

# Prevalence of Eating Disorders Among Medical Students in a Lebanese Medical School: A Cross-Sectional Study

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**Background:** Eating disorders are among the most severe psychiatric disorders. Medical students are subjected to high levels of stress and have a high risk of developing burnout and mental health problems, including eating disorders. Due to societal stigma and lack of awareness, it is plausible that disordered eating behaviors among students may go unrecognized and under-reported. The current study aimed to evaluate the prevalence and possible factors associated with eating disorders among medical students at the American University of Beirut in Lebanon (AUB).

**Methods:** This cross-sectional descriptive study was conducted in 2017 at AUB. Electronic anonymous surveys were sent to all 412 medical students, with a mean age of 23, enrolled in our four-year medical school. In addition to demographic data, students were asked to complete two validated questionnaires, the SCOFF and EAT-26, to assess eating disorders risk.

**Results:** Total responses were 156, out of which 124 completed the whole survey. A total of 131 participants completed the EAT-26 questionnaire and 124 participants completed the SCOFF questionnaire. Out of those, 17% on EAT-26 and 19% on SCOFF were found to be at high risk of developing eating disorders.

**Conclusion:** There seems to be a high level of underrecognized and under-treated disordered eating behaviors among female medical students at AUB. Raising awareness among medical students is important, as well as developing better prevention and treatment strategies.

**Keywords:** eating disorder, medical students, middle east, eating behaviors

## Introduction

Eating disorders (ED) are among the most serious psychiatric disorders, with some of the highest mortality rates among psychiatric disorders.<sup>1,2</sup> Medical students have higher rates of psychiatric disorders given the chronic stress and risk of burnout that they are subjected to,<sup>3,4</sup> with eating disorders being particularly concerning for upcoming physicians, since they are associated with a very high risk of impairment.<sup>5,6</sup>

Globally, in the general population, the point prevalence of eating disorders is 5.7% in women and 2.2% in men, according to a systematic review examining data from 2000 to 2018.<sup>7</sup> This prevalence sharply increases among medical students, with a recent systematic review and meta-analysis estimating a global prevalence of ED risk among medical students at 10.4%.<sup>8</sup> No similar data have been reported among the Lebanese, neither for the general population nor for medical students.

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In Lebanon, a study conducted among first- and second-year undergraduates across all allied healthcare specialties at the Saint Joseph University in Lebanon estimated the prevalence of eating disorders to be 31.4%.<sup>9</sup> Recently, another study among Lebanese medical students showed the association between a higher risk of “Orthorexia Nervosa” (an entity not diagnosable yet by DSM-5) and anxiety. The prevalence of eating disorders in at risk medical students was not examined.<sup>10</sup>

In a recent survey targeting Lebanese medical students, up to 43% reported symptoms of burnout,<sup>11</sup> therefore we hypothesize that the risk of ED (and other mental health disorder will be at least as high as international prevalence rates cited in the literature).

To our knowledge, this study is the first that estimates the prevalence of disordered eating behaviors among medical school students in Lebanon and the Arab region. The primary aim of this study is to estimate the prevalence of medical students at risk of eating disorders and compare the findings to international data. A secondary objective is to examine factors that are associated with or correlated with ED risk among medical students.

## Methods

This study was administered in Lebanon, a middle-income country representative of developing countries in the Middle East. An electronic cross-sectional survey was conducted at the American University of Beirut Faculty of Medicine (AUB-FM) from January 2017 to March 2017.

AUB-FM is a middle-sized private medical school following the United States of America medical school curriculum. English is the language of instruction at AUB and students must complete undergraduate premedical studies and sit for the Medical College Admission Test (MCAT) to be eligible for acceptance at AUB-FM. All medical students enrolled were eligible to participate in the study, from first-year medical students to fourth-year medical students. On average, each year of medical school has around 100 medical students.

The survey consisted of general questions related to students' demographics and two questionnaires that screen for eating disorders' risk: Eating attitude test-26 (EAT-26) and SCOFF. There were also supplemental questions regarding recent familial or social stressors, use of mental health services and medications, current year of medical education, living arrangements, as well as, medical history and family history of mental and eating disorders.

