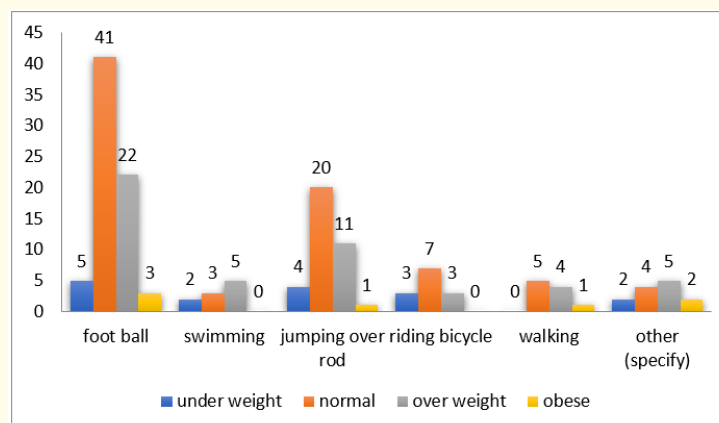
Figure 10

How many times do practice sport per a week?

	Obese				Total	
	Under weight	**Normal**	**Over weight**	**Obese**		
Once	4	14.3%	7	25%	14	50%	3	10.7%	28	100%
Twice	3	12%	10	40%	10	40%	2	8%	25	100%
Three times	3	9.4%	18	56.3%	10	31.3%	1	3.1%	32	100%
More than three times	6	8.8%	45	66.2%	16	23.5%	1	1.4%	68	100%
Total	16	10.5%	80	52.3%	50	32.7%	7	4.6%	153	100%

Table 11

P value = 0.045

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

28
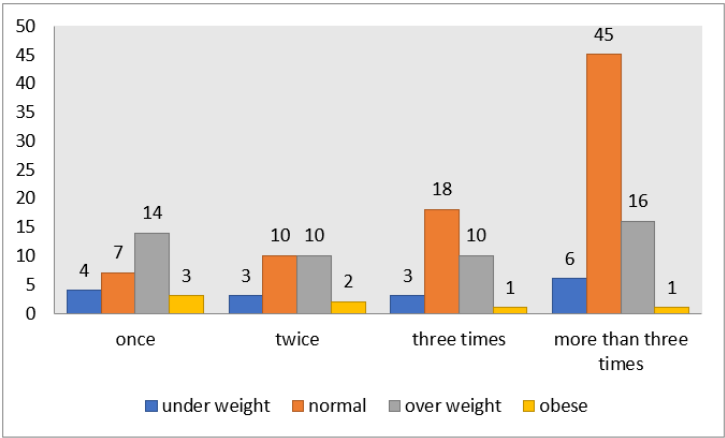
Figure 11

Do you watch television?

	Obese				Total
	Under weight	**Normal**	**Over weight**	**Obese**	
Yes	6 6.9%	36 41.9%	38 44.2%	6 6.9%	86 100%
No	1 10%	8 80%	1 10%	0 0%	10 100%
Sometimes	9 13.8%	38 58.5%	16 24.6%	2 3.1%	65 100%
Total	16 9.9%	82 50.9%	55 34.2%	8 4.9%	161 100%

Table 12

P value = 0.040

Figure 12

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

29
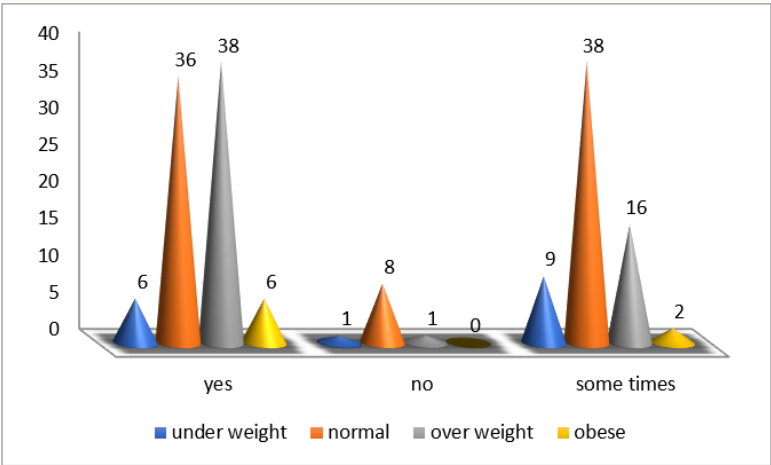
If your answer for the above question is yes or sometimes for how long do you watch tv per day?

