

A Questionnaire-based Survey on Irritable Bowel Syndrome among Medical and Non-Medical Students at Al-Neelain University, Khartoum, Sudan.

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Abstract

Irritable bowel syndrome is a functional multifactorial gastrointestinal disorder, stress is one of the proposed factors that play a crucial role in the exaggeration of (IBS). The study aimed to determine the prevalence and impact of stressful education on Irritable Bowel Syndrome among Medical and Non-Medical Students at Al-Neelain University. A cross-sectional study was carried out at Al-Neelain University faculty of Medicine and Commerce Khartoum State, Sudan, out of 270 students were chosen proportionately utilizing systematic random sampling method, Data were gathered using a pre-tested, structured questionnaire. A total of (270) students from both faculties; 44.8% (121) students of the faculty of medicine and 55.2% (149) from the faculty of accounting. The overall prevalence of IBS was 27.2% in the faculty of medicine while (26.8%) were diseased in the faculty of commerce. Among medical diseased students; IBS Diarrhea predominant was significantly 76%, IBS Mixed predominant type was 15%, and IBS Constipation 9%. We conclude that Irritable bowel syndrome is a common disease among Al-Neelain University students, more common in medical students than nonmedical ones, which can be considered as a female prevalent disease.

Key words: IBS, irritable bowel syndrome, medical students, stress, anxiety, depression

Introduction

Various diseases involve the gastrointestinal tract (Gheisari *et al.*, 2018; Bottalico *et al.*, 2020). Irritable Bowel Syndrome (IBS) is a common functional gastrointestinal disorder (FGID), portrayed by abdominal discomfort and disruption in bowel habits with the absence of precise and distinct organic pathology, hence the diagnosis of IBS is depend on clinical observation and the exclusion of other diseases (Spiller *et al.*, 2001; Jafri *et al.*, 2005).

The pathogenesis of IBS has been connected to altered gastrointestinal motility, visceral hypersensitivity, post-infectious

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reactivity, brain-gut interactions, alteration in gut microbiota, food sensitivity, dietary intakes, and intestinal permeability (Occhipint *et. al* 2012). Even so, in the United States alone there are somewhere in the range between 2.4 and 3.5 million doctor visits each year for IBS, is it more IBS as reported by the Rome III models has a high prevalence in the African provincial population (Okeke *et. al* 2009). It is the most frequent condition reported by physicians and represents about 12% of total encountered to health concern professionals, an important percent about 60% to 65% of people who diagnosed as IBS patients in the society are female (El-Salhy M 2012).

Because of its high prevalence and absence of effective treatments, IBS imposes a great load on patients and hospital systems. It is among the most common outpatient diagnoses in general practice and gastroenterology (Jung *et.al* 2014). There have been few studies concerning both medical and non-medical students.

There are identical researches concerning the prevalence of IBS among South American medical students (Nellesen *et al.*, 2013), Pakistan (Machicado *et al.*, 2013) and Saudi Arabia (Ibrahim *et al.*, 2013), conclude that there was a predominant percent of their population diagnosed as IBS patients 21%, 28.3%, 31.8% respectively.

Also, a study run in Egyptian participants in the Suez governorate, their result of IBS was (117) 34.2% (Abdulmajeed *et al.*, 2013). The second investigation was carried out in Sues, Egypt, aimed for the determination of the prevalence of irritable bowel syndrome (IBS) among Suez Canal university students. Among 170 students who diagnosed according to Rome III criteria, the prevalence of IBS is higher in nonmedical students comparing with medical one 23.8%, 22.1% respectively (Darweesh *et. al.*, 2015)

IBS symptoms are the same as any abdominal problems, although some of them could be quite aggressive. Even though different situations require different therapies, the search for the proper diagnosis is crucial. There is no specific standard test for diagnosing IBS because other disorders must be omitted prior treatment can start, but, it should be noted that the existence of alarming symptoms, such advance distress, disruption of sleep and restless, recurrent nausea and vomiting, hematochezia or melanic stools, fecal occult blood positivity, fever, weight loss or anorexia, is not related to IBS (Saito *et al.* 2010).

The disease typically causes long-term symptoms: can exist as episodes, can differ, can be meal-related and in certain cases, it may be overlap with everyday activities of life and social performance, symptoms often tend to progress as a result of serious intestinal inflammation, or may be induced by great life events, or through a period of considerable stress (Haider *et al.*, 2018; Arbaiza and Guillen, 2018). IBS sub-classification according to the Rome III criteria, and based on the patient's stool characteristics classified as IBS with diarrhea (IBS-D), IBS with Constipation (IBS- C), IBS Mixed (IBS M) (Hungin *et al.*, 2003).

