

# Stress and a sedentary lifestyle are associated with irritable bowel syndrome in medical students from Saudi Arabia

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Received: November 2021; Accepted: December 2021; Published: January 1, 2022.

Citation: Amna Fadl Bashir Fadl et al. Stress and a sedentary lifestyle are associated with irritable bowel syndrome in medical students from Saudi Arabia. *World Family Medicine*. 2022; 20(1): 101-108 DOI: 10.5742/MEWFM.2022.95216

## Abstract

**Background:** Irritable bowel syndrome (IBS) is a chronic gastrointestinal condition presented by abdominal discomfort due to unknown cause. The prevalence of IBS in the world extends between 5.7% to 34%, with different ranges based on the tools used for diagnosis. Evidence has indicated genetic predisposition and psychosocial stress as risk factors. This study aims to assess the prevalence of IBS with its subtypes in undergraduate medical students using Rome III criteria. We also investigated the association of IBS and emotional disorders including stress among undergraduate medical students in Saudi Arabia.

**Methods:** This cross-sectional study was conducted in January and February 2021 among undergraduate medical students in Saudi Arabia. Volunteer participants answered the questions relating to demographics and surveys containing the Rome III criteria and the Self-reported Stress questionnaire.

**Results:** A total of 300 participants were recruited of whom 63.7% were females. The majority of the participants were aged more than 22 years (72.7%). IBS prevalence in undergraduate medical students was 49.3% in Saudi Arabia which was higher than the global prevalence of IBS. There are many associated factors with IBS including female gender, higher academic year, sleeping less than 6 hours and less exercise practicing.

**Conclusion:** Higher prevalence of IBS was detected in undergraduate medical students in Saudi Arabia than worldwide prevalence. Female gender, higher academic grades, less exercise practicing and sleep disturbance were predictors for IBS. More screening and management of stress causes are needed to decrease medical field stressors.

**Key words:** Irritable bowel syndrome, medical students, stress, sedentary lifestyle

## Introduction

Irritable bowel syndrome (IBS), is a chronic gastrointestinal condition, manifested clinically by recurrent abdominal discomfort or pain that is relieved after bowel emptying and also associated with bowel habits changes [1].

The complete pathophysiology of IBS is still under investigation, but there are some commonly accepted theories including abnormal regulation of serotonin, post-infectious IBS, and bacterial overgrowth [2]. Some evidence also suggests a link of genetic predisposition with IBS [3]. Moreover, some studies suggested that psychosocial factors have been incriminated in IBS predisposition [2]. Traditionally, in practice, IBS was considered as a disease of excluded diagnosis, but lately, Rome III criteria was applied as a tool of choice for diagnosis in research and other clinical study. Using Rome III criteria, three different subtypes of IBS have been established: constipation-predominant, diarrhea-predominant, and alternating diarrhea and constipation [4].

The prevalence of IBS in the world extends between 5.7% and 34%, with different ranges built on the tool used for diagnosis [5]. Women and adults less than 50 years are more likely to be diagnosed with IBS [6,7]. The IBS prevalence is higher in western regions than Asian regions with prevalence of 10%-15% and 1%-10%, respectively [8].

Currently there is lack of evidence produced from Arab countries. A meta-analysis on IBS prevalence has found that no proven studies have been produced from an Arab country [5]. Ranging prevalence of IBS in Middle East has been 11.4% in Saudi Arabia and 34.2% in North-East of Egypt [9,10].

In Saudi Arabia, limited knowledge is known about the IBS prevalence among university students [11]. Various cross-sectional studies, based on diagnostic criteria of Rome III, have suggested IBS is prevalent among undergraduate students as reported in a study conducted in Jeddah and Riyadh, KSA which showed that the prevalence of IBS is 31.8% and 21% of undergraduate students and medical students, correspondingly [11,12]. IBS prevalence rates are changeable, and several factors, such as study methods, diagnostic criteria, and sample size, should be considered. Hasosah et al. have assessed the prevalence of IBS to be 15.6% between medical students of Jeddah, KSA. In this study, the authors reported that high stressful environment, IBS family history, and decrease of exercise practicing were found to be suggestive risk factors for IBS [13].

