

The Risk of Developing Eating Disorders Among Medical Students in University of Khartoum, Khartoum, Sudan 2021

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Research Article

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Abstract

Background: Abnormal eating habits defines Eating Disorders. The aim of this study is to explore the risk of developing Eating Disorders among Medical students and examine its association to Childhood Trauma and Low Self-esteem eating habits causing physical or psychosocial derangements are the main constituents.

Methodology: An observational (comparative cross-sectional) study where a total of 299 students participated, 81 males and 218 females. 62 from the faculty of Dentistry, 49 from the faculty of Pharmacy and 202 from the faculty of Medicine - all in Year 3, 4 and 5. Participants filled out a pre-designed online Google survey. Descriptive statistics were used to compute means, and standard deviations for numerical variables.

Results: The total number of participants was 299 of which 37 students were found to be at risk of developing an Eating Disorder (12.4%). There was no correlation between the increased risk and socio-demographic characteristics (gender, age, academic year, faculty and weight status). No significant association between sexual, emotional and physical abuse was found. Conversely, it was discovered that Emotional Neglect may be a factor leading to an increased risk of developing Eating Disorders ($p=0.028$). A correlation was also established with childhood maltreatment and the prevalence of risk for Eating Disorders ($p=0.016$). The correlation with Low self-esteem proved to be statistically insignificant as well ($p>0.05$).

Conclusion: The percentage of medical students victimized by Eating Disorders was found to be relatively high hence it is important that more attention is brought to this phenomenon.

Plain English Summary

The risk of developing Eating Disorders has increased substantially in developing countries. Medical students are at risk due to the high levels of stress they experience. The aim of this study was to explore the risk of development of Eating Disorders among Medical students in the University of Khartoum (Sudan) and its association with other factors such as Childhood Trauma and Low Self Esteem. The results revealed an association between Eating Disorders and Emotional Neglect (a subset of the Childhood Trauma Questionnaire); and Eating Disorders and Childhood maltreatment.

Introduction

Physical or psychosocial derangements caused by abnormal eating habits are the main constituents which define Eating Disorders (EDs).^[1] They range from Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder, Pica, etc. Over the past 50 years, there has been an increase in the number of people suffering from eating disorders due to changes in the food industry .^[2]

Medical Students are prone to a wide number of mental health issues.^[3] In Egypt it was found that over 50% of students have been victims of mental illness, of these a small percentage however sought

assistance from a medical practitioner.^[4] According to a meta-analytic study conducted, the prevalence of EDs among Medical students was found to be 10.4%.^[5] A study in Hungary however established a decline in binge eating habits by almost double.^[6]

Cases of EDs have been reported in developing countries as well. An example is Egypt, where a study conducted in the University of Tanta found the risk of developing Eating Disorders is 33%.^[7] In Nigeria, a research demonstrated the prevalence of abnormal eating habits in University students to be 9.1%.^[9] A similar study carried out in India found a percentage risk of 13% and there was an association with increased levels of stress.^[8]

Little light has been shed on this issue among Medical students in Sudan. A study conducted recently across six Medical colleges in Sudan revealed a prevalence of stress of 31.7% and students in their final years were found to have higher levels of stress.^[10] These high levels of stress can account to an increased prevalence of EDs.^[11]

Studies have revealed that LSE increases the likelihood of developing EDs.^[12] In 1996, a study showed that those with low self-esteem were 8 times more likely to develop an ED as opposed to those with higher self-esteem.^[13] Another national study confirmed the assumption by using the Rosenberg Self-Esteem scale where an increased risk by 9% was seen with every 1 point decrease on the scale.^[14] Childhood abuse was also shown to render subjects more susceptible to mental disorders.^[15] The results of a study carried out in Chile revealed that 30% of their participants with EDs were victims of childhood sexual abuse.^[16] A study conducted in Turkey showed an association between an increase of prevalence of EDs with Sexual and Emotional Abuse.^[17]

Scientific studies have proved that EDs can negatively impact Medical students' performance as they lower both individuals' attention span, alter their memory and ability to focus. [18]

Due to the lack of scientific research available on the topic of EDs in Sudan, the aim of this research was to explore the risk of developing EDs and its association with Childhood Trauma and Low Self-esteem in order to achieve a higher level of awareness and take measures towards the prevention of this illness. By taking such measures a deterioration in medical practitioners' performance due to the behavioral alterations caused by the disease will be avoided.

