

<https://doi.org/10.48047/AFJBS.6.15.2024.7608-7626>



African Journal of Biological Sciences

Journal homepage: <http://www.afjbs.com>



Research Paper

Open Access

Prevalence and Correlates of Eating Disorders among a Sample of Middle School Adolescents in Morocco

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Volume 6, Issue 15, Sep 2024

Received: 15 July 2024

Accepted: 25 Aug 2024

Published: 05 Sep 2024

doi: [10.48047/AFJBS.6.15.2024.7608-7626](https://doi.org/10.48047/AFJBS.6.15.2024.7608-7626)

Abstract:

Introduction: Eating disorders (ED) significantly impact both physical and mental health. Adolescents are particularly affected, with concerning rates reported in recent studies. In Morocco, data are very limited. This study aimed to determine the prevalence of potential ED among middle school adolescents and assess their risk based on associated factors.

Methods: We conducted a cross-sectional descriptive and analytical study in Casablanca, Morocco, in 2022. The survey included a sample of 410 students. We used the Eating Attitude Test (EAT26) to screen for ED, the ROSENBERG scale to assess self-esteem, and the Beck Depression Inventory (BDI) to screen for depressive disorders. A questionnaire collected sociodemographic and lifestyle data. Weight status was determined according to WHO reference standards.

Results: The EAT-26 identified 182 participants (44.4%) at risk of ED. BMI and depression were significantly associated with the risk of ED among middle school adolescents. The prevalence of ED varied according to self-esteem in our study, although the differences were not significant. Sociodemographic variables did not significantly influence ED prevalence.

Conclusion: The high prevalence and complexity of ED revealed by this study highlight the importance of extending research to larger and more diverse samples to gain a comprehensive understanding of the situation in Morocco. This will help strengthen recommendations and improve prevention and management strategies for adolescents.

Keywords : eating disorders, adolescents, prevalence, correlates.

Introduction

Eating disorders (ED) are complex, multidimensional illnesses with determinants that can be biological, psychological, and sociocultural (Schmidt & al., 2003). These serious disorders predominantly affect adolescents and young adults (Whitaker, 1992). Eating disorders, alongside anxiety and depression, are among the leading causes of morbidity and disability among adolescents (World Health Organization (n.d.) provides growth reference data for children and adolescents). These disorders pose potential severe consequences for physical and mental health (Palla, 1988 ; Campbell, 2014 & Chaulet, 2018) with an elevated mortality risk (Smink & al., 2012). EDs, including anorexia nervosa, bulimia nervosa, binge eating disorder, and unspecified eating disorders, are characterized by an excessive preoccupation with weight and body appearance (Rome, 2003 & Stice, 2011). The prevalence of EDs has increased over the past decades and almost doubled between 2000 and 2018 (Galmiche & al., 2019), especially in developing countries (Wu & al., 2017) where sociocultural norms regarding body image are rapidly changing (Hausenblas, 2002 ; Stojcic, 2020 & Psychology, 2023).

The scientific literature highlights several risk factors associated with EDs in adolescents, including sociocultural influences (Stice, 1994 & Bradford, 2008), family dynamics (Seepersad, 2012 ; Sibeoni, 2013 & Erriu, 2020), self-esteem (Seepersad, 2012 & Livet, 2022), and depressive symptoms (Stice & al., 2011). Body Mass Index (BMI) is also frequently studied as a risk factor, with some studies showing that overweight or obese adolescents are more likely to develop EDs (Neumark-Sztainer., 2007 & Musaiger, 2023). Additionally, a significant association between depression and EDs has been documented, suggesting that adolescents with depressive symptoms are more vulnerable to disordered eating behaviors (Stice & al., 2011).

Despite growing attention to EDs in the international literature, there is very limited data on their prevalence and associated factors in Morocco. This gap in research is concerning, as Moroccan adolescents face unique sociocultural pressures and rapid changes in lifestyle and social expectations (Riard & Wallet, 2007). Moreover, resources for screening and treating EDs are limited in this region, making it essential to gain a better understanding of the extent and determinants of these disorders.