## Measurements

The Eating attitude test-26 (EAT-26): a self-administered questionnaire that is used to screen for eating disorders risk. Section A consists of 26 questions. Scoring is done on a 6-point scale from always (6) to never (0). Total sum of EAT-26 scores range from 0 to 78. Interpretation of scores is standardized as per protocol to identify high-risk individuals. Individuals scoring 20 or above were classified in the high-risk group.<sup>12</sup> Section B asks about behavioral weight-control patterns that include self-reported binge eating, self-induced vomiting, laxative diet pills or diuretics use, excessive exercising to control weight, along with a drastic weight loss of more than 8 kilograms over the past 6 months. The EAT-26 has been shown to be a psychometrically sound instrument displaying high internal consistency (Cronbach's  $\alpha = 0.90$ ).<sup>13</sup>

The SCOFF questionnaire is another reliable self-administered questionnaire widely used as a screening tool for eating disorders risk. The name is derived from an acronym of the following questions:

Do you make yourself Sick because you feel uncomfortably full? Do you worry you have lost Control over how much you eat? Have you recently lost more than One stone (6.5 KG) in a 3-month period? Do you believe yourself to be Fat when others say you are too thin? Would you say that Food dominates your life?

It comprises five questions for which, scoring of each question is on a 2-point scale. A total score of 2 or more is deemed high-risk.<sup>14</sup> This is an effective tool used in screening for suspected eating disorders with good psychometric properties (kappa statistic=0.73 to 0.82).<sup>15</sup>

## Ethical Considerations

Participants were asked to complete an anonymous online survey. The survey was administered via e-mail link to an electronic form on a secure website. Informed consent was obtained electronically. Reminders to complete the survey were sent electronically (three reminders). The study was approved by the Institutional Review Board (IRB) at AUB and has been performed in accordance with the ethical standards laid down in the Helsinki II Declaration about informed consent, voluntariness and anonymity. Data collection tools contained no identifying information and therefore kept the individual responses confidential. A disclaimer included that participation in the study is purely voluntary and the responses would have no influence on participants' grades.

## Data Analysis

All analyses were performed using IBM SPSS Statistics for Mac, version 25 (IBM Corp., Armonk, N.Y., USA). Standard univariate statistics were used to characterize the sample. Descriptive statistics were calculated for the point-prevalence of reported eating disorders. Associations between different general characteristics and outcomes were assessed using the Pearson's chi-square test and Fisher's Exact test. All tests were 2-sided, with a type I error rate of 0.050. Multiple Linear Regression was conducted to explore significant correlates of disordered eating aptitudes using stepwise method with 95% Confidence Interval.

## Results

Out of 412 medical students enrolled at AUB, the overall response rate was 35.4%. The EAT-26 questionnaire was completed by 131 students and the SCOFF questionnaire was completed by 124 students. The majority of respondents were Lebanese (91.6%) and living at home with their parents (70.2%). Only one student was married. They were almost equally distributed among gender and year of medical education [Table 1].

Interestingly, with approximately 17% of respondents being diagnosed with a mental health disorder and 69% undergoing active stressors, only 6% were followed by a mental health professional and 3% were taking psychiatric medications. Among those with a history of recent stressors, 35% reported those stressors were academic, 10% familial, 8% personal relationships, 5% financial, 4% health-related, and the rest were "other" stressors. Eating disorders were relatively prevalent in the families of those who responded at 8% [Table 1].

All of those identified to be at high-risk on both the EAT-26 and SCOFF questionnaires reported being subjected to stressors, with 41% and 42% having received a mental health diagnosis, respectively. However, only 18% and 8% of them (respectively) had a mental health provider, and none of them were receiving pharmacological treatment [Table 2].

Female medical students were significantly more likely to be identified at high risk on both the EAT-26 and SCOFF questionnaires ( $X^2=3.955$ ,  $p=0.047$ ;  $X^2=5.268$ ,  $p=0.022$ ; respectively) [Figure 1]. Age was only a significant predictor in one of the questionnaires, with those students aged between 22 and 25 years being more likely to be at high risk of eating disorders on the EAT-26 ( $p=0.006$ ). There was

no significant correlation between the year of medical education and the risk of eating disorder.