Objectives:

1. General objectives:

- To measure the risk of developing eating disorders among Khartoum university medical students, Khartoum State, Sudan 2021

2. Specific objectives:

- To assess the association between childhood abuse and the risk to develop eating disorders, among Khartoum university medical students, Khartoum State, Sudan 2021.
- To measure the association between the risk to develop eating disorders and low self-esteem, among Khartoum university medical students, Khartoum State, Sudan 2021

Methodology

1. Study design:

Observational descriptive (Comparative Cross-sectional) institutional based study design.

2. Study area:

The study was conducted in the Medical Campus of University of Khartoum located in Al Qasr Avenue, Khartoum, Sudan. It was established in the year 1924 where it was previously known as Kitchener Medical School.

The Medical Campus is made up of 3 faculties (Medicine, Dentistry and Pharmacy) and 14 Academic departments taking more than 300 students annually. It accommodates 3,174 medical students in total. 1998 studying Medicine, 514 Pharmacy and 662 Dentistry.

3. Study population:

Name: Students at the University of Khartoum, Medical campus, studying either Medicine, Dentistry or Pharmacy.

age: 20-24.

Inclusion criteria: undergraduate Medical students studying Medicine, Dentistry or Pharmacy of age 20-24, who gave informed written consent.

Exclusion criteria: Ages <20 and >24 who study in universities other than University of Khartoum, or who study there yet are enrolled in facilities other than the faculties of Medicine, Pharmacy and Dentistry and/or who did not give an informed written consent.

4. Sampling

4.1. Sample size

288 students based on 25% prevalence and 95% confidence interval using the equation

$$n = \frac{z^2 * p * (1 - P)}{e^2}$$

n= sample size

z= standard normal deviation

p=proportion of students with EDs= 25%

e=gross margin error=0.05.

4.2. Sampling technique

Stratified simple random sampling.

The total number of students within each faculty was obtained from previous records and divided into three strata on the basis of their faculties. Participants of ages 20-24 were then chosen Randomly:

Strata	Total population	Number of participants
Faculty of Dentistry	662	62
Faculty of Pharmacy	514	49
Faculty of Medicine	1998	188

The number of participants 299 was reached suggesting a response rate of 100%.

5. Data Collection

5.1. Tools:

Three pretested, structured, self-administered questionnaires with closed-ended questions were used:-

1. The Eating Attitudes Test 26-item which is a standardised self-report measure of Symptoms and concerns characteristic to EDs that was developed by D. Garner in 1987. Options for each question were given a score from 0 to 3 (Always=3, Often= 2, Sometimes=1, Rarely= 0, Never= 0). Individual scores were then added and a score of 20 or more suggested a high risk for development of EDs. The BMI was also calculated using the formula (body weight/height (m) ²). A BMI of less than 18.5 for females was considered underweight, higher than 18.5 but less than 24.9 was considered normal and more than 24.9 overweight. As for males, less than 19.6 was considered underweight, a BMI lying within the range 19.6-24.9. A value higher than 24.9 was also considered overweight. There was also a second section with five behavioural questions whose aim was to find out the necessity of seeking professional medical help.