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
One –two hours	7	17.5%	25	62.5%	7	17.5%	1	2.5%	40	100%
Three –four hours	2	8.3%	13	54.2%	6	25%	3	12.5%	24	100%
More than four hours	0	0%	14	35%	25	62.5%	1	2.5%	40	100%
Only on holidays	4	8.5%	23	48.9%	17	36.2%	3	6.4%	47	100%
Total	13	8.6%	75	49.7%	55	36.4%	8	5.3%	151	100%

Table13

P value = 0.002
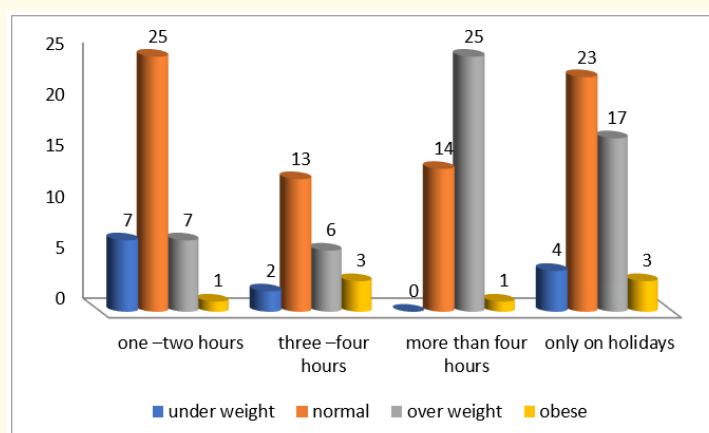
Figure 13

Do you play video games?

Figure 14

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

30
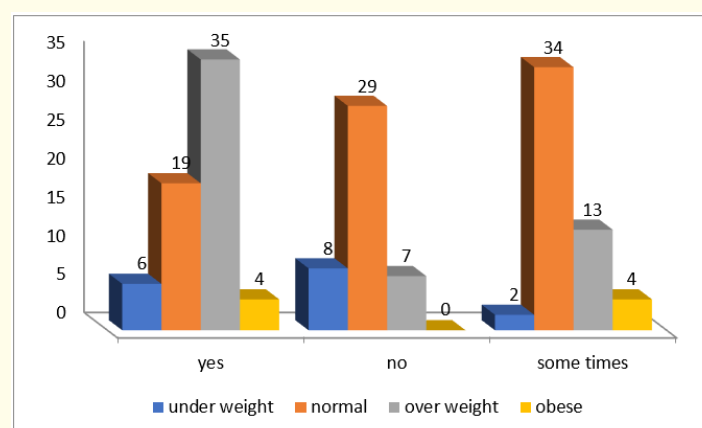
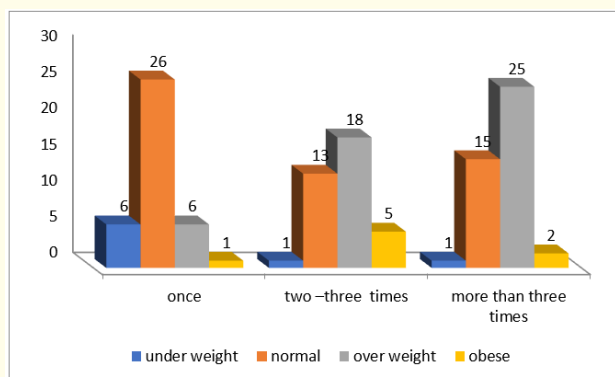|	Obese								Total	
	Under weight		Normal		Over weight		Obese			
Yes	6	9.4%	19	29.7%	35	54.7%	4	6.3%	64	100%
No	8	18.2%	29	65.9%	7	15.9%	0	0%	44	100%
Sometimes	2	3.8%	34	64.2%	13	24.5%	4	7.5%	53	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 14

P value = 0.000

If your answer for the above question is yes or sometimes, how many times do you play per a week?