On both the EAT-26 and SCOFF questionnaires, the presence of stressors ( $p=0.000$ ); was significantly associated with being at high risk of eating disorders. In addition, even though those with no history of mental health disorder diagnosis were significantly associated with being at high risk of eating disorders on both questionnaires ( $P=0.001$  on Eat-26;  $p=0.000$  on SCOFF), we notice in Figure 2 that those who have answered yes to having psychiatric diagnosis were 3.4 times more in the high-risk group than in the low-risk group [Figure 2]. The current use of psychiatric medications was not correlated with this outcome on either scale.

Having a family history of mental health illness was not significantly associated with the risk of eating disorder on either scale, except for having a family history of specifically eating disorders [Table 2]. The latter was only significantly associated with eating disorder risk on the EAT-26 questionnaire ( $p=0.038$ ).

The step-wise Multiple Linear Regression analysis, using EAT-26 score as dependent variable, showed that currently seeking a professional mental health provider ( $t=2.899$ ,  $p=0.004$ ), having a history of recent stressors ( $t=-2.289$ ,  $p=0.024$ ), and gender ( $t=2.149$ ,  $p=0.034$ ) were risk factors of having an eating disorder risk.

Disordered eating behaviors items over the past 6 months were examined separately [Table 3]. Binge eating episodes were significantly more frequent in the high-risk group with 27% of them having 2 to 6 episodes per week as opposed to none in the low-risk group. Similarly, 9% of the high-risk group had at least one self-induced vomiting episode to control weight or shape, compared to none in the low-risk group. Exercise longer than 1 hour a day for weight control was prevalent among the high-risk group, with 27% performing it at least once a week, 14% at 2 to 6 times a week and 2 students at least once daily. Weight loss of more than 20 LBS (9 KG) over the past 6 months was not correlated with eating disorder risk group. Use of laxatives, diet pills or diuretics to control weight or shape was less prevalent than other disordered eating behaviors among the high-risk group: 3 students (14%) reported engaging in such behavior once a month or less, while one student reported doing so at least once daily.

## Discussion

Eating disorders (ED) were quite prevalent in our study sample at close to 17% (EAT-26) and 19% (SCOFF)

**Table 1** Characteristics of the Sample of 146 Medical Students Completing the Eating Behaviors Survey at the American University of Beirut in 2017

		n	n (%) of EAT-26 Responders N= 131	n (%) of Complete Responders N=124
Gender	Male	70	61 (46.6)	57 (46.0)
	Female	76	70 (53.4)	67 (54)
Age	21	17	15 (11.5)	15 (12.1)
	22–25	123	111 (84.7)	104 (83.9)
	>25	6	5 (3.8)	5 (4.0)
Nationality	Lebanese	133	120 (91.6)	113 (91.1)
	Other	10	8 (6)	8 (6.4)
Year of medical education	Med I	34	32 (24.4)	31 (25.0)
	Med II	44	37 (28.2)	34 (27.4)
	Med III	28	25 (19.1)	23 (18.5)
	Med IV	40	37 (28.2)	36 (29.0)
Marital status	Single	145	131 (100)	124 (100)
	Married	1	0 (0)	0 (0)
Living situation	With parents	102	92 (70.2)	88 (71.0)
	Dorms/ student housing	14	12 (9.2)	11 (8.9)
	Private apartment	28	25 (19.1)	23 (18.5)
	Other	1	1 (0.8)	1 (0.8)
Presence of recent stressors	Yes	98	90 (68.7)	85 (68.5)
	No	41	41 (31.3)	33 (26.6)
Currently seeking a mental health provider	Yes	10	8 (6.1)	7 (5.6)
	No	136	123 (93.9)	117 (94.4)
Currently taking a psychiatric medication	Yes	5	4 (3.1)	3 (2.4)
	No	141	127 (96.9)	121 (97.6)
Personal history of mental health diagnosis	Yes	26	22 (16.8)	20 (16.1)
	No	120	109 (83.2)	104 (83.9)
Family history of eating disorder	Yes	10	10 (7.6)	10 (8.1)
	No	136	121 (92.4)	114 (91.9)
Family history of other mental health disorder	Yes	36	32 (24.4)	31 (25.0)
	No	110	99 (75.6)	93 (75.0)
Personal history of a medical diagnosis	Yes	35	31 (23.7)	31 (25.0)
	No	111	100 (76.3)	93 (75.0)