2. To find the correlation between it and Child abuse and neglect the CATQ (Child Trauma Questionnaire) was used, developed by Bernstein and Fink. Its main focus was covering three aspects; sexual abuse, emotional abuse and physical abuse, but emotional and physical neglect were covered as well. Questions on each form of abuse were scored according to Likart's scaling system (SA=5, A=4, N=3, D=2, SD=1) and the total was calculated and compared to its cut-off scores (physical ≥ 10 ; emotional ≥ 13 ; sexual ≥ 8) and neglect (physical ≥ 10 ; emotional ≥ 15). Childhood maltreatment in general was described as a score

which lies above the 50th percentile of the distribution ($\Rightarrow 40$), this was done as there was no official cut-point for the total score.

3. Self-esteem was assessed using a scale developed by Rosenberg in the year 1965, publically known as the Rosenberg Self-Esteem scale. It was a ten-item Likert scale (SA=5, A=4, N=3, D=2, SD=1) and high scores indicated high self-esteem and vice versa.

5.2. Method of data collection:

The questionnaire was created using an online Google form on the 1st of January 2021 and sent to participants selected randomly (through WhatsApp and Telegram applications) within the three faculties of Medicine, Pharmacy and Dentistry. No pilot test was performed as constituents of the questionnaire were pre-designed well-known scales.

After the results were submitted and the required sample size reached on the 20th of January, the scores for each section were calculated using each component's scoring system and was investigated for the presence of any correlation.

6. Variables:

6.1 Independent variables: Age, Gender, Faculty, Academic Year, Body Mass Index, Eating Disorder

6.2 Dependent variables: Low Self Esteem, Physical Abuse, Sexual Abuse, Emotional Abuse, Physical Neglect, Emotional Neglect Childhood maltreatment

7. Data analysis:

Data from the online Google form was transferred into a Microsoft Excel database and analyzed using Statistical Package for Social Science (SPSS) ® version No. 23 software.

Descriptive statistics were used to compute means, and standard deviations for numerical variables. Frequencies were calculated for nominal and ordinal variables. Appropriate tests for significance were carried out and a significance was denoted when $p < 0.05$ All the results were presented in the form of graphs and tables.

Results

The study included 299 participants, 218 females (72.9%) and 81 males (27.1%), The mean age of participants was 22.1 years. 32 participants were 20.0 years (10.2%), 56 were 21.0 years (17.9%), 100 were 22.0 years (31.9%), 74 were 23.0 years (23.6%) and 50 of the participants were 24.0 years (15.6%). The number of participants from the faculty of Dentistry were 62 (19.8%), 49 were from the Faculty of Pharmacy (17.5%) and the highest percentage of participants were from the faculty of Medicine; 188 students. (62.9%).

Faculty

The number of participants from the faculty of Dentistry were 62 (20.7%), 49 were from the Faculty of Pharmacy (16.4%) and the highest percentage of participants were from the faculty of Medicine; 188 students. (62.9%). (Fig. 3), 28 students were in their third year (9.4%), 148 in their fourth year (49.5%), 123 were 4th year students (41.1%) (Fig. 4)

Weight status

The BMI (Body Mass Index) fell under three categories: either normal 180 (62.5%), underweight 50 (15.1%), overweight 53 (17.1%), or obese 15 (5.1%). The mean BMI was 22.5 + 5.5kg/m².

The EAT-26: Results.

Using the EAT-26- out of all 299 participants, 37 (12.4%) scored 20 or above suggesting a high risk for development of EDs whereas 262 (87.6%) scored below 20 which suggests the opposite. The difference in prevalence of risk in relation to age, gender, faculty, academic year and weight status showed no statistical significance.

Behavioural Score:

According to the Behavioural score, 193 out of 299 (61.7%) of the participants required medical evaluation while 120 students (38.3%) did not. Also, from 299 students, 58 students lost 20 pounds over the past month (18.5%) while 255 did not (81.5%).