Table (1-1): Rome III criteria for the diagnosis of Irritable Bowel Syndrome:

Recurrent abdominal pain or discomfort with onset at least 6 months before diagnosis, associated with 2 or more of the following, at least 3 days/months in the last 3 months:

- Improvement with defecation
- Onset associated with a change in frequency of stool
- Onset associated with a change in form (appearance) of stool

It should be noted that using of the Rome III criteria are restricted in medical diagnosis by physicians, as many doctors they depending on diagnosing IBS by excluding other illness, (Ibrahim *et al.*, 2013) also in Sudan. For maximum quality control, we apply Rome III criteria in our diagnosis of research subjects as it is the most appropriate method to describe IBS cases, and because it's approved criteria worldwide. In India, for example, a patient who had passing hard stools is possibly complain of constipation even if he or she passes stools more than once daily so cultural issues tell symptom notification (Hungin *et al.*, 2003).

There are a variety of extraintestinal co-morbidities associate with IBS and appear in up to 65%. About one-half of the patients suffer from gastrointestinal disorders, such as functional dyspepsia, gastroesophageal reflux disease, functional constipation, and anal incontinence (Vandvik *et al.*, 2004).

There may also be a significant correlation among the seriousness of IBS and its comorbid psychiatric disorders, in particular depression and anxiety. A study written in 2013 about the psychosocial determinants of IBS (Surdea-Blaga, 2012) shows a substantial change in stressor level from non-patient IBS to patient IBS just before development. And major life traumas (e.g., the breakup of a close relationship, marital split, a family member leaving home, or break-up of a serious girl/boyfriend relationship) were also regularly recorded 38 weeks before the onset of IBS symptoms. Additionally, the latest studies have shown that early adverse events in life (e.g., maladjusted relationships, severe illness or death of a parent, etc) are linked with IBS prevalence (Chang *et al.*, 2011; Bradford *et al.*, 2012; Hong-Yan *et al.* 2014). So, these studies strongly assume that the development of IBS is determined by the psychological or psychosocial stressors to determine the development of IBS.

Hence, our study aimed to determine the prevalence of IBS among medical and non-medical students at Al-Neelain university to determine the effect of educational stress on the severity of disease and to identify undiagnosed cases of IBS.

Methodology:

A cross-sectional descriptive study utilizing the Rome III module questionnaire of IBS; a self-administrated questionnaire that contains ten questions estimating the current condition of a normal person.

Sample selection:

Students were selected proportionately from each faculty using systematic random sampling to select students from the researcher's faculty list of students before the data collection tool was distributed, thus selecting one student from every 10 students in the list.

All the participants were allowed to participate in the study. Permission was taken from the heads department of each college to perform the research at the chosen Faculty. Completing and returning the questionnaire meant the informed consent of the students.

Every question can be responded to by a scale of grades that reflect the severity of symptoms encountered. A skilled trained group was in charge of distributing the questionnaire and display support as subjects filling it. The questionnaire was administrated to Al-Neelain University students; a study participants consisting of (121) students of the faculty of medicine & non-medical (149) students of the faculty of Commerce, with total (270) students all batches from both.

Statistical analysis:

Data were analyzed using statistical package for social science (SPSS) version16, using the chi-squared test, with a 95% confidence interval (CI), a p-value less than 0.05 was considered statistically significant.

Results

A total of (121) participants of the faculty of medicine & (149) non-medical participants of the faculty of commerce with a total of (270) students of both faculties (whose mean age is 22 ± 3.5) years old. Our findings revealed that, a total (126) female and (144) male. Commonly, the students who are not diseased 237(73%) are those who are diseased 33(27%) (Figure 1). Table 1 summarized the Frequency of Irritable Bowel Syndrome and Non-irritable Bowel Syndrome Students among both faculties. The result is close to each other (27.2%) were diseased in the faculty of Medicine, while there were 26.8% in faculty of Commerce 26.8%). Although, there is a significant correlation (0.002) between faculty & diagnosis of IBS. Regarding Demographic data and Academic characteristics among students

in table 2, there is a significant correlation between IBS diagnosed patients and gender. This leads to the fact that females are more likely to have IBS since (61.2%) of ill females are more likely than males (48.3%). Also, significant correlation regarding the source of food and family history in faculty of Medicine as well as Commerce faculty (0.00 and 0.002 respectively)

Table 3 concludes the distribution of IBS subtypes among students between two faculties, IBS D was significantly more frequent at both faculties 25 (76%) and 28 (70%) (p. value = 0.054). Followed by IBS M 9 (22.5%) which is higher in the faculty of Commerce. In diseased students, the most common type of IBS is the Diarrheal predominant type (76%), followed by IBS Mixed (15%), while the least one is the constipation-

predominant type cases (9%) (Table 3). The Correlation of IBS subtypes and students' gender of faculty of Medicine was in figure 2.