among respondents. These results are compatible with some international studies: data from Pakistan using similar self-administered questionnaires, reported a 23% (EAT-26) and 17% (SCOFF) incidence in a sample of

medical students in Karachi.<sup>16</sup> That sample was however younger with a mean age of 20 years. Globally, our numbers were higher than the average pooled point prevalence, which was estimated at 10.4% (with a 95% CI 7.8–13.0%) recently.<sup>8</sup> Jahrami et al had also estimated pooled prevalence of ED risk by country, the highest of which was for Pakistan at 17.1%, close to our estimate.<sup>8</sup>

Nationally, our numbers are lower than those reported for undergraduate students in their first or second year of allied healthcare studies (Dentistry, Pharmacy, Nursing and Dietetics) at Saint Joseph University in Lebanon.<sup>9</sup> In that study, a positive SCOFF was recorded in 31% of the sampled population. Aside from it being a younger population, their sample included students studying nutrition, a particular population where the high prevalence of ED has been documented.<sup>17–19</sup> This could partly explain the difference in rates of ED detected.

The female-to-male ratio in the high-risk group was approximately 3:1 in both questionnaires as opposed to 1:1 ratio in the low-risk group. Similarly, to other studies, females were significantly more likely to be identified at risk of eating disorders than males.<sup>8,16,20,21</sup> Our findings contradict however those of a recent comprehensive study among undergraduate and graduate students across 12 campuses in the USA, which suggest a narrower gender gap.<sup>22</sup> There were no significant differences among males and females in medicine with regards to eating disorder risk, compensatory behavior and objective binge eating. One possible explanation is that the latter aimed at identifying sub-threshold ED symptoms using a different tool (Eating Disorder Examination Questionnaire (EDE-Q)). Specifically, across different academic degrees, females in medicine were among the least likely women (along with those in natural sciences) to have an elevated ED risk, although the association was non-significant.

Of note, with approximately 17% of respondents being diagnosed with a mental health disorder and 69% undergoing stressors, only 6% were followed by a mental health professional and 3% were taking psychiatric medications. This low rate of help-seeking behavior for mental health problems is prevalent in the general Lebanese population with only 10% of those with a mental disorder in Lebanon seeking help in the previous year.<sup>23</sup> In approaching their own personal health, medical students seem to adopt a similar attitude to that of physicians. They would not seek the professional help themselves that they would recommend to their patients and would rather rely on self-management including self-prescribing.<sup>24</sup> Specifically, with regards to mental health, help seeking is even lower due to

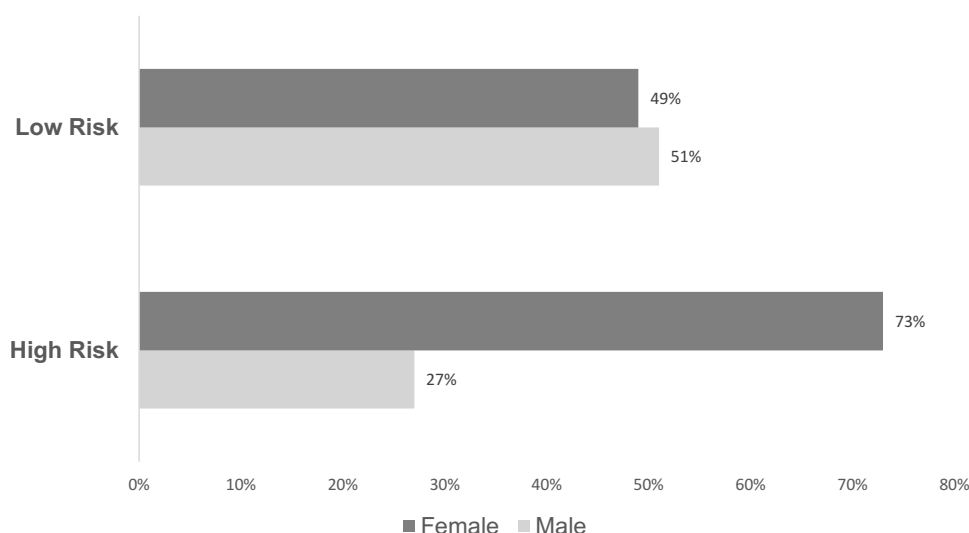
**Table 2** Distribution of Sociodemographic Characteristics of 146 Medical Students Across Eating Disorders Risk Groups Using EAT-26 and SCOFF Questionnaires at the American University of Beirut in 2017