EAT-26 and socio-demographic characteristics and behavioural score:

Table No. (1) shows the Chi square values for association between risk for developing EDs and Gender, Age, Faculty, Academic Year and Weight Status among Medical students in University of Khartoum ,Faculty of Medicine 2021 (n = 313)

	Chi-square value
Gender and high EAT score	.424
Age and high EAT score	.414
Faculty and high EAT score	.843
Academic Year and high EAT score	.943
Weight status and high EAT score	.094
Behavioural score and high EAT score	.727

Using cross-tabulation and Pearson Chi-Square, the p-value was found to be statistically insignificant (> 0.05) which suggests no correlation between the socio-demographic characteristics (gender, age, faculty, academic year and weight status) and risk for developing EDs. No correlation was established with the Behavioural score as well. (Table 1)

Child Abuse and Neglect according to CATQ:

Table No. (2) shows frequency and percentage prevalence of Emotional Abuse using the CTQ among Medical students in University of Khartoum 2021 (n = 313)

Emotional Abuse				
	Frequency	Percent	Valid Percent	Cumulative Percent
non	181	60.5	60.5	60.5
low	76	25.4	25.4	86.0
moderate	25	8.4	8.4	94.3
sever	17	5.7	5.7	100.0
Total	299	100.0	100.0	

Out of 299 participants, 181 did not experience Emotional Abuse (60.5%), 76 experienced low levels of Emotional Abuse (25.4%), 25 moderate experienced Emotional Abuse (8.4%) and 17 suffered from severe Emotional Abuse (5.7%). (Table 2)

Table No. (3) shows frequency and percentage prevalence of Physical Abuse using the CTQ among Medical students in University of Khartoum 2021 (n = 313)

Physical Abuse				
	Frequency	Percent	Valid Percent	Cumulative Percent
	214	71.6	71.6	71.6
	43	14.4	14.4	86.0
	28	9.4	9.4	95.3
	14	4.7	4.7	100.0
	299	100.0	100.0	

Out of 299 participants, 214 did not experience Physical Abuse (71.6%), 43 experienced low levels of Physical Abuse (14.4%), 28 experienced moderate Physical Abuse (9.4%) and 14 suffered from severe Physical Abuse (4.7%). (Table 3)

Table No. (4) shows the frequency and percentage prevalence of Sexual Abuse using the CTQ among Medical students in University of Khartoum 2021 (n = 313)

Sexual Abuse					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	non	157	52.5	52.5	52.5
	low	47	15.7	15.7	68.2
	moderate	53	17.7	17.7	86.0
	sever	42	14.0	14.0	100.0
	Total	299	100.0	100.0	

Out of 299 participants, 157 did not experience Sexual Abuse (52.5%), 47 experienced low levels of Sexual Abuse (15.7%), 53 experienced moderate Sexual Abuse (17.7%) and 42 suffered from severe Sexual Abuse (14.0%). (Table 4)

Table No. (5) shows frequency and percentage prevalence of Emotional Neglect using the CTQ among Medical students in University of Khartoum 2021 (n = 313)

Emotional Neglect					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	non	129	43.1	43.1	43.1
	low	84	28.1	28.1	71.2
	moderate	47	15.7	15.7	87.0
	sever	39	13.0	13.0	100.0
	Total	299	100.0	100.0	

Out of 299 participants, 129 did not experience Emotional Neglect (43.1%), 84 experienced low levels of Emotional Neglect (28.1%), 47 experienced moderate Emotional Neglect (15.7%) and 39 suffered from severe Emotional Neglect (13.0%). (Table 5)

Table No. (6) shows frequency and percentage prevalence of Physical Neglect using the CTQ among Medical students in University of Khartoum 2021 (n = 313)

Physical Neglect		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	non	190	63.5	63.5	63.5
	low	56	18.7	18.7	82.3
	moderate	38	12.7	12.7	95.0
	sever	15	5.0	5.0	100.0
	Total	299	100.0	100.0	

Out of 299 participants, 190 did not experience Physical Neglect (63.5%), 56 experienced low levels of Physical Neglect (18.7%), 38 experienced moderate Physical Neglect (12.7%) and 15 suffered from severe Physical Neglect (5.0%). (Table 6)

Concerning possible childhood trauma, 154 students out of 299 lied above the median (51.5%) and (48.5%) were below the median.