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
Once	6	15.4%	26	66.7%	6	15.4%	1	2.6%	39	100%
Two –three times	1	2.7%	13	35.1%	18	48.6%	5	13.5%	37	100%
More than three times	1	2.3%	15	34.9%	25	58.1%	2	4.7%	43	100%
Total	8	6.7%	54	45.4%	49	41.1%	8	6.7%	119	100%

Table 15

P value = 0.000

Figure 15

What is the number of your daily meals?

Count	Obese								Total	
	Under weight		Normal		Over weight		Obese			
one-two	4	10%	26	65%	8	20%	2	5%	40	100%
three-four	11	12.4%	48	53.9%	26	29.2%	4	4.5%	89	100%
more than four	1	3.1%	8	25%	21	65.6%	2	6.3%	32	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 16

P value = 0.002

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

31
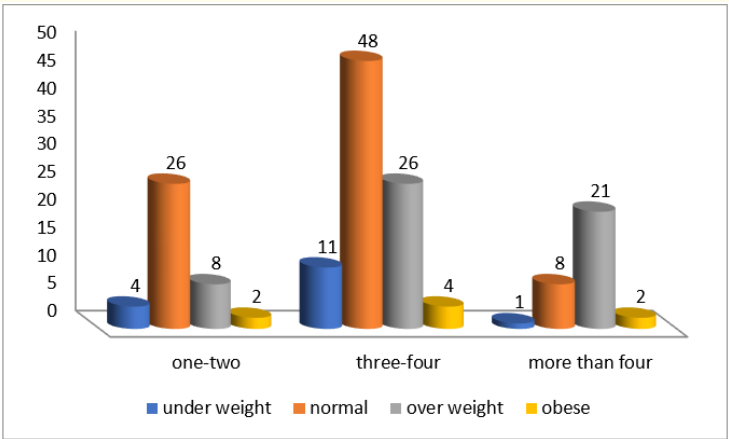
Figure 16

What is the source of your breakfast?

	Obese								Total	
	Under weight		**Normal**		**Over weight**		**Obese**			
Home	13	10.7%	60	49.6%	41	33.9%	7	5.8%	121	100%
School	3	8.8%	19	55.9%	11	32.4%	1	2.9%	34	100%
Other (specify)	0	0%	3	50%	3	50%	0	0%	6	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 17

P value = 0.906

Figure 17

Citation: Huda Abbass Alhadi. "Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum". *Acta Scientific Paediatrics* 2.5 (2019): 15-41.

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

32

What do you eat commonly for breakfast?

	Obese								Total	
	Under weight		**Normal**		**Over weight**		**Obese**			
Fool	2	11.1%	13	72.2%	3	16.7%	0	0%	18	100%
Taamia	7	9.7%	37	51.4%	25	34.7%	3	4.1%	72	100%
Egg	0	0%	8	32%	11	44%	3	12%	25	100%
Meat	1	3.6%	16	57.1%	9	32.1%	2	7.1%	28	100%
Other	6	33.3%	8	44.4%	7	38.9%	0	0%	18	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 18

P value = 0.028
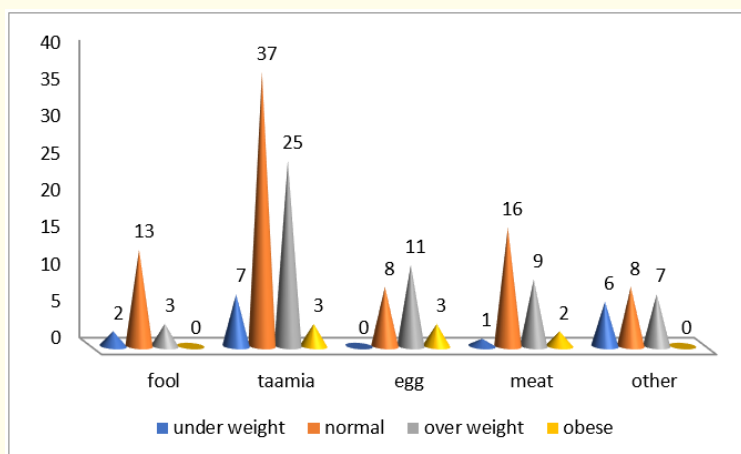
Figure 18

Do you eat fast food?