		EAT-26 N=131			SCOFF N=124		
		High Risk, n (%) N= 22	Low Risk, n (%) N= 109	p-value	High Risk, n (%) N= 24	Low Risk, n (%) N= 100	p-value
Gender	Male	6 (27.3)	55 (50.5)	0.047	6 (25.0)	51 (51.0)	0.022
	Female	16 (72.7)	54 (49.5)		18 (75.0)	49 (49.0)	
Age	21	7 (31.8)	8 (7.3)	0.006	5 (20.8)	10 (10.0)	0.254
	22–25	14 (63.6)	97 (89.0)		18 (75.0)	86 (86.0)	
	>25	1 (4.5)	4 (3.7)		1 (4.2)	4 (4.0)	
Year of medical education	Med I	9 (40.9)	23 (21.1)	0.273	7 (29.2)	24 (24.0%)	0.326
	Med II	4 (18.2)	33 (30.3)		4 (16.7)	30 (30.0%)	
	Med III	4 (18.2)	21 (19.3)		7 (29.2)	16 (16.0%)	
	Med IV	5 (22.7)	32 (29.4)		6 (25.0)	30 (30.0)	
Presence of recent stressors	Yes	21 (100.0)	69 (67.0)	0.000	24 (100.0)	61 (64.9)	0.000
	No	0 (0.0)	34 (33.0)		0 (0.0)	33 (35.1)	
Currently seeking a mental health provider	Yes	4 (18.2)	4 (3.7)	0.015	2 (8.3)	5 (5.0)	0.482
	No	18 (81.8)	105 (96.3)		22 (91.7)	95 (95.0)	
Personal history of mental health diagnosis	Yes	9 (40.9)	13 (11.9)	0.001	10 (41.7)	10 (10.0)	0.000
	No	13 (59.1)	96 (88.1)		14 (58.3)	90 (90.0)	
Currently using psychiatric medications	Yes	0 (0.0)	4 (3.7)	0.763	0 (0.0)	3 (3.0)	0.739
	No	22 (100.0)	105 (96.3)		24 (100.0)	97 (97.0)	
Family history of eating disorder	Yes	4 (18.2)	6 (5.5)	0.038	4 (12.7)	6 (6.0)	0.062
	No	18 (81.8)	103 (94.5)		20 (83.3)	94 (94.0)	
Family history of other mental health disorder	Yes	7 (31.8)	25 (22.9)	0.376	8 (33.3)	23 (23.0)	0.294
	No	15 (68.2)	84 (77.1)		16 (66.7)	77 (77.0)	
Personal history of medical diagnosis	Yes	6 (27.3)	25 (22.9)	0.662	5 (20.8)	26 (26.0)	0.600
	No	16 (72.7)	84 (77.1)		19 (79.2)	74 (74.0)	