Self-esteem using the Rosenberg Self-esteem scale:

Table No. 7 shows the self esteem levels' frequency and cumulative percentage among Medical students in University of Khartoum 2021 (n = 313)

	Frequency	Percent
Low	67	22.4
Normal	227	75.9
High	5	1.7
Total	299	100

22.4% of the students, 67 out of 299, were found to have low self-esteem while 239 (75.9%) have normal self-esteem. As for a high esteem level, there were only 5 (1.7%). (Table 7)

The association between high EAT-26 score and the risk factors:

Table No. (8) shows the Chi square values for association between high EAT score and Physical, Sexual and Emotional abuse, Physical and Emotional Neglect, Childhood trauma and finally Self-esteem levels among Medical students in University of Khartoum ,Faculty of Medicine 2021 (n = 313)

	Chi-square value
Physical abuse and high EAT score	.573
Emotional abuse and high EAT score	.103
Sexual abuse and high EAT score	.440
Physical Neglect and high EAT score	.319
Emotional neglect and high EAT score	.014
Childhood Trauma and high EAT score	.015
Self-Esteem and high EAT score	.109

No correlation was found between emotional abuse, physical abuse, sexual abuse and physical neglect and high risk of EDs as the p-value was $> .05$. However, there was a correlation between it and emotional neglect (p-value = .014) and childhood trauma when the 50th percentile was used (.015). There was no correlation with the other variable- self esteem levels. ($p = .109$) (Table 8)

Discussion

This study addresses the risk for developing Eating Disorders among Medical students at the University of Khartoum and its correlation with specific factors which are Low Self-esteem and Childhood abuse and Neglect. The results obtained by this study were found to be slightly higher than those revealed by a global meta-analysis which involved students of a similar background (Medical students). [5] However if the results of this study were to be compared to other national studies, the risk was found to be half that deduced by the study performed in Egypt. [7] This might be due to the fact that the Egyptian study included Medical students of all age groups unlike here where those younger than 20 were not included. Nevertheless, when compared to the study in the rural area in South Africa, the findings were four times greater. [18]. It is fair to assume that this is because those living in rural areas are less exposed to social media and other external influences which play a role in the prevalence. [19]

Medical students in the University of Khartoum were found to be at higher risk than those in France, India and China [20, 21, 22]. The fact that this percentage in the University of Khartoum surpassed that of China and France suggests that EDs are a bigger issue in the developing countries and the numbers are yet to rise. This can be blamed on the unavailability of treatment facilities and the stigma associated with mental illnesses; which makes it difficult for victims to seek professional help. [23] Another factor that might have played a role is that developing countries have recently adopted Western standards and show less interest in their own customs- a direct effect of globalization. [24]

The results of a wide-scale study in a Spanish university for the risk of developing EDs was also higher. [25] This variation might be due to differences in execution as the study in Spain used the SCOFF

questionnaire which has a lower specificity (higher false-positive results) than the EAT-26 which was used in this study and most of the ones mentioned above. Even though the risk was higher among females there was no association between it and socio-demographic factors (age, gender, academic year, faculty and weight status) (Table No. 3) matching the proposition presented by the studies in the University of Tanta and France [7, 20]. As for the second objective, which is the presence of an association between LSE and the risk of developing EDs, this study showed no significant association. A study in Turkey however established an association; (the p value was 0.001 when the correlation between prevalence of EDs and LSE were investigated). [17] Another paper substantiated the belief that LSE is a vital risk factor and it was found that almost a quarter of girls with a known history of EDs have LSE. [26] This can be due to the fact that in the latter studies a larger, more diverse study population was targeted. Regarding the third objective, there was no statistical significance between the risk of prevalence for EDs and sexual, physical and emotional abuse in childhood contradicting the outcome of the paper in Turkey which unveiled childhood sexual and emotional abuse in particular to be strongly correlated ($p = 0.03$). [17] The same can't be said about emotional neglect however which showed a statistically significant p-value. (Table No. 5) Emotional neglect can be a precipitating factor as parents' lack of concern towards children's needs will then force them to resort to other sources of comfort, an example of which is food. [54] As there is no cut-point for the total score in the CTQ used in this study, the median was used. Those who lied at or above the median ($= > 40$) were considered to be victims of childhood maltreatment and those below were considered as the opposite. A strong correlation was found between childhood maltreatment using the 50th percentile and those at risk of developing an ED. (Table No. 5) The reasoning for this is the same as above, which is that children whom are maltreated might try to numb the pain caused by their parents' lack of concern through frequent episodes of bingeing and purging. [27]

