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Original Article

Investigation of Gastroesophageal Reflux Disease among Medical Students

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ABSTRACT

Background:
Gastroesophageal reflux disease (GERD) is a common gastrointestinal complaint in the adult population worldwide; nevertheless, few studies have assessed this disorder among medical students. The stress, lifestyle, and burdensome educational curriculum exposes this particular population to GERD. To the best of our knowledge, there was no information about the frequency of GERD in Iranian medical students. We aimed to assess the prevalence of GERD as well as its risk factors among the medical students.

Materials and Methods:
In this cross-sectional study, the symptoms of GERD were investigated among 290 medical students using the frequency scale for the symptoms of gastroesophageal reflux (FSSG) at Isfahan University of Medical Sciences during 2018-2019. Additional information, including age, sex, body mass index (BMI), and studying grade, were entered in the checklist.

Results:
Among the studied population, 104 (36.55%) students had GERD. Heartburn was associated with studying grade (p =0.022) and BMI (p < 0.001). Esophageal regurgitation was related to BMI only (p < 0.001). The logistic regression evaluations revealed overweight (p < 0.001; OR: 14.49; 95%CI: 7.29-28.81), obesity (p < 0.001; OR: 14.16; 95%CI: 4.38-45.74), studying the physiopathology course (p < 0.001; OR: 5.05; 95%CI: 2.07-12.30) and being in the stagership period (p = 0.007; OR: 3.50; 95%CI: 1.41-8.64) were independent predictors of heartburn, while overweight (p < 0.001; OR: 8.33; 95%CI: 4.26-16.28), obesity (p < 0.001; OR: 54.87; 95%CI: 11.31-266.10) and being in the stagership period (p = 0.024; OR: 2.89; 95%CI: 0.87-6.22) were the predictors for esophageal regurgitation.

Conclusion:
Based on this study, GERD was prevalent among the medical students, and factors, including BMI and studying grade, were predictors of its incidence.

Keywords: Gastroesophageal reflux disease, Risk factors, Prevalence, Medical students

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INTRODUCTION

Digestive diseases are among the most prevalent cause of illness affecting a large population worldwide (1). Among gastrointestinal disorders, gastroesophageal reflux disease (GERD) is one of the most common, defined as the backflow of gastroduodenal contents into the esophagus and nearby (2). GERD affects all age groups from infancy to adulthood and all areas around the world. Although, it is more prevalent in the western communities, recent investigations have shown an increasing prevalence in Asia (3-5).

The principal symptoms associated with GERD include

heartburn with or without regurgitation (6). Younger age, female sex, and obesity, along with numerous lifestyle factors such as eating fatty meals, alcohol consumption, early dinner-to-bed time, and smoking, are considered as the risk factors associated with GERD (7-9). Psychological conditions and mental health are other factors contributing to the disease as well as their role in the illness experience and modification of subjective symptoms (10). Observational studies have yielded a remarkable lower quality of life among those with GERD (11).

Medical students are one of the population groups that may experience considerable lifestyle changes and face psychological factors such as training disciplines, stressful conditions, quick serving meals, difficult courses and exams, and irregular sleep time, probably makes them susceptible to GERD (12,13). The previous studies on medical students in different grades and different communities have shown a prevalence of 25% for GERD in Indian (14), 25.9% in Saudi Arabia (15), and 23% in Pakistan (16). Nevertheless, investigations about GERD among this group are limited and require further evaluations. Therefore, we aimed to evaluate the factors associated with GERD among medical students in Isfahan, central Iran. Gaining a better insight about functional gastrointestinal disorders among medical students helps provide a thorough schedule to prevent these disorders and minimize their complications.

MATERIALS AND METHODS

Study population

In the current cross-sectional study, the presence of gastroesophageal reflux symptoms was evaluated among 290 medical students studying at Isfahan University of Medical Sciences from January 2018 to March 2019.

The Ethics Committee of Isfahan University of Medical Sciences approved the study protocol (code: IR.MUI.MED.REC.1398.019). After that, the study was entirely explained for the medical students of all grades; they were reassured about the confidentiality of the personal information and were requested to sign a written consent form to participate.

The medical students studying at any grade of medicine (basic science, physiopathology, stagership, and internship) in Isfahan University of Medical Sciences were included if they were willingness to participate. The student's reluctance for participation in the study and the presence of the alarm signs (including dysphagia, odynophagia, anorexia, weight loss, and gastrointestinal bleeding), university dropout, and family history of gastric cancer were considered as the exclusion criteria. Moreover, of over 20% of the questionnaire was not filled it was excluded from analysis.

The study population was selected using block sampling in a way that each grade was considered as a block, and the included students of each block were selected through convenience sampling.