This study aims to fill this gap by assessing the prevalence of EDs among school-aged adolescents in Casablanca and exploring associations between EDs and various sociodemographic, anthropometric, and psychological factors, such as BMI, depression levels, and self-esteem, as well as factors related to eating attitudes and lifestyle. The use of the Eating

Attitude Test (EAT26), the Rosenberg Self-Esteem Scale, and the Beck Depression Inventory (BDI), all adapted into Arabic, provides a comprehensive and contextualized assessment of the eating behaviors and psychological state of Moroccan adolescents.

By providing empirical data on these aspects, this study aims to inform public health policies, prevention programs, and clinical interventions, and to encourage future research to deepen the understanding of EDs in similar contexts.

Subjects and methods

Study setting and participants

The study was conducted in Casablanca, Morocco, among adolescents attending public middle schools during the year 2022. Casablanca, as a major Moroccan metropolis, provided a diverse and representative setting for this study, capturing a wide range of socio-economic backgrounds and lifestyles among adolescents. A total of 410 students participated in the study, selected through random sampling from various public middle schools located in different districts of Casablanca. Participants were recruited with the collaboration of school authorities, ensuring a broad geographic and demographic representation within the city. Inclusion criteria required that participants be enrolled in a public middle school and voluntarily consent to participate in the study. This setting allowed for a comprehensive examination of sociodemographic characteristics, eating attitudes, lifestyle, weight status, self-esteem levels, depressive symptoms, and their associations with eating disorders among adolescents in Casablanca.

Sampling

A stratified random sampling method was used to ensure the representativeness of adolescents attending public middle schools in Casablanca. Public educational institutions were chosen to reflect the geographic and socio-economic diversity of the city, including middle schools in various neighborhoods. Within each selected public school, only students in the 1st and 2nd grade levels were included in the study. Students were randomly chosen to ensure a balanced distribution of participants in terms of gender, age, and grade level. This process resulted in a sample of 410 adolescents. Inclusion criteria consisted of being enrolled in a public middle school in Casablanca and voluntarily consenting to participate in the study. This sampling methodology aims to minimize selection bias and maximize the generalizability of the results to the entire adolescent population attending public middle schools in Casablanca. The stratified random approach ensures that relevant subgroups of the population are adequately represented, allowing for a more accurate and comprehensive analysis of factors associated with eating disorders in this specific population.

Ethical considerations

This study was conducted in strict accordance with ethical principles established by the Faculty of Medicine and Pharmacy Research Ethics Committee in Casablanca. All procedures were approved by this committee to ensure the protection of participants' rights and well-being. Prior to commencing the study, permission was obtained from the educational authorities in Casablanca, as well as from the principals of the participating schools. Parents or legal guardians of adolescents were informed about the nature of the study and their rights as participants. Informed consent was obtained from each participant after providing detailed information about the study's objectives, methods, anticipated benefits, and potential risks. Collected data were treated confidentially and anonymously, following international data protection standards. Participants were assured of their right to withdraw their consent at any time without negative consequences. Measures were taken to ensure participants' emotional safety by offering psychological support as needed. By adhering to these rigorous ethical guidelines, this study aims to responsibly contribute to understanding eating disorders among adolescents in Casablanca, while safeguarding the integrity and well-being of those involved.

Data collection and measuring instruments*Questionnaire*

Sociodemographic data, including age, gender, school grade, and other variables, as well as information related to eating habits and lifestyle, were collected using a pretested and validated questionnaire.

Anthropometric measurements and Body Mass Index

Anthropometric measurements were conducted following the World Health Organization (WHO) standard protocols. The body mass index (BMI), reported in kg/m², was determined using the WHO AnthroPlus software (World Health Organization, n.d.).