Medical students are prone to stress due to the duration of their studies and difficult exams [11]. The high prevalence rate of IBS detected in university students, particularly medical students, could be attributed to the role of stress [14]. IBS prevalence has been seen higher in women and medical students [15]. We hypothesis that stress and sedentary life could be risk factors for IBS in medical students.

This study aims to assess the prevalence of IBS with its subtypes in undergraduate medical students using Rome III criteria. We also investigated the association of IBS and emotional disorders including stress among undergraduate medical students in Saudi Arabia.

## Subjects and Methods

This analytical cross-sectional study was conducted during the months of January 2021 and February 2021 among all medical students of Saudi Arabia. Different Saudi universities including Taif university, King Saud university, Umm Al-Qura University, King Abdul Aziz university, King Saud bin Abdulaziz University for Health Sciences in Riyadh, and Princess Nourah Bint Abdul Rahman university were sites for our study.

Undergraduate Saudi medical students in the selected universities from all the years of their degree were recruited. All postgraduate, non-medical students or students from other universities were excluded. All cases were randomly collected from selected universities in Saudi Arabia.

A self-administered online questionnaire was used which was disseminated using online platforms and social media at: <https://docs.google.com/forms/d/e/1FAIpQLSf490Ptg4d8BH59PDIGxijK2e54vN8KDCpjFk-M9IBzDLNDvg/viewform>. The questionnaire comprised questions about age, sex, sleep duration, income per month, history of travel to tropical areas, current academic year, medical history, and presence or absence of Rome III criteria used in diagnosis of IBS. The questionnaire also covers special habits such as practicing any type of sports. We also asked about stress in daily life and other diseases related to this stress. The questionnaire consisted of twelve questions about personal information and the situations of life that were answered only either with Yes or No. This test had been widely used in clinical and epidemiological studies. [16] The validity was verified by checking an online sample. And it was reliable and simple.

The data were transferred to Statistical Package for the Social Sciences (SPSS) version 16 (SPSS Inc., Chicago, IL) for analysis. Categorical variables were extracted as frequencies and percentages and continuous variables were extracted as mean and standard deviation.

Research proposal and a request letter were submitted to the Dean, College of medicine and Vice Dean Scientific research for approval before conduction of the study. Ethical approval was granted by the Research Ethics Committee at Taif University via letter number (42-170)

Consent of participations was taken in the online questionnaire at <https://docs.google.com/forms/d/e/1FAIpQLSf490Ptg4d8BH59PDIGxijK2e54vN8KDCpjFk-M9IBzDLNDvg/viewform> before answering the questions.

## Results

A total of 300 medical students were recruited, the majority of whom were females (63.7%). About three-quarters (72.7%) of the study participants were aged above 22 years (Table 1).