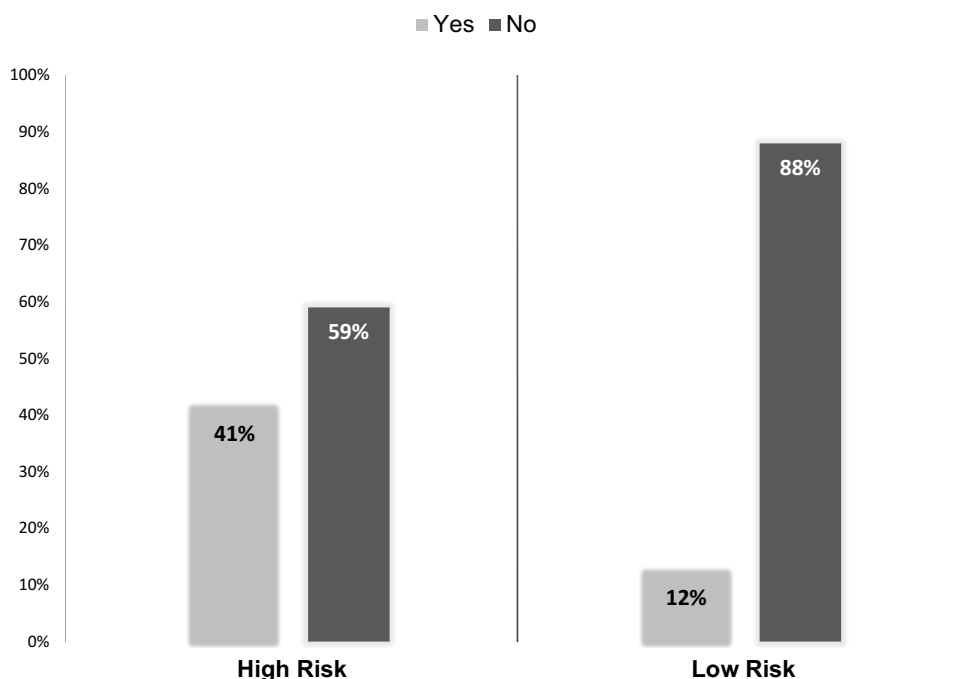
the stigma associated with mental health services. This attitude has led to an underestimation of the prevalence of mental illnesses among medical students and hence many of such cases become untreated.<sup>25</sup> Stigmatization levels were shown to be high and common towards individuals with eating disorders, as rated by the public and experienced by the sufferers.<sup>26</sup> There is evidence that anticipated discrimination is associated with a reduced readiness to seek help from mental health professionals.<sup>27</sup>

Additionally, a family history of mental illness was only correlated to a higher likelihood of eating disorders when it was a family history of eating disorders. This is in line with previous evidence discussing genetic vulnerability and learned behavior as major risk factors for the development of eating disorder.<sup>28</sup>

Disordered eating behaviors to control weight or shape were more prevalent in the high-risk group as well. These most commonly included binge-eating episodes and extreme exercising. Additionally, 4 students in the high-risk group (18%) reported self-induced vomiting over the past 6 months as a compensatory behavior, versus 1 student in the low-risk group. Similarly, 4 (18%) high-risk students reported compensatory pill intake, as opposed to 1 student in the low-risk group. An earlier study investigating risky weight control measures (vomiting or pill use) among university students in Lebanon (both graduate and undergraduate) reported that close to 20% of those engaged in weight reduction methods had used one of either methods.<sup>29</sup> Although the differences in populations sampled and definitions make it difficult to compare, these



**Figure 1** The distribution of males and females among 131 medical students, across eating disorders risk groups, using the EAT-26 questionnaire, at the American University of Beirut in 2017.



**Figure 2** The distribution of the personal history of mental health disorder diagnosis among 131 medical students, across eating disorders risk groups, using the EAT-26 questionnaire at the American University of Beirut in 2017.

are alarmingly close to our high-risk group rates and highlight the need for screening.