Eating Attitude Test (EAT26)

The Eating Attitude Test (EAT26) developed by Garner et al. (1982) is a tool designed to detect the presence of eating disorders (ED) without specificity. It has been translated and validated into several languages, including French (Leichner et al., 1994). The version used in our study was the one translated and validated in Arabic (Haddad et al., 2021). Participants were asked to respond to 26 items, each rated on a scale from 1 to 6, corresponding respectively to always to never. The total score, obtained by summing the scores of all items, indicated the presence of ED when it was 20 or higher.

Rosenberg scale

The Rosenberg Self-Esteem Scale (RSES) consists of 10 items and typically takes about 3 minutes to complete. It can be administered individually or in groups, with flexibility in presentation format. Each item uses a 4-point Likert-type response scale ranging from strongly disagree to strongly agree. Depending on the original studies, both a total score and scores for each of its two dimensions can be derived by summing the item scores.

In our research, we used the Rosenberg Self-Esteem Scale in Arabic, adapted for Moroccan Adolescents (RSES. AL-MA) (Zarhbouch, & al., 2021). The adaptation process of psychological assessment scales is crucial for ensuring cultural relevance and psychometric validity (Events, n.d.).

Beck Depression Inventory (BDI)

The Beck Depression Inventory (BDI) is a standardized assessment tool designed to measure the intensity of depressive symptoms (Beck & al., 1961). Originally consisting of 21 items, the adapted version used here includes 19 items. From the original studies, it is possible to calculate an overall score, along with individual scores for the two dimensions: cognitive-affective and somatic. In our research, we used the Beck Depression Inventory IA. in Arabic, adapted for Moroccan Adolescents (BDI-IA. AL-MA) (Alaoui &al., 2021). Adaptation process of psychological assessment scales is crucial for ensuring cultural relevance and psychometric validity (Events, n.d.).

Statistical analysis

The statistical analysis of this study was conducted using Jamovi version 2.0. Sociodemographic data, dietary habits, lifestyle factors, and scores from the EAT26, ROSENBERG, and Beck Depression Inventory (BDI) questionnaires were descriptively analyzed to provide an overview of the sample. Chi-square tests were used to examine associations between eating disorders (ED) and categorical variables such as BMI and levels of depression. Student's t-tests and analysis of variance (ANOVA) were employed to compare mean scores across different groups. Finally, multivariate logistic regression models were used to identify independent predictors of ED adjusted for potential confounding variables. A significance threshold of $p < 0.05$ was set to determine statistical significance.

Results

Sociodemographic and anthropometrics characteristics of the sample

The studied sample comprised a total of 410 participants, whose sociodemographic and anthropometric characteristics are presented in Table 1. The sample was relatively balanced in

terms of gender. The majority of participants were in the age range of 13 to 15 years, representing 55.1% of the sample. More than half of the participants were in the first year of middle school, suggesting a slightly higher distribution in this group. An overwhelming majority of participants had siblings and were not the eldest in their family. Most families had 4 to 5 members, while a significant number of families (42.2%) had more than 5 members. The secondary education level was the most common among mothers, while a minority had a university-level education. The secondary education level also predominated among fathers, with a significant proportion having attained primary education. The majority of participants lived with their parents, which is a common characteristic in this sample.

The anthropometric characteristics of the participants present averages and standard deviations. The average Body Mass Index (BMI) of the participants was $19,26 \pm 3,63 \text{ kg/m}^2$.

Table 1. Sociodemographic and anthropometric characteristics of the sample (n= 410)

Variables		Frequency	Percentage (%)
Gender	Girls	210	51,2
	Boys	200	48,8
Age	<13 years	144	35,1
	[13-15 years[	226	55,1
	15 years &+	40	9,8
School level	1st year	233	56,8
	2 nd year	177	43,2
Siblings	Presence	389	94.9
	Absence	21	5.1
Rank in siblings	Eldest	153	37.3
	No Eldest	257	62.7
Family size	2 or 3	27	6,6
	4 or 5	210	51,2
	> 5	173	42,2
Maternal education	Illiterate	118	28,8
	Primary	107	26,1
	Secondary	150	36,6
	University	35	8,5
Paternal education	Illiterate	63	15,4
	Primary	125	30,5
	Secondary	183	44,6
	University	39	9,5
Family situation	Lives with his parents	383	93.4
	Dont lives with parents	27	6.6
Anthropometric characteristics	Averages $\pm$ Sdandard déviations		
	Weight (Kg)	48,77 $\pm$ 10,96	
	Height (cm)	158,73 $\pm$ 8,25	
	BMI (Kg/m ²)	19,26 $\pm$ 3,63	