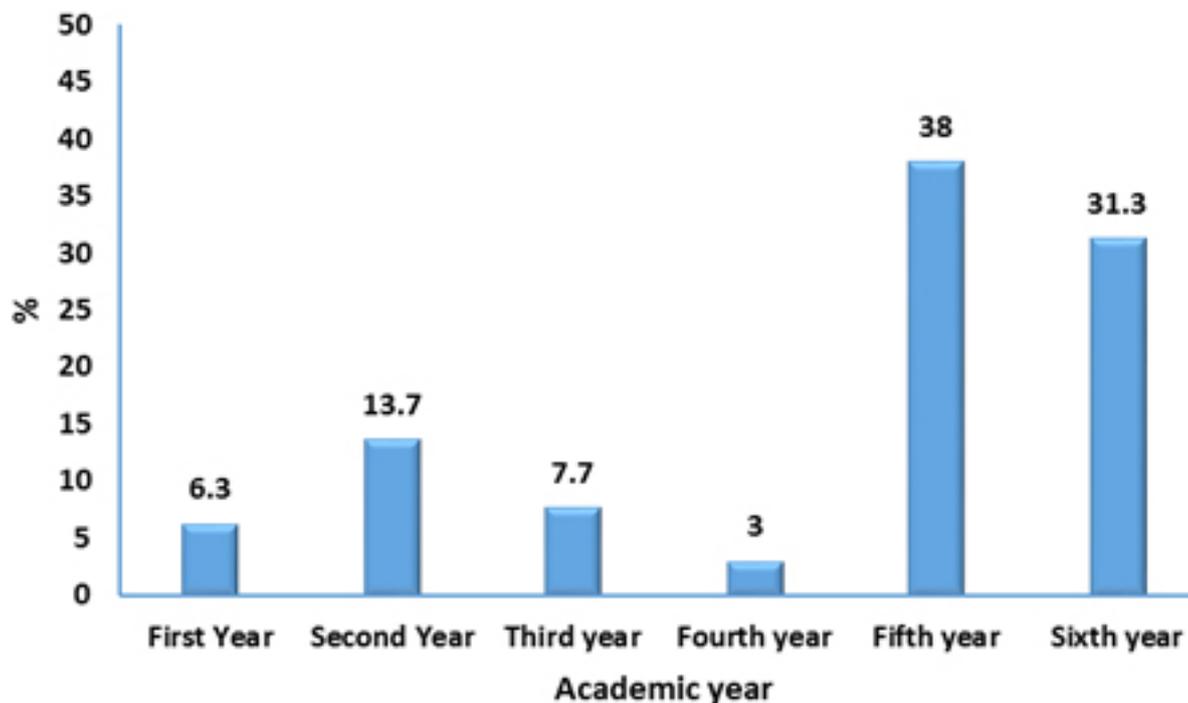
**Table 1. Demographic characteristics of the study population**

		N	%
Age	≤22 years	82	27.3
	>22 years	218	72.7
Gender	Male	109	36.3
	Female	191	63.7

Regarding distribution of universities and academic years of participants in the study population (Table 2), more than one-half (56.3%) of the study participants were from Taif University and more than two-thirds (69.3%) of the study participants were in fifth and sixth academic year with a higher percentage of fifth year than sixth year participants by (6.7%) (Figure 1).

**Table 2. Distribution of universities in the study population**

University	N	%
Al Baha University	2	0.7
Al Ghad International Colleges	2	0.7
Al Qassim University	8	2.7
Al-Imam Mohammad Ibn Saud Islamic University	2	0.7
Al Maarefa University	1	0.3
Fatima College of Health Sciences	1	0.3
Gulf Medical University	1	0.3
Imam Abdulrahman Bin Faisal University	11	3.7
Imam Muhammad Bin Saud Islamic University	1	0.3
Inaya Medical College	1	0.3
Jazan University	2	0.7
King Abdulaziz University	35	11.7
King Faisal University	7	2.3
King Saud Bin Abdulaziz University for Health Sciences	7	2.3
King Saud University	15	5.0
Mashad University of Medical Sciences	1	0.3
Najran university	1	0.3
Northern Border University	1	0.3
Prince Mohammad Bin Fahd University	1	0.3
Prince Sultan University	1	0.3
Princess Nora University	10	3.3
Sulaiman Al-Rajhi University	12	4.0
Tabuk University	1	0.3
Taif University	169	56.3
Umm Al Qura University	5	1.7
University Of Hail	2	0.7

**Figure 1. Distribution of the academic year in the study population**

Regarding lifestyle and health condition, more than one-half (56.7%) of participants were sleeping more than 6 hours and less than one-half (47.0%) practiced physical exercise with more than one-half (55.3%) of them practicing physical exercise more than once/week (Table 3).

**Table 3. Sleep duration and sport habits in the study population.**

		N	%
Sleep duration	≤6 hours	130	43.3
	>6 hours	170	56.7
Have a sport habit	Yes	141	47.0
If having sports habit how many times do you perform it?*	Once/week	63	44.7
	More than once/week	78	55.3

\* Percentages were calculated based on the total number having a sport habit

As regards history of travel to tropical areas and psychiatric pathology in the study population, less than three-quarters (72.7%) of the study participants had travelled to tropical areas and only approximately one-tenth (10.7%) of the study participants had a history of psychiatric pathology (Figure 2).

More than one-tenth (13.7%) of study participants had diarrhea. Out of the participants having diarrhea, more than two-thirds (68.3%) of them have diarrhea more than once a week and one-half (50.0%) of them were found to have diarrhea associated with any type of food and less than two-thirds (63.4%) of them were found to have diarrhea alternating with constipation (Figure 3).