	Obese								Total	
	Under weight		**Normal**		**Over weight**		**Obese**			
Yes	4	6.5%	25	40.3%	27	43.5%	6	9.7%	62	100%
No	2	14.3%	9	64.3%	2	14.3%	1	7.1%	14	100%
Sometimes	10	11.8%	48	56.5%	26	30.6%	1	1.2%	85	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 19

P value = 0.032

Citation: Huda Abbass Alhadi. "Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum". *Acta Scientific Paediatrics* 2.5 (2019): 15-41.

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

33

Figure 19

If your answer for the above question is yes or sometimes, how many times do you eat it?

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
Daily	0	0%	9	34.6%	14	53.8%	3	11.5%	26	100%
One-two times per week	8	14%	23	40.4%	21	36.8%	5	8.8%	57	100%
More than two times per week	1	2.4%	27	65.9%	13	31.7%	0	0%	41	100%
One-two times per month	3	14.3%	13	61.9%	5	23.8%	0	0%	21	100%
More than two times per month	1	50%	1	50%	0	0%	0	0%	2	100%
Total	13	8.8%	73	49.7%	53	36.1%	8	5.4%	147	100%

Table 20

P value = 0.011

Figure 20

Citation: Huda Abbass Alhadi. "Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum". *Acta Scientific Paediatrics* 2.5 (2019): 15-41.

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

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Do you consume soft drinks?

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
yes	4	4.8%	30	36.1%	45	54.2%	4	4.8%	83	100%
no	2	25%	4	50%	2	25%	0	0%	8	100%
sometimes	10	14.3%	48	68.6%	8	11.4%	4	5.7%	70	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 21

P value = 0.000
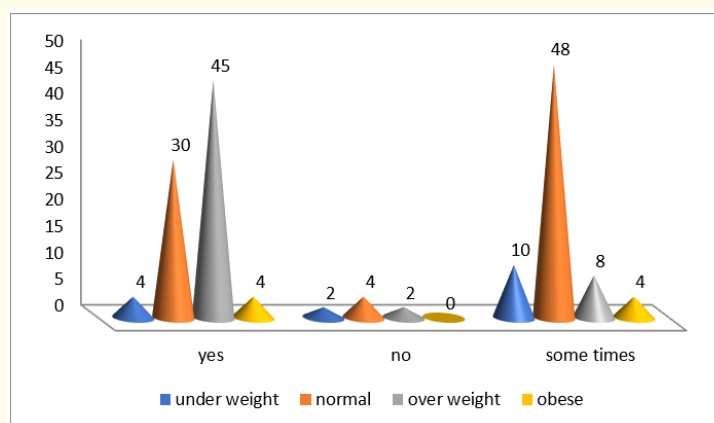
Figure 21

If your answer for the above question is yes or sometimes, how many times you consume it

	Obese								Total	
	Under weight		Normal		Over weight		Obese			
Daily	0	0%	18	42.9%	20	47.6%	4	9.5%	42	100%
One-two times per week	5	13.2%	18	47.4%	13	34.2%	2	5.3%	38	100%
More than two times per week	7	15.9%	20	45.5%	16	36.4%	1	2.3%	44	100%
One-two times per month	1	6.7%	13	86.7%	1	6.7%	0	0%	15	100%
More than two times per month	1	7.1%	9	64.2%	3	21.4%	1	7.1%	14	100%
Total	14	9.2%	78	50.9%	53	34.6%	8	5.2%	153	100%

Table 22

P value = 0.04

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

35
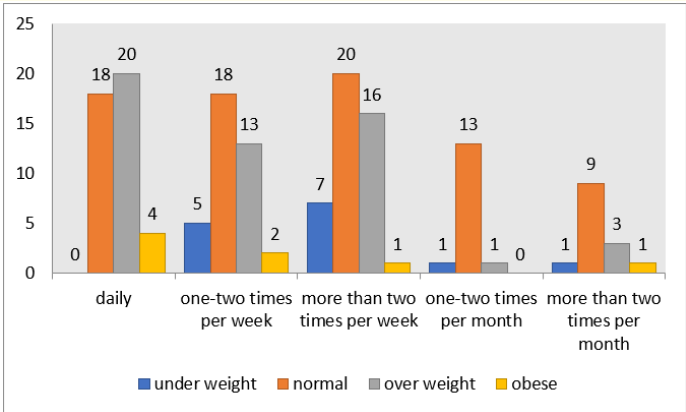
Figure 22

How much money does family give you daily for school?