Limitations

Students who were asked to participate were university years from the age of 20–24 who experienced stress mostly since they are in their final years, this is on the hypothesis that stress is a precipitating factor for the development of EDs [10, 11]. The percentage prevalence might have been higher since EDs do not affect this age group exclusively, and the risk can start at a much younger age.[28] There was selection bias as students were chosen based on their ability to access the online Google forum and an online platform was the only possible method due to the restrictions caused by the current pandemic. The questionnaire used to detect the risk of EDs (EAT-26) has moderate sensitivity.[29]

Conclusion

The study found out that risk for developing EDs among Medical students in the University of Khartoum was 12.4% using the EAT-26. Emotional Neglect and Childhood maltreatment were found to be strongly correlated to the risk of developing an ED.

Recommendations

Mental health care services should be included in Sudanese universities which incorporate treatment plans for EDs in its early stages. It's vital that similar studies are carried out on a wider scale to raise more awareness on EDs so that students are able to identify this abnormality. Moreover, it's important to implement effective measures to tackle the stigma associated with EDs, to ensure that those having symptoms seek help. Lastly, it is crucial that Medical practitioners are included as both helpers and helpees.

Declarations

Ethics approval and consent to participate:

Ethical clearance was obtained from the Department of Community Medicine, Faculty of Medicine, and University of Khartoum. An informed written consent was obtained from the study subjects before they participated. No conflict of interest has been denoted. The participants' personal data remained confidential. This also certify that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Consent for publication:

Not applicable.

Availability of data and materials:

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests:

The authors declare that they have no competing interests.

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Authors' contributions:

M.Y is the owner of the research idea. M.Y and A.R participated in writing the main manuscript text, M.Y and A.R participated in preparing figures. All authors participated in reviewing the manuscript. All authors read and approved the final manuscript.