Means of assessment

The gathered demographic information included age, sex, body mass index (BMI), residence (dormitory or private house), and studying grade (basic sciences course, physiopathology course, stagership, and internship).

The patients' height was measured using a standard tape meter at the standard anatomical position, whereas target scales were utilized for the determination of the students' weight. The BMI was calculated by the division of height in meters on weight in kilograms and divided into three subgroups of normal (19.5-25 kg/m^2), overweight (25.1-30 kg/m^2), and obese (> 30 kg/m^2), respectively.

Based on the educational protocol of Isfahan University of Medical Sciences, the medicine studying grades are divided into four grades. The first five, six, and seven, eight-to-eleven, and twelve-to-fourteen semesters are considered as basic sciences courses, physiopathology course, stagership, and internship, respectively.

The frequency scale for the symptoms of gastroesophageal reflux (FSSG)

This questionnaire contains 12 questions about the typical symptoms related to GERD scored on a five-point Likert scale from zero to four (never, occasionally, sometimes, often, and always) The reflux was defined as the sensation of heartburn and regurgitation. A total score of over ten was considered positive for GERD (17).

Table 1: The association between heartburn and the demographic characteristics of the participants

Variables		Heartburn		*p* value
		Positive	Negative	
		n (%)		
Sex	Male	43 (37.03)	73 (62.93)	0.72
	Female	61 (35.06)	113 (64.94)	
Residence	Dormitory	69 (37.10)	117 (62.90)	0.55
	Private house	35 (33.65)	69 (66.35)	
Studying grade	Basic sciences course	18 (25)	54 (75)	0.022
	Physiopathology course	35 (48.61)	37 (51.39)	
	Stagership	28 (37.84)	46 (62.16)	
	Internship	22 (30.99)	49 (69.01)	
Body mass index	Normal	33 (17.46)	156 (82.54)	< 0.001
	Overweight	51 (69.88)	25 (30.12)	
	Obese	13 (72.22)	5 (27.78)	

Table 2: The association between esophageal regurgitation and the demographic characteristics of the participants

Variables		Esophageal regurgitation		*p* value
		Positive	Negative	
		n (%)		
Sex	Male	31 (26.72)	48 (27.59)	0.87
	Female	85 (73.28)	126 (72.41)	
Residence	Dormitory	54 (68.35)	25 (31.65)	0.36
	Private house	132 (62.55)	79 (37.44)	
Studying grade	Basic sciences course	13 (13.06)	59 (81.94)	0.24
	Physiopathology course	20 (27.78)	52 (72.22)	
	Stagership	23 (31.08)	51 (68.92)	
	Internship	22 (30.99)	49 (69.01)	
Body mass index	Normal	23 (12.17)	166 (87.83)	< 0.001
	Overweight	40 (48.19)	43 (51.81)	
	Obese	16 (88.89)	2 (11.11)	

Statistical analysis:

Eventually, the obtained data were entered into SPSS software, version 23, and analyzed. Descriptive information was presented in mean, standard deviation, absolute numbers, and percentages. Chi-square, Fisher's exact, t, and logistic regression tests were used as appropriated. $p < 0.05$ was considered as statistically significant.

RESULTS

In this study, 290 medical students participated. FSSG questionnaire was used to determine the diagnosis of GERD in the studied population, and the obtained information was divided into two regular symptoms of GERD (heartburn and regurgitation). Tables 1 and 2 show the association of the symptoms with the demographic information of the studied cases.

Logistic regression was used to assess the predicting factors for the incidence of heartburn and regurgitation (tables 3 and 4). Based on both tables, overweight, obesity, and studying at stagership were the independent predictors for the incidence of GERD symptoms among medical students, whereas studying at physiopathology course was only a predictor for heartburn ($p < 0.05$).

Table 3: Logistic regression evaluation of the factors associated with heartburn in medical students

	Odds ratio	95% Confidence interval	*p* value
Sex			
Male	1		
Female	1.42	0.77-2.63	0.262
Residence			
Private house	1		
Dormitory	1.25	0.68-2.31	0.481
Body mass index			
Normal	1		
Overweight	14.49	7.29-28.81	< 0.001
Obese	14.16	4.38-45.74	< 0.001
Studying grade			
Basic courses	1		
Physiopathology courses	5.05	2.07-12.30	< 0.001
Stagership	3.50	1.41-8.64	0.007
Internship	2.13	0.81-5.56	0.123
Constant	0.05	0.02-0.15	< 0.001

Table 4: Logistic regression evaluation of the factors associated with esophageal regurgitation in medical students