Count	Obese							Total	
	Under weight		Normal		Over weight		Obese		
One-two SDG	5	14.7%	21	61.8%	7	20.6%	1	2.9%	34 100%
Three –ten SDG	9	9.2%	52	53.1%	34	34.7%	3	3.1%	98 100%
More than ten SDG	2	6.9%	9	31%	14	48.3%	4	13.8%	29 100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161 100%

Table 23

P value = 0.03

Figure 23

Citation: Huda Abbass Alhadi. "Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum". *Acta Scientific Paediatrics* 2.5 (2019): 15-41.

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

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Do you stop practicing activities because of your weight?

	Obese							Total	
	Under weight		Normal		Over weight		Obese		
Yes	1	2%	5	10%	40	80%	4	8%	50	100%
No	15	13.5%	77	69.4%	15	13.5%	4	3.6%	111	100%
Total	16	9.9%	82	50.9%	55	34.2%	8	4.9%	161	100%

Table 24

P value = 0.000
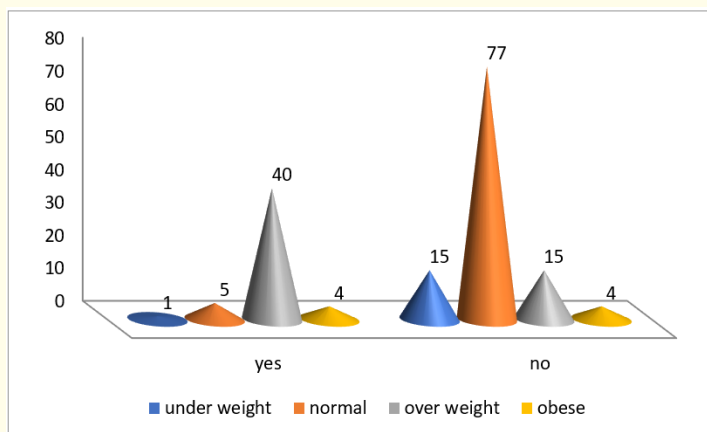
Figure 24

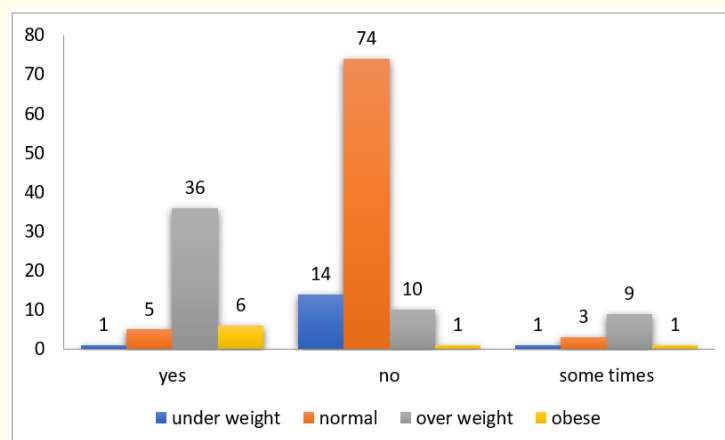Do you suffer from friends kidding\bulling because of your weight?

Figure 25

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

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Count	Obese				Total	
	Under weight	**Normal**	**Over weight**	**Obese**		
Yes	1 2.1%	5 10.4%	36 75%	6 12.5%	48	100%
No	14 14.1%	74 74.7%	10 10.1%	1 1%	99	100%
Sometimes	1 7.1%	3 21.4%	9 64.3%	1 7.1%	14	100%
Total	16 9.9%	82 50.9%	55 34.2%	8 4.9%	161	100%

Table 25

P value = 0.000

What is your class rank for this year?