Using Rome III Criteria we identified 148 undergraduate medical students diagnosed as having IBS which in turn gives an overall IBS prevalence of 49.3% between undergraduate medical students and interns (Figure 4).

Figure 2. Travel to tropical areas and psychiatric pathology in the study population

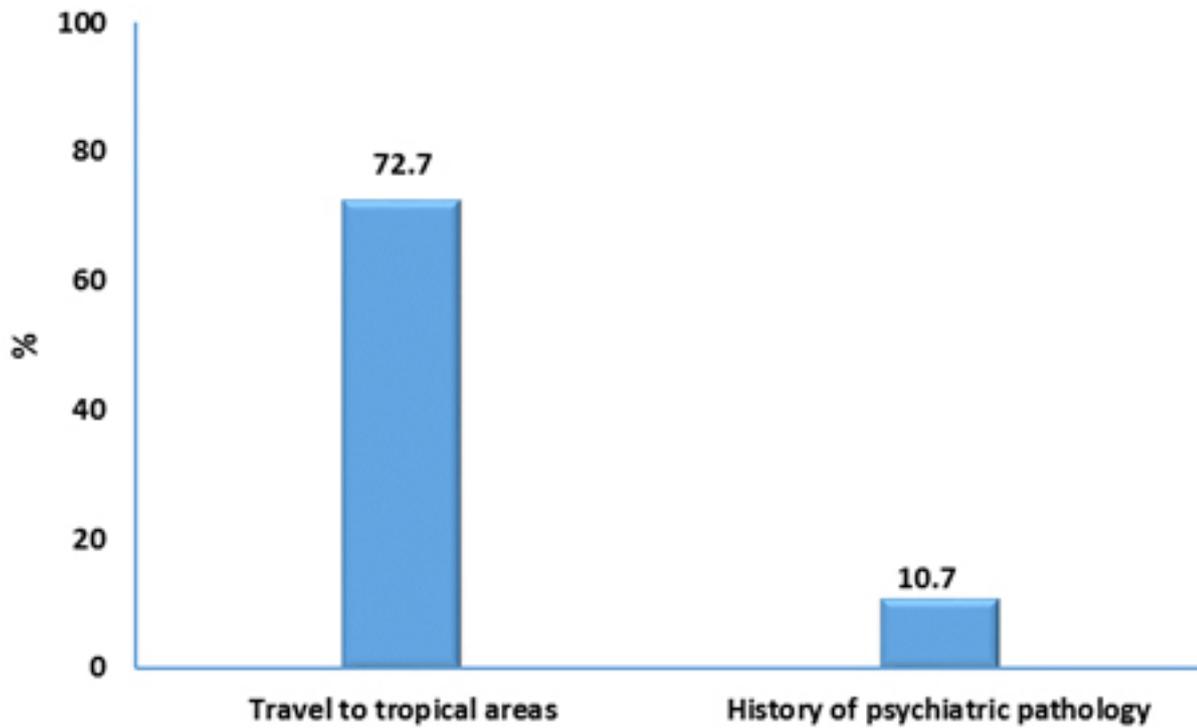
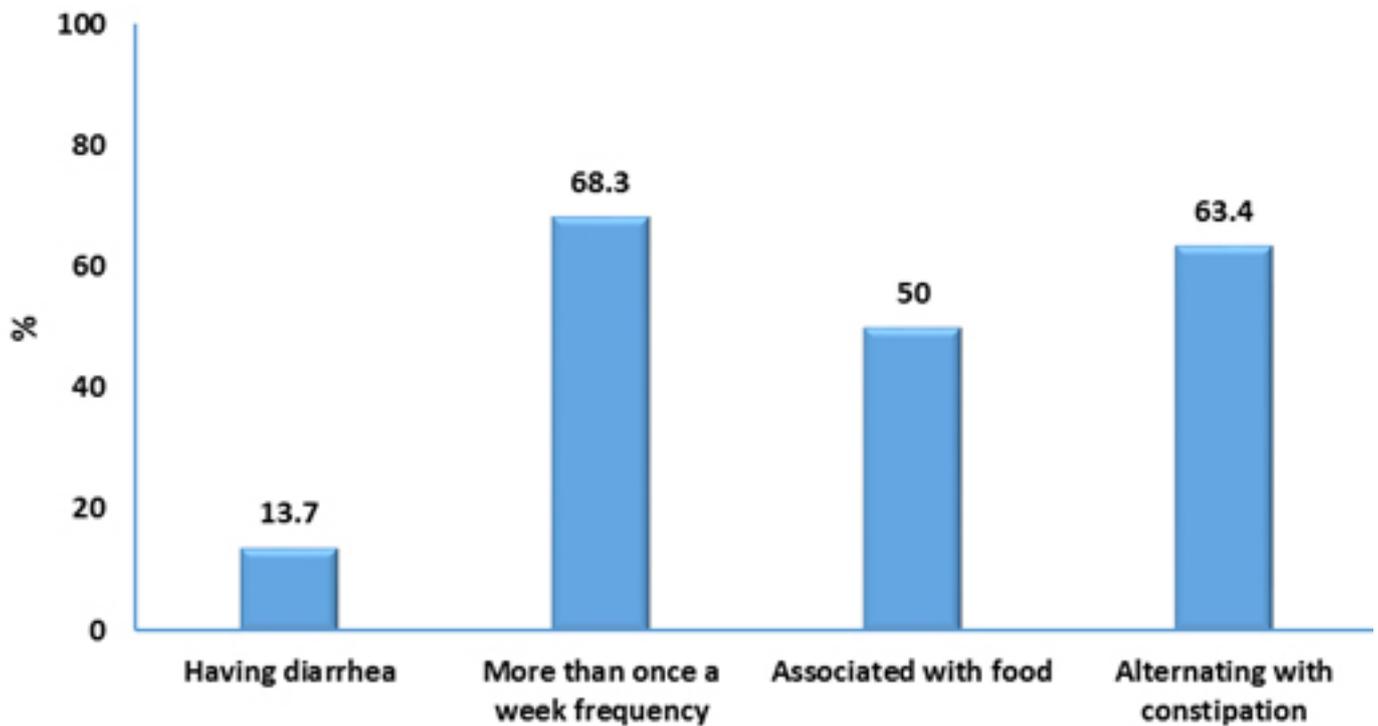
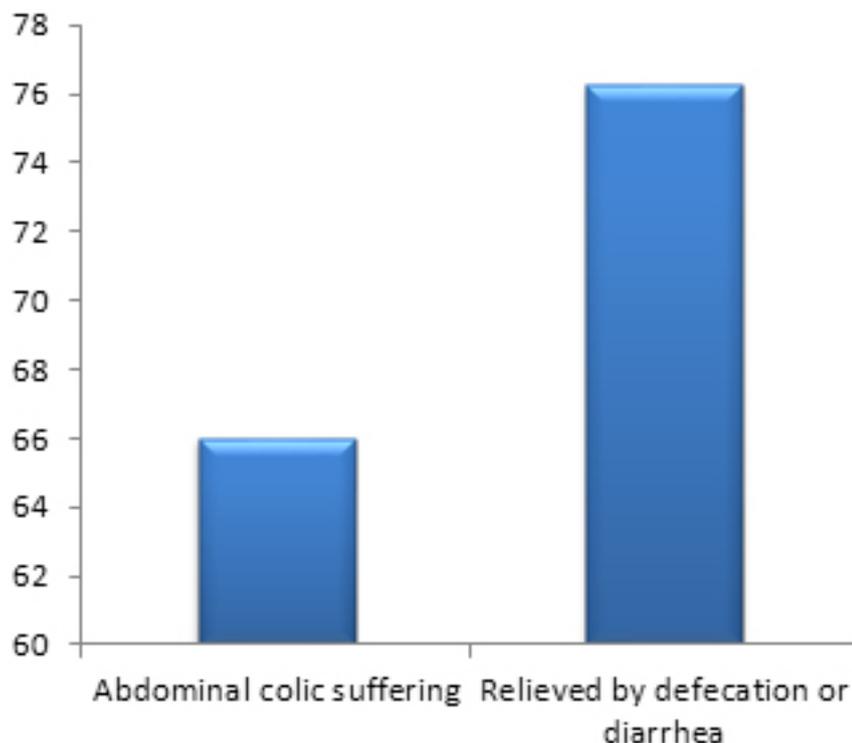