Note. BMI : Body mass index

Participants' scores on the Eating Attitude Test and Prevalence of ED

Our study examined the mean score of the Eating Attitude Test (EAT26) and the prevalence of eating disorders (ED) among the participants. The results revealed that the mean EAT26 score among participants was 19.6 ± 10.9 . The prevalence of ED in this sample was 44.4%, with a 95% confidence interval ranging from 39.7% to 49.2%. These data indicate that a significant proportion of participants had high EAT26 scores, which are associated with a higher likelihood of having ED. The relatively high mean score and standard deviation suggest considerable variability in problematic eating attitudes within the studied population. The narrow confidence interval reinforces the reliability of this observed prevalence, highlighting the relevance of the results for targeted interventions. Results in Table 2.

Table 2. Average score according to EAT26 and Prevalence of eating disorders (n=410)

EAT26 Score		ED	
Mean	SD	Frequency (%)	95% Confidence Intervals
19.6	10.9	182 (44.4%)	[39.7 % ; 49.2 %]

ED prévalences by sociodemographics characteristics, eating habits and life style

The results of our study showed that the prevalence of ED was slightly higher among boys (47.5%) compared to girls (41.4%), but this difference was not statistically significant ($p=0.216$). Additionally, ED appeared to affect different age groups similarly, with a slight increase among participants aged 15 and above (50%), though the observed differences were not significant ($p=0.738$). The prevalence of ED was higher among first-year students (48.1%) compared to second-year students (39.5%), although this difference was not significant ($p=0.085$). The presence or absence of siblings did not appear to have a significant effect on the prevalence of ED ($p=0.449$). Similarly, birth order did not influence the prevalence of ED, with identical percentages for eldest and non-eldest siblings (44.4%, $p=0.986$). Family size showed no significant difference in the prevalence of ED ($p=0.464$). Maternal education level did not have a significant relationship with the prevalence of ED ($p=0.954$). Likewise, paternal education level was not significantly related to the prevalence of ED ($p=0.971$). Family situation did not have a significant impact on the prevalence of ED ($p=0.693$). Snacking habits showed no significant difference in the prevalence of ED ($p=0.708$). Eating meals at the table did not have a significant relationship with ED ($p=0.876$). Similarly, the prevalence of ED was not significantly influenced by eating meals in front of the television ($p=0.852$), nor by family meals ($p=0.913$). Participation in sports activities at school was not significantly related to the prevalence of ED ($p=0.206$). Additionally, engaging in sports outside of school activities did not show a significant relationship with ED ($p=0.805$). Finally, screen time for entertainment

activities was not significantly related to the prevalence of ED ($p=0.223$). Results are summarized in Table 3.

Table 3. Eating disorders prévalences by sociodemographics characteristics, eating habits & life style