	Obese				Total	
	Under weight	**Normal**	**Over weight**	**Obese**		
Excellence	7 14%	28 56%	13 26%	2 4%	50	100%
Very good	6 10.5%	27 47.4%	23 40.4%	1 1.7%	57	100%
Good	3 7.5%	21 52.5%	14 35%	2 5%	40	100%
Pass	0 0%	6 42.9%	5 35.7%	3 21.4%	14	100%
Total	16 9.9%	82 50.9%	55 34.2%	8 4.9%	161	100%

Table 26

P value = 0.137

Figure 26

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

38
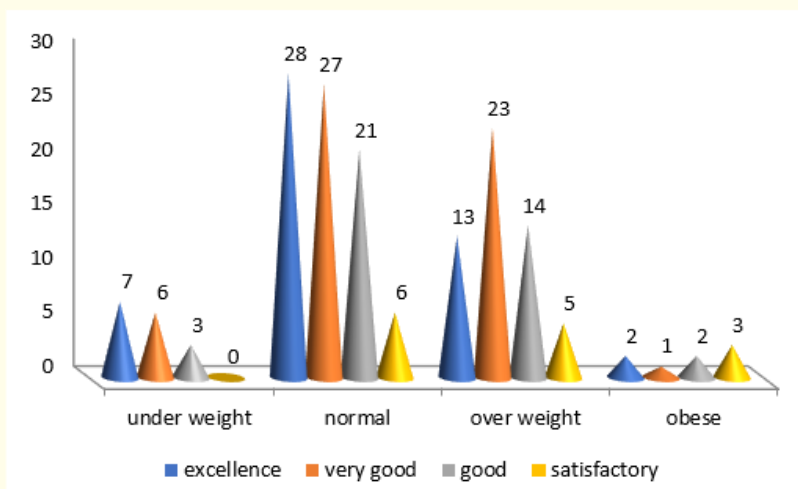
What is your class rank for the previous year?

	Obese				Total	
	Under weight	**Normal**	**Over weight**	**Obese**		
Excellence	5 11.1%	28 62.2%	11 24.4%	1 2.2%	45 100%	
Very good	7 12.5%	26 46.4%	21 37.5%	2 3.6%	56 100%	
Good	3 7.1%	15 35.7%	22 52.4%	2 4.8%	42 100%	
Pass	1 5.6%	13 72.2%	1 5.6%	3 16.7%	18 100%	
Total	16 9.9%	82 50.9%	55 34.2%	8 4.9%	161 100%	

Table 27

P value = 0.010

Figure 27

Number of family members

	Obese				Total	
	Under weight	**Normal**	**Over weight**	**Obese**		
Small	0 0%	5 50%	2 20%	3 30%	10 100%	
Average	14 12.6%	59 53.2%	34 30.6%	4 3.6%	111 100%	
Large	2 5%	18 45%	19 47.5%	1 2.5%	40 100%	
Total	16 9.9%	82 50.9%	55 34.2%	8 4.9%	161 100%	

Table 28

P value = 0.003

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

39
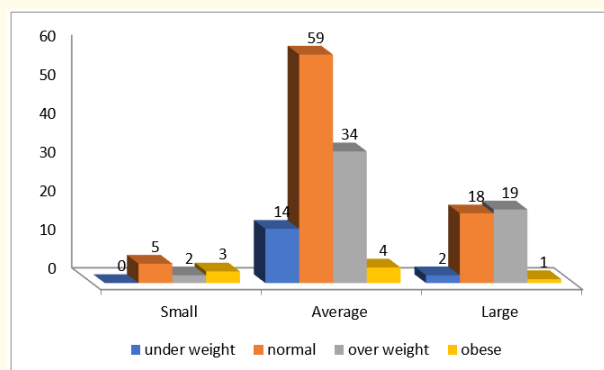
Figure 28

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Weight	161	30.00	87.00	48.1118	11.94885
Height	161	126.00	162.00	141.2174	8.08138
Valid N (list wise)	161				