Figure 3. Diarrhea and its characteristics in the study population



**Figure 4. Abdominal colic in the study population**

## Discussion

IBS prevalence varied widely between different investigations. IBS prevalence was prevalent in between 15% and 24% between the populations of Western areas [17]. An international study conducted in 2003 on 41,984 persons in eight countries in Europe showed that IBS prevalence in selected population was 11.5% [18]. The current study reported a higher IBS prevalence rate of 49.3% in undergraduate medical students. The different range of IBS prevalence between the current study and the European study may be related to more than one explanation which includes sample size used, age group in the study, the different criteria used for diagnosis of IBS, environmental and demographic changes between regions and higher stressors present on the population of one study than the others.

As regard to varied types of students, a Chinese study showed that a higher risk of IBS was found in medical students than science and engineering students [15]. In a Japanese study, results found that the IBS prevalence was 35.5% between undergraduate nursing and medical students [14]. Two Pakistani studies showed similar rates among medical students: 28.3% in 2012 [19] and 34% in 2005 [20]. In a Korean study, the rate was 29.2% between undergraduate medical students [21]. In contrast, current analysis found the prevalence rate of IBS of 49.3%. This difference between the current study and other studies might be related to not only the difference in genetic, environmental factors and diagnostic criteria used, but also the enormous stress in some countries moreso than others.

A study conducted in 2003 in the United States reported that the undergraduate medical students who met the IBS criteria were only 11% [22]. A study conducted among secondary school students in Saudi Arabia showed that IBS prevalence extended between 8.9 and 9.2% based on Manning and Rome II Criteria, correspondingly [23]. The discrepancy between the last two studies and the current study may be related to a more tough stressful medical life than others which played a main risk factor in predisposition of IBS [14,24]. Longer time to achieve medical degree, exams, large numbers and irregular and too many studying hours are all examples of these stressful conditions [24].

The described connections that are verified in our study are female gender and advanced academic grade. In comparison to males, females two times more likely than males of having IBS. This finding shows similar results in wider studies which reported strong associations between female gender and IBS [14, 15,17,18,19,21,24,25].

As regards age relation and academic level, the current study reported that higher IBS prevalence was found more in older students who are in higher academic grades (fifth- and sixth-year students) than in low academic grade students. The explanation might be the relation between clinical years and increased work and stressors. Another Chinese study stated that the higher the level of undergraduate medical students, the more risk of having IBS [15]. Another study performed by Payne et al. in 2004 reported that age and IBS prevalence had no relation to each other [26]. Similar results were found in a Canadian study conducted in 2012 [25]. An Iranian systemic review reported that IBS prevalence was higher in the lower-level undergraduate medical students than higher academic levels [27].

As regards sleep changes, the current study reported that sleeping less than 6 hours per day students reported more IBS prevalence than students who sleep more than 6 hours per day. Another study conducted in Saudi Arabia by Al-Turki et al. reported that students with insomnia had more risk of developing IBS in comparison to others [28]. Another study stated that sleep disorders were more common in males who had IBS than females [23]. However, another Canadian study showed that undergraduate medical students who don't sleep at night were not associated with IBS development [25].

As regard habits, the current study stated that the prevalence of IBS was higher (26.1%) among students who didn't do any physical exercise in relation to others (23.2%). A study conducted in Saudi Arabia showed higher IBS prevalence in students who did less exercise than others [29].

## Conclusion

The current study showed higher prevalence (49.3%) of IBS in undergraduate medical students in Saudi Arabia. Female gender, less exercise practicing, emotional disorders such as stress and higher academic level were the major indicators and predictors for IBS risk. More screening is needed for IBS early detection through early identifying psychological problems in medical students. Management of stress is needed for medical students to allow them to face medical field stressors without a negative impact on their, mental and physical health.

### List of abbreviation:

IBS: Irritable bowel syndrome  
KSA: Kingdom of Saudi Arabia

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