Variables		ED		P-value
		N	%	
Gender	Girls	87	41.4	0.216
	Boys	95	47.5	
Age	<13 years	64	44.4	0.738
	[13-15 years[	98	43.4	
	15 years &+	20	50.0	
School level	1st year	112	48.1	0.085
	2 nd year	70	39.5	
Siblings	Presence (yes)	171	44.0	0.449
	Absence (no)	11	52.4	
Rank in siblings	Eldest	68	44.4	0.986
	No Eldest	114	44.4	
Family size	2 or 3	13	48.1	0.464
	4 or 5	87	41.4	
	> 5	82	47.4	
Maternal education	Illiterate	51	43.2	0.954
	Primary	48	44.9	
	Secondary	66	44.0	
	University	17	48.6	
Paternal education	Illiterate	29	46.0	0.971
	Primary	56	44.8	
	Secondary	79	43.2	
	University	18	46.2	
Family situation	Lives with his parents	171	44.6	0.693
	Dont lives with parents	11	40.7	
Snacking habits	Toujours	32	51.6	0.708
	Parfois	48	45.7	
	Jamais	12	52.2	
Eating at the table	Toujours	171	44.2	0.876
	Parfois	9	50.0	
	Jamais	2	40.0	
Meals in front of TV	Toujours	50	46.7	0.852
	Parfois	71	43.6	
	Jamais	61	43.6	
Family meals	Toujours	143	43.9	0.913
	Parfois	31	46.3	
	Jamais	8	47.1	
Sport at school	Oui	174	43.8	0.206
	Non	8	61.5	
Sport outside of school	Oui	102	44.9	0.805
	Non	80	43.7	
Screen time for entertainment activities	< = 2h	102	47.2	0.223
	>2h	80	41.2	

ED prévalences by BMI categories

This study evaluated the prevalence of eating disorders (ED) among a sample of 410 participants, based on their body mass index (BMI) categories. The BMI categories included in the analysis were underweight, normal weight, overweight, and obesity. Statistical analyses were conducted to determine the relationships between these different BMI categories and the prevalence of ED. The results showed that the prevalence of ED varied significantly according to BMI categories ($p=0.041$). Among underweight participants ($n=33$), 39.4% had ED. For those with normal weight ($n=294$), 41.5% had ED, indicating a slightly higher prevalence in this category compared to the underweight group. The prevalence of ED increased further among overweight participants ($n=58$), reaching 51.7%. Finally, the category with the highest prevalence of ED was obese participants ($n=25$), with 68.0% having ED. This progressive increase in ED prevalence from underweight to obesity highlights a notable trend in the data. Results are summarized in Table 4.

Table 4. Eating disorders prévalences according to BMI categories

BMI categories	Eating Disorders		P-value
	Yes	No	
	N (%)	N (%)	
Underweight ($n=33$)	13 (39.4%)	20 (60.6%)	0.041*
Normal weight ($n=294$)	122 (41.5%)	172 (58.5%)	
Overweight ($n=58$)	30 (51.7%)	28 (48.3%)	
Obesity ($n=25$)	17 (68.0%)	8 (32.0%)	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

ED prevalences according to profile of self-esteem

This study also investigated the prevalence of eating disorders (ED) among participants based on their self-esteem profiles. The self-esteem profiles included in the analysis were: very low, low, medium, high, and very high self-esteem. Statistical analyses were conducted to determine the relationships between these different self-esteem profiles and the prevalence of ED.

The results showed that the prevalence of ED varied according to self-esteem profiles, although the observed differences were not statistically significant ($p=0.316$). Among participants with very low self-esteem ($n=26$), 53.8% had ED. For those with low self-esteem ($n=105$), 51.4% had ED, indicating a slightly lower prevalence in this category compared to very low self-esteem. The prevalence of ED was 42.9% among participants with medium self-esteem ($n=105$). Among participants with high self-esteem ($n=159$), 39.6% had ED, representing a progressive decrease in the prevalence of ED with increasing self-esteem. Finally, the category

with the lowest prevalence of ED was participants with very high self-esteem (n=15), with 40% having ED. Results are summarized in Table 5.