Table 29

Prevalence over weight = 34%

Prevalence obese = 4.97%

Discussion

- This study represents the result from 161 students aged between 10-14 years old school children in Khartoum ARKAWEET, the result of study showed an overall prevalence of overweight and obesity was 34% and 4.97% respectively, which was higher than a study result done in Omdurman althawra21priamry school 2016-2017

- The prevalence rate among females was 50.3% and that among males was49.7% similar to study done in omduraman

- There was no significant association between overweight and obesity and age of the student in contrast to study conducted in turkey which concluded that 67.1%of obese students in the age of 6-10years old, whereas 32.9% of obese students in age group of 11-15 years old

- There was strong association between overweight and obesity and the educational level of parents which show high percent of overweight and obesity among illiterate parents,similar to the finding of previous study done in Omdurman

- There was high prevalence of overweight and obesity among students whose mothers are working, similar to study conducted in Saudi Arabia

- There was strong association between overweight and obesity and physical sessions in the school,as found that students whom practice sport sessions at school are protected from obesity in comparison between those who have no sport sessions, similar to the finding of study result in Omdurman

- At the other hand also sports generally (at home, elsewhere) decrease the risk of obesity, but there is no significanse association between type of sports that sudent practice and his weight, the more student practise sport per week, the less likely to be overweight or obese

- There was strong association between sedentary life (watching TV or playing video games) and overweight and obesity, the more hours spend, the higher risk of overweight and obesity, similar to study done in Khartoum

Citation: Huda Abbass Alhadi. "Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum". *Acta Scientific Paediatrics* 2.5 (2019): 15-41.

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

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- There was strong direct association between number of daily meals and prevalence of overweight and obesity, similar to study done in turkey

- The prevalence was higher among those students whom eat eggs commonly for breakfast

- As expected there is strong association between fast food consumption and prevalence of overweight and obesity among students, in contrast to study done in Omdurman

- As expected there is strong association between soft drink consumption and prevalence of overweight and obesity among students, in similar to study done in Omdurman

- Students whom given money more than 10 SDG per day are more overweight and obese than other students whom given less money

- There is obvious psychological impact among overweight and obese students as they stop practicing with others in activities, and they suffer a lot from their class mates bulling

- Obviously overweight and obesity are more common in small size families, similar to study result conducted in Saudi arabia

- The effect of overweight and obesity on academic achievement is not clear as there is no significance between current class rank and student weight, but there is significant association between previous year rank and student weight as overweight and obese students are at the end of the a cademic rank

Limitations

1. The sample size was small due to lack of sufficient time to cover the largest sample.

2. The information about mother and father level of education and family history of obesity were collected from students which their knowledge about this information is not accurate.

3. The age of students who have been selected in this study was limit rang due to lack of sufficient time to cover all ages which require that the questionnaire filled by mothers.

4. Conscent from parents was not taken

Suggested further studies

I suggest to conduct a survey about psychiatric problems among overweight and obese students

Conclusion and Recommendation

Conclusion

- The study was show the prevalence of overweight and obesity was 34% and 4.97% respectively. Rates of overweight were higher among females 38.3% compared to males 30%. Obesity was higher among females (7.4%) compared to males (2.4%.) the majority of subjects studied healthyweight (50.9%). BMI was significantly associated with: educational level of parents, working mothers, physical activities, sedentary life (watching TV, playing video games), number of daily meals, type of food, fast food and soft drinks consumption and family size.

- There was obvious psychological effect on the overweight and obese students, as they suffer a lot from their classmate bulling.

Recommendations

1. School health programmes which involve yearly measuring of weight and height and calculating BMI in all basic school classes.

2. Councilling of students about risk and side effect of fast food and soft drinks

3. Limitation of soft drink and fast food intake to a maximum once per month.

4. School education programs should be directed to educate students and their families to reduce number of hours spend per day on watching TV or playing video games

5. Avoidance of bulling between students or even from teachers

6. Conduct house hold surveys to assess prevalence of overweigh and obesity among adults.

7. Further studies are needed to determine magnitude of overweight and obesity in school children.

8. Encouraging overweight and obese students to lose weight.

Prevalence of Overweight and Obesity and its Associated Risk Factors among Primary Public School Children (10-14) Years Old in Arkaweet Block 50-Khartoum

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