The lack of information regarding body mass index (BMI) precludes correlation of results with BMI. However, a study done in 2014 on a sample of Lebanese college students showed that 26.6% were overweight or obese, and males (67.4%) were significantly more obese than females (32.6%)<sup>30</sup> which shows how imperative it is

to note the significance of interaction between age, gender, and BMI in predicting risk of eating disorders.<sup>31</sup>

As this study was cross-sectional, no inferences could be made regarding causality. Our sample size was relatively small and precluded more extensive investigation of possible correlations, but further research could help further elaborate on our findings. Limitations of this study include a low response rate (however the response rate is comparable to



**Table 3** Distribution of Frequency of Disordered Eating Behaviors Over the Past Months Across Risk Groups of 126 Medical Students at the American University of Beirut in 2017

		EAT-26 N=126			SCOFF N=124		
		High Risk, n (%) N= 22	Low Risk, n (%) N= 104	p-value	High Risk, n (%) N= 24	Low Risk, n (%) N= 100	p-value
Eating binges episodes	Never	9 (40.9)	81 (77.9)	0.000	7 (29.2)	82 (82.0)	0.000
	≤ Once per month	4 (18.2)	18 (17.3)		8 (33.3)	14 (14.0)	
	Once a week	3 (13.6)	4 (3.8)		4 (16.7)	3 (3.0)	
	2–6 times a week	6 (27.3)	0 (0.0)		5 (20.8)	0 (0.0)	
	≥ Once a day	0 (0.0)	1 (1.0)		0 (0.0)	1 (1.0)	
Vomiting for weight or shape control	Never	18 (81.8)	103 (99.0)	0.002	20 (83.3)	99 (99.0)	0.004
	≤ Once per month	2 (9.1)	1 (1.0)		2 (8.3)	1 (1.0)	
	Once a week	2 (9.1)	0 (0.0)		2 (8.3)	0 (0.0)	
	2–6 times a week	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	
	≥ Once a day	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	
Use of laxatives, diet pills, or diuretics for weight or shape control	Never	18 (81.8)	103 (99.0)	0.007	20 (79.8)	99 (99.0)	0.001
	≤ Once per month	3 (13.6)	0 (0.0)		3 (12.5)	0 (0.0)	
	Once a week	0 (0.0)	1 (1.0)		0 (0.0)	1 (1.0)	
	2–6 times a week	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	
	≥ Once a day	1 (4.5)	0 (0.0)		1 (1.0)	0 (0.0)	
Exercise >60 min/day for weight loss or control	Never	5 (22.7)	74 (71.2)	0.000	7 (29.2)	71 (71.0)	0.001
	≤ Once per month	6 (27.3)	14 (13.5)		7 (29.2)	13 (13.0)	
	Once a week	6 (27.3)	8 (7.7)		5 (20.8)	8 (8.0)	
	2–6 times a week	3 (13.6)	6 (5.8)		4 (16.7)	5 (5.0)	
	≥ Once a day	2 (1.9)	2 (9.1)		1 (4.2)	3 (3.0)	
Weight loss ≥20 lbs. (9 kg)	Yes	1 (4.5)	5 (4.8)	0.795	0 (0.0)	6 (6.0)	0.462
	No	21 (95.5)	99 (95.2)		24 (20.3)	94 (94.0)	

similar types of studies). There is also potential self-selection responder bias, since no data is available for the non-responders. The study sample was a convenience sample, and students were not randomly selected; this limits the generalizability of findings beyond the AUB community. Also, the results were based on students' self-reported information, which may represent some bias as students may not be accurate in reporting their behaviors. Results should be interpreted with caution since no clinical diagnostic data were collected to validate ED screening and report specific types.

## Conclusion

In conclusion, despite the relatively low response rate, this study highlights an underrated health problem among Lebanese medical students. Further research is needed exploring other risk factors including comorbid substance use, history of trauma, and targeting a larger sample size.

Follow up studies should assess caffeine, nicotine, or stimulant use which may be appetite suppressants.

Investigating premedical years, maybe important to help early detection of ED among medical students. Eating disorders prevention programs that target females in their college years, and which are interactive multi-sessions, not explicitly presented as eating disorders prevention programs, have shown promising results<sup>32</sup> and should be implemented in Medical Schools. Medical Educators are encouraged to address healthy eating habits at an institutional level, whether by providing healthy food options at affordable prices, or by providing trained specialists to help prevent and treat Eds.

## Ethical Approval

Approved by Institutional Review Board (IRB) at the American University of Beirut in 2017. (IRB ID: PSY.FT.07)

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## Disclosure

The authors have no conflicts of interest to declare.

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