Table 5. Eating disorders prévalences according to profile of self-esteem (n=410)

Self-Esteem Profile		Eating disorders	P-value
		N (%)	
Very low self-esteem	(n=26)	14 (7.7%)	0.316
Low self-esteem	(n=105)	54 (29.7%)	
Medium self-esteem	(n=105)	45 (24.7%)	
High self-esteem	(n=159)	63 (34.6%)	
Very high self-esteem	(n=15)	6 (3.3%)	
TOTAL		182 (100%)	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

ED prevalence according to scores of the Beck Depression Inventory

The present study examined the prevalence of eating disorders (ED) among participants based on their BECK Depression Inventory scores, focusing on cognitive-affective depression and somatic depression scores. The results showed that cognitive-affective depression and somatic depression scores varied significantly between participants with and without ED. Participants with ED had a median cognitive-affective depression score of 13.0 (IQR: 7.0-20.0), compared to a median score of 8.0 (IQR: 5.0-14.0) for those without ED, this difference being statistically significant ($p < 0.001$). Similarly, for the somatic depression score, participants with ED had a median of 2.0 (IQR: 1.0-4.0), compared to a median of 2.0 (IQR: 0.0-3.0) for those without ED, this difference also being significant ($p < 0.001$). These results indicate that higher cognitive-affective and somatic depression scores are associated with an increased prevalence of ED among participants. Results are summarized in Table 6.

Table6. Eating disorders prevalence according to scores of the Beck Depression Inventory

TCA	Cognitive-Affective Depression Score		Somatic Depression Score	
	Médiane (IIQ)	P-value	Médiane (IIQ)	P-value
Yes	13,0 (7,0-20,0)	< 0.001***	2,0 (1,0-4,0)	< 0.001***
No	8,0 (5,0-14,0)		2,0 (0,0-3,0)	

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Discussion

Our research is among the first to examine the prevalence of eating disorders (ED) and associated risk factors among adolescents in Morocco. The scarcity of studies and results in our context, as well as the use of different measurement and assessment tools by researchers, have made discussing the results challenging.

According to our study, the prevalence of ED among the participants was 44.4%, with a mean score of 19.6 ± 10.9 on the EAT26 test. These results indicate that a substantial proportion of adolescents exhibited problematic eating attitudes. The significant prevalence reported aligns with the estimates from a literature review on EDs in the Arab world, where 2 to 54.8% of individuals were at high risk of eating disorders (Melisse et al., 2020). The systematic review by Alsheweir et al. (2023) on eating and eating disorders among adolescents and young adults in Saudi Arabia also revealed similarly high rates, ranging from 10.2% to 48.1%. Another study in Jordan among young female students aged 10 to 16 years reported that 40.5% of them had negative eating behaviors (Moussa et al., 2010). The result also aligns with that of a study conducted in 2021 in France, which aimed to investigate the evolution of eating disorder prevalence since the COVID-19 pandemic among university students in France. It reported a prevalence of 46.6%, indicating that it nearly doubled between 2018 and 2021 (Tavolacci & al., 2022). However, in another study conducted in 2015 among adolescents in Fez, Morocco, the reported prevalence of 22.6% (Makdad et al., 2022), although significant, was lower than ours. The study by Rauof et al. (2015) among adolescents in Iran showed that 24.2% were at risk of eating disorders. Koushiou et al. (2019) estimated the prevalence at 26% among Greek Cypriot adolescents and young adults. It was 32.8% according to Azzouzi et al. (2019) among Moroccan medical students and 25.09% in another study by Attouche et al. (2021). The high prevalence in our research could be related to sociocultural factors, unhealthy eating behaviors, or excessive concerns about weight and appearance among adolescents in Casablanca, a large metropolis and the largest city in Morocco that has undergone significant modernization in recent decades. The considerable variability in EAT26 scores indicates a diversity of problematic eating behaviors within the studied population. Our study's results suggest the need for systematic screening programs in schools to identify at-risk adolescents early. Specific interventions should be developed to raise awareness about the dangers of EDs and promote healthy eating behaviors. Public health policies could integrate educational campaigns to reduce disordered eating behaviors and improve adolescent nutrition.