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Figures

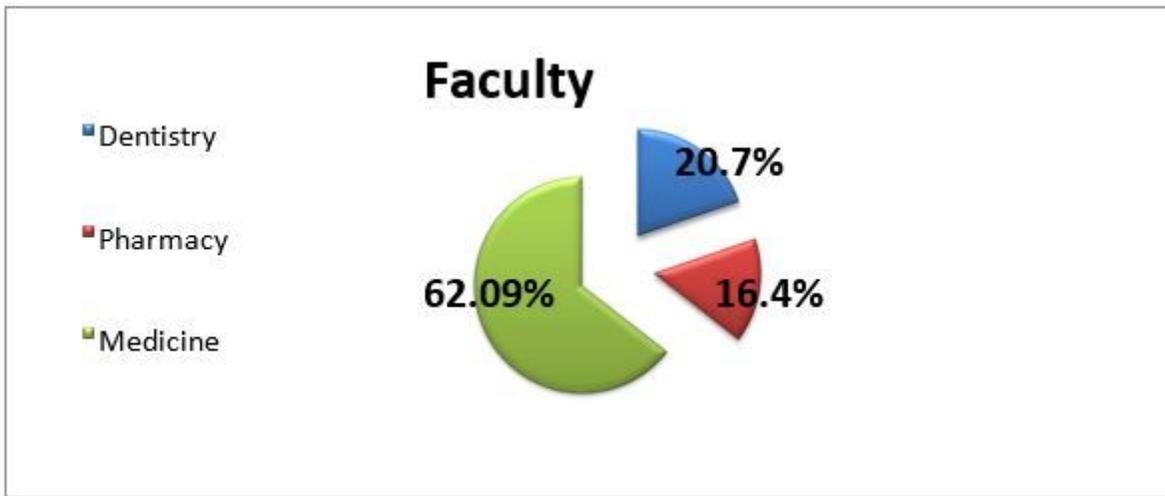


Figure 1

No. of participants in the study from each faculty, Medical Campus, University of Khartoum, 2021 (n=313)