	Odds ratio	95% Confidence interval	*p* value
Sex			
Male	1		
Female	1.63	0.85-3.14	0.142
Residence			
Private house	1		
Dormitory	1.43	0.75-2.76	0.280
Body mass index			
Normal	1		
Overweight	8.33	4.26-16.28	< 0.001
Obese	54.87	11.31-266.10	< 0.001
Studying grade			
Basic courses	1		
Physiopathology courses	2.18	0.89-5.40	0.087
Stagership	2.89	1.15-7.26	0.024
Internship	2.33	0.87-6.22	0.091
Constant	0.037	0.01-0.11	< 0.001

DISCUSSION

GERD is a popular gastrointestinal disorder that bothers many people worldwide and is a leading cause of impaired quality of life. Nevertheless, studies targeting medical students in terms of GERD assessments are few. We observed a GERD incidence of over 35% among the studied medical students. A study by Sharma and colleagues on the medical staff of a hospital showed a prevalence of 16.2%. This considerable difference may be attributed to the design of their study as they included all the medical staff that are exposed to different levels of stress, occupational responsibilities, working time per day, and lifestyle habits (18). The studies conducted on the university students have stated a range of 14.8-25% for GERD that is less than our study (6,19); however, even the studies assessing the prevalence of GERD among medical students have shown lower ranges (6,14,20) than our stud y. The different means of GERD assessment or selection bias may be responsible for this higher rate of GERD complaint among the studied population; however, a population-based European study has revealed a surprisingly high rate of 70% (21).

A noteworthy point in this term is the higher prevalence of GERD among medical students than the studies performed on the general population of university students. Medical students are a group of people almost always under considerable pressure for their studies and examinations. Psychological stress as a factor related to increased acid secretion, increased susceptibility of esophageal mucosa to gastric acid, and a reduced level of gastric emptying is higher among medical students as compared to the general population (22). Irregular meal time, quick meal serving, and abundant use of caffeine-containing agents such as tea and coffee are the other lifestyle factors associated with GERD in medical students (6).

Heartburn, as one of the manifestations of GERD, was not correlated with the students' gender or residence, while we found that studying at physiopathology course or stagership as well as abnormal ranges of BMI were associated with heartburn. Further investigations in terms of regurgitation as the other most prominent symptom of GERD revealed a remarkable correlation with abnormal BMI only; nevertheless, along with overweight and obesity as the predictive factors of regurgitation, studying at stagership was the other independent determinant of regurgitation among

medical students with GERD.

Although we found no correlation between sex and GERD, most of the studies either on the general population (23) or medical students (24) have shown increases incidence of GERD among women. In contrast, in a study assessing GERD prevalence among university students regardless of their major found a higher rate among men to the extent that even by the logistic regression assessments, they found that male sex was an independent predictor for GERD development (1). Bordbar and colleagues compared the symptoms of heartburn and regurgitation in men and women, and reported significantly higher prevalence of both symptoms among women (6).

We found that residence in dormitory versus private house was not correlated to GERD, which is inconsistent with a study on university students in China (25) and Syria (19). They both insisted on the role of living in a dormitory as a factor associated with GERD because of the quality of food provided by the university, irregular and late meals, consumption of snacks late at night, and inability to cope with the new life regarding the new place and people.

High weight as an independent factor associated with GERD in all of the populations, general or target (19, 26, 27), was one of the factors found to be an independent predictor of GERD among the studied medical students of the current report, as well. We found that overweight and obesity were associated with both heartburn and regurgitation, hallmark manifestations of GERD.

Assessment of the correlation between studying grade and the symptoms of GERD is the novel part, whereas we found a significant correlation between studying at different grades and the symptoms of GERD. Although internship accompanies numerous night shifts and actual attendance in the management of the patients, stagership and physiopathology course were found as the determinants of GERD; however, Sharma and colleagues mentioned internship as the grade associated with the symptomatic GERD (14). We assume that the short period of training and heavy exams are the leading causes of excessive stress on the students and contribute to this correlation.

Failure to assess psychological disturbances, meal-related habits, smoking and alcohol use, and the other probable confounders associated with GERD incidence was a significant limitation of this study. Moreover, a larger study population can provide a better view of factors correlated with GERD.

CONCLUSION

Based on the current study, GERD was a prevalent complaint among medical students. The high BMI and studying at physiopathology course or stagership were the independent predictors of heartburn, while as well as high weight, regurgitation was correlated with studying at stagership only. We found no association between GERD in medical students with sex or residence.

Ethical statement

The current report has been conducted based on the Helsinki Declaration and written consent was obtained from the participants.

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CONFLICT OF INTEREST

The authors declare no conflict of interests related to this work.

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