Regarding ED by gender, our results revealed a non-significant difference but with a slightly higher prevalence in boys (47.5%) compared to girls (41.4%). This finding aligns with the systematic review by Alsheweir et al. (2023) on eating and eating disorders among adolescents and young adults in Saudi Arabia, which showed a significantly higher prevalence in males. Other studies, respectively in Fez, Morocco, Egypt, the Caribbean, and Norway, reported significantly higher prevalences in girls than in boys (Makdad, 2022; Sabry, 2020; Seepersad, 2012; Dahlgren, 2023). Although not significant, the trends in our study could suggest gender

differences in the perception and manifestation of EDs. These might be underestimated and underreported by male subjects due to cultural representations considering these disorders as feminine. Age differences were also not significant. Other studies, such as those conducted in Saudi Arabia according to the systematic review by Alsheweir et al. (2023), have shown that older adolescents were more likely to exhibit eating disorders than younger ones. The lack of significant age differences might indicate that EDs affect adolescents relatively uniformly across school years in our population. Regarding the parental and familial characteristics of the participants, our results did not indicate a statistically significant correlation between the presence of eating disorders and the analyzed variables. This is consistent with the study by Rauof et al. (2015) in Iran.

No statistically significant difference in eating habits was noted in our study either, unlike others that have revealed family meal consumption as a protective factor against EDs in adolescents (Neumark-Sztainer, 2004 & Neumark-Sztainer, 2007). Sports practice and screen overexposure did not yield any statistically significant results in our study either. Interventions should address eating behaviors in both boys and girls. Additionally, prevention programs should be introduced early in adolescence to maximize their effectiveness, particularly regular family meals from a young age, which could contribute to the adoption of healthy eating habits (Burgess-Champoux et al., 2009).

Our study showed that the prevalence of eating disorders (ED) significantly increased with BMI, reaching 68.0% among obese adolescents ($p=0.041$). This relationship suggests that excess weight is a major risk factor for the development of ED. Weight and appearance pressures may exacerbate disordered eating behaviors in obese adolescents. This finding is consistent with several previous studies (Leichner, 1986; Neumark-Sztainer, 2007; Mallaram, 2023 & Sabry, 2020). It is also supported by other results indicating that the incidence of ED was four times higher among adolescents with body dissatisfaction (Stice et al., 2011), and that significant body dissatisfaction was correlated with more severe ED (Ohashi et al., 2023). The literature review by Melisse et al. (2020) on ED in the Arab world and the cross-cultural study by Musaiger et al. (2023) on eating disorders among adolescents aged 15 to 18 from seven Arab countries revealed that the association between obesity and ED was statistically significant. Musaiger et al. (2023) showed that the risk of ED in obese adolescents was two to three times higher than that of non-obese adolescents. It is crucial to promote a balanced diet and regular physical activities in school programs for our population. Overweight adolescents should receive specific support, including nutritional and psychological consultations, to help them manage their weight healthily and avoid problematic eating behaviors.

The prevalence of ED varied according to self-esteem in our study, although the differences were not significant ($p=0.316$). Low self-esteem appeared to be associated with a higher prevalence of ED, suggesting that adolescents with a negative self-image may be more likely to develop disordered eating behaviors. However, the lack of statistical significance might indicate that other factors also play an important role. This aligns with a study on self-esteem conducted in Morocco with the same population of adolescents. The study revealed that the average self-esteem score among obese adolescents was lower than the scores obtained by adolescents in other BMI categories (Fathi & al., 2024). Other research has shown with statistically significant results a strong negative correlation between self-esteem and ED (Seepersad, 2012; Livret, 2022; Mallamar, 2023 & Sabry, 2020). ED prevention programs should include components aimed at improving adolescents' self-esteem. Psychological interventions could help boost self-confidence and reduce unhealthy eating behaviors.

Cognitive-affective and somatic depression scores were significantly higher among participants with ED ($p < 0.001$). These results indicate a strong association between depression and ED, suggesting that depressive symptoms may exacerbate disordered eating behaviors. Our findings align with the research by Allen et al. (2013), which showed that ED diagnoses were related to depressive symptoms and poor mental quality of life, and with Stice et al. (2011), which revealed that the incidence of ED was almost three times higher among adolescents with depressive symptoms. This result is supported by other studies conducted among adult subjects (Attouche, 2021; Haddad, 2021). A systematic review and meta-analysis showed that pathological eating and depression are competing risk factors (Puccio et al., 2016). The underlying psychological and emotional mechanisms of this association deserve particular attention. ED treatment programs should include psychological support components to address depressive symptoms. Collaboration between mental health professionals and nutrition professionals could improve intervention outcomes.