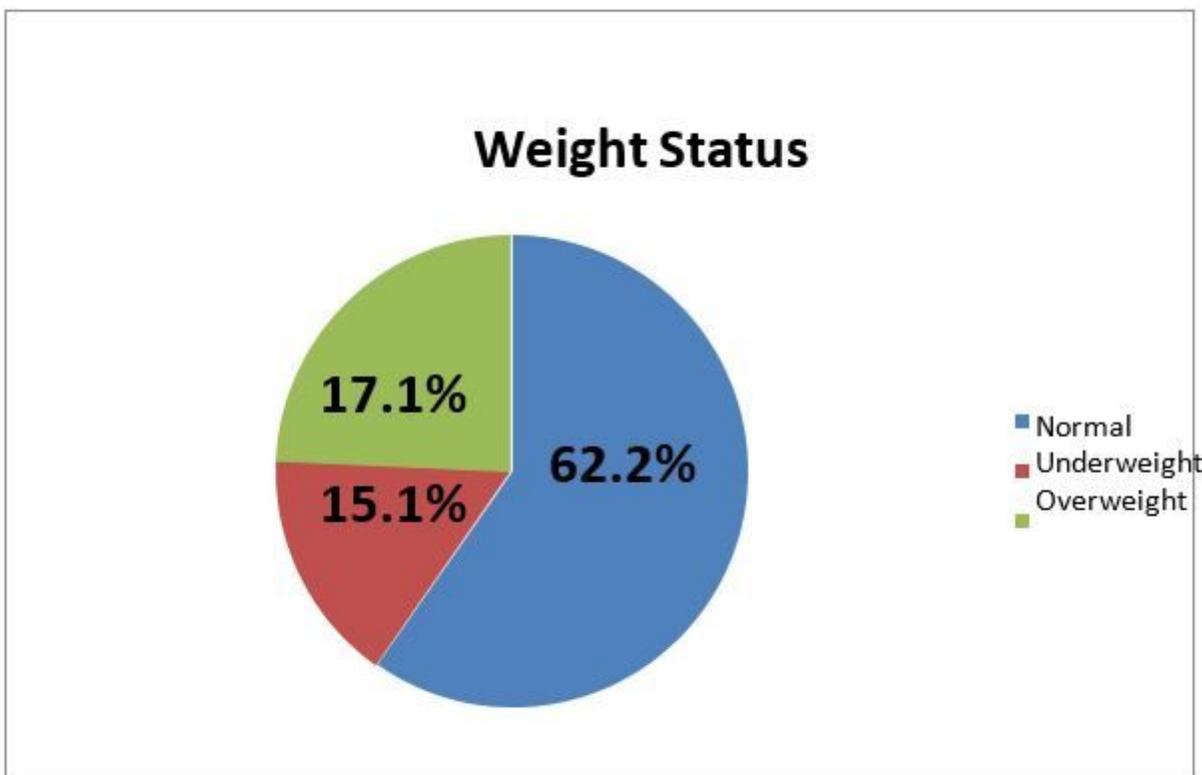


Figure 2

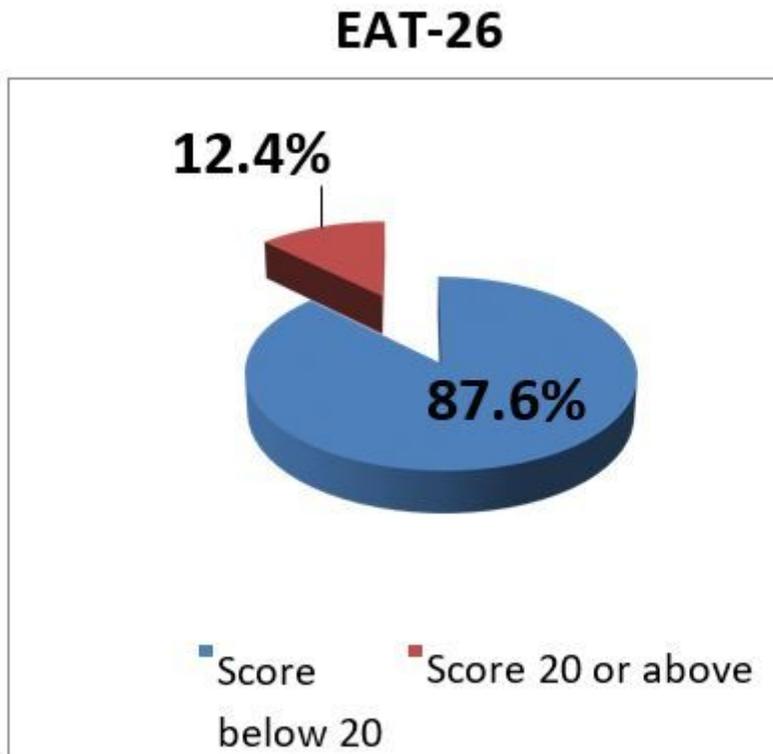


Figure 3

The percentage of students at risk of developing an ED and those who are not using the EAT-26, Medical Campus, University of Khartoum, 2021 (n=299)

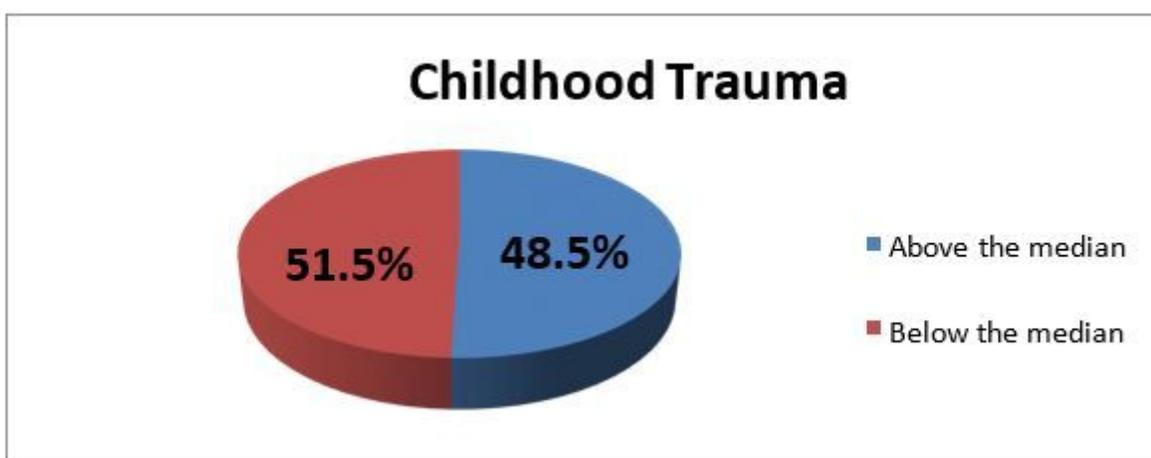


Figure 4

shows the number of students who experienced childhood trauma in the Medical Campus, University of Khartoum 2021 (n=313)