Our study is one of the first to examine eating disorders (ED) and correlation factors among adolescents in our context. It opens new research perspectives in this field, especially in the current context of dietary, social, and cultural transitions. One of its strengths lies in the representativeness of the sample used. However, the interpretation of our results must also take into account certain limitations.

The cross-sectional nature of this study limits our ability to establish causal relationships between the variables studied. Additionally, as the sample was limited to public middle schools in Casablanca, the results may not be generalizable to other populations. Longitudinal studies could explore the developmental trajectories of ED in adolescents. Qualitative research could

deepen the understanding of the underlying mechanisms of problematic eating attitudes, particularly by examining the influence of sociocultural and psychological factors.

The non-significant differences in this study may be due to the sample size or reporting biases. Studies with larger samples could clarify these trends. Future studies should include larger and more diverse samples to more accurately assess the impact of gender and age on ED. The use of qualitative methods could also offer a better understanding of gender differences in eating behaviors.

The study cannot establish a causal relationship between BMI and ED. Longitudinal studies should be conducted to determine whether BMI precedes or follows the development of ED. Targeted interventions should be tested to evaluate their effectiveness in reducing ED among obese adolescents.

The use of self-report questionnaires may introduce reporting biases. The non-significant differences may also be due to unmeasured confounding factors. Future research should explore the relationships between self-esteem and ED in more detail, using mixed methods that combine quantitative and qualitative approaches.

The cross-sectional nature of the study limits the ability to establish causal relationships between ED and depression. Additional clinical assessments could offer a better understanding of this association. Longitudinal studies could explore the dynamic interactions between depression and ED over time. Integrated interventions aimed at simultaneously addressing ED and depression should be developed and evaluated.

Conclusion

This study provides crucial insights into the prevalence and correlates of eating disorders (EDs) among adolescents in our specific context, marking one of the first investigations of this nature. Elevated scores on the Eating Attitude Test (EAT26) highlight the significant presence of problematic eating attitudes, emphasizing the need for early monitoring to identify at-risk adolescents and guide prevention and treatment strategies.

The findings reveal that sociodemographic variables, dietary habits, and lifestyle factors did not significantly influence ED prevalence, indicating that other determinants may play a more decisive role. The significant correlation between higher BMI and increased ED prevalence underscores the necessity of targeted interventions for overweight and obese adolescents.

While the relationship between lower self-esteem and ED prevalence was not statistically significant, the trend suggests that self-esteem, combined with other factors, may influence the

onset of EDs. The significant association between depression scores and ED prevalence highlights the importance of addressing mental health in prevention and intervention programs. This study's limitations include the use of self-administered questionnaires, which may introduce response biases, and a sample limited to one city, which may not be generalizable. Additionally, the cross-sectional nature of the study limits the ability to establish causality between the studied factors and ED prevalence.

In conclusion, this research underscores the complexity of eating disorders among adolescents and the need for a comprehensive approach to their prevention and treatment. Effective programs should address not only eating behaviors and body weight but also psychological aspects such as self-esteem and depression. Given the context of cultural and social transitions, this study opens new research perspectives. Future research should involve larger, diverse samples and longitudinal approaches to deepen our understanding and develop more effective strategies to reduce ED prevalence among adolescents.

Acknowledgements

We would like to thank the Casablanca-Settat Regional Academy for Education and Training and the Casablanca-Settat Regional Direction of the High Commission for Planning for supporting. We would also like to thank all the middle schools involved, the students taking part in the study and their parents for their cooperation with data collection.

Source of Fund

No

Conflicts of Interest

No

Ethical Clearance

We have respected ethical committee approval

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