Table 1: Frequency of Irritable Bowel Syndrome and non-Irritable Bowel Syndrome Students among faculty of medicine and commerce

Faculty	IBS N (%)	Non-IBS N (%)	Total	p-value
Medicine	33 (27.2%)	88 (72.2%)	121 (100%)	0.002
Commerce	40 (26.8%)	109 (73.2%)	149 (100%)	0.035
Total	73 (27%)	197 (73%)	270 (100%)	

Table 2: Demographic data and Academic characteristics among students

Characteristics		Faculty of Medicine			Faculty of Commerce		P. value
		IBS n=33 (%)	Non IBS n=88 (%)	P. value	IBS n=40 (%)	Non IBS n=109 (%)	
Student gender	Male	13(39 %)	54 (61%)	0.001	14 (35%)	89 (82%)	0.002
	Female	20 (61%)	34 (39%)		26 (65%)	20 (18%)	
Material status	Single	14 (42%)	75 (65%)	0.164	21 (53%)	53 (49%)	0.145
	Married	19 (58%)	13 (35%)		19 (47%)	56 (51%)	
Living status	Family	19 (58%)	13 (15%)	0.541	19 (47%)	56 (60%)	0.432
	Friend	8 (24%)	62 (70%)		11 (28%)	25 (24%)	
	Alone	6 (18%)	13 (15%)		10 (25%)	28 (26%)	
Source of food	Home	9 (27%)	71 (81%)	0.000	17 (42%)	83 (76)	0.000
	Restaurants	24 (73%)	17 (19%)		23 (58%)	26 (34%)	
Family history of IBS	Yes	32 (97%)	15 (17%)	0.002	29 (73%)	10 (9%)	0.001
	No	1 (3%)	73 (83%)		11 (27%)	99 (91%)	

Table 3: Subtypes of IBS according to predominant bowel habit

IBS type	Faculty of Medicine	Faculty of Commerce	P. value	95% Confidence Interval
	Diseased n= 33 (%)	Diseased n=40 (%)		
IBS-M	5 (15 %)	9 (22.5%)	0.389	3.45- 15.8
IBS- C	3 (9%)	3 (7.5 %)	0.213	12.23- 20.44
IBS-D	25 (76%)	28(70 %)	0.054	-2.34- 1.48
Total	33(100%)	40 (100%)		

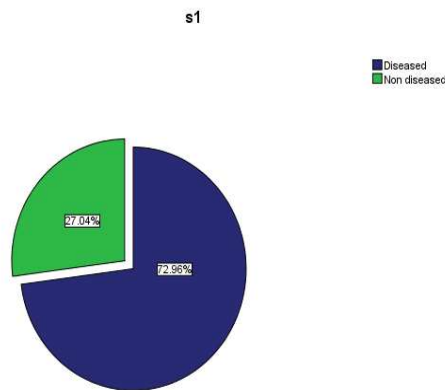


Figure 1: The Prevalence of IBS

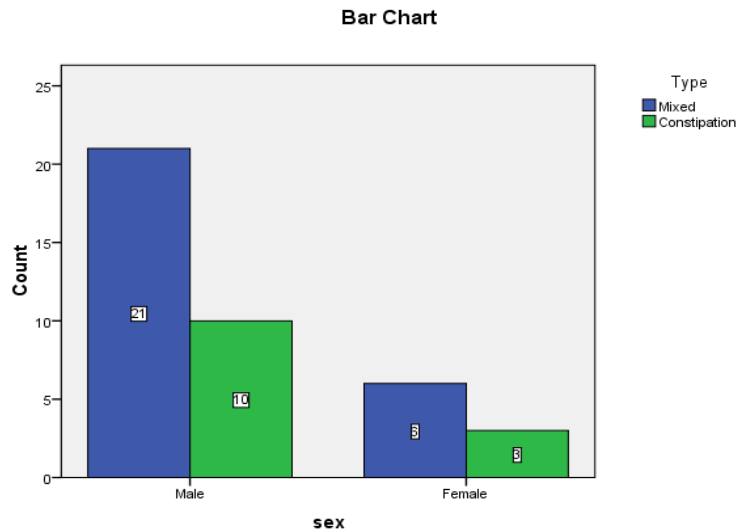


Figure 2: Correlation of IBS subtypes and students' gender of faculty of Medicine

Discussion:

There are numerous and complex mechanisms that might play a crucial role in the pathophysiology of Irritable Bowel Syndrome, more or less lead to an exaggeration of bowel symptoms, the current study was conducted at Al-Neelain University among medical and non-medical students through the Rome III criteria to determine the role of psychological stress in the development of IBS.

This is the first study carried out at Al-Neelain University and also, in Sudan. The finding showed that 73% of all the included students were free of the disease and only 27% were diseased. 26.8% were diseased in the faculty of commerce while 27.2% in faculty of medicine these results correspond with (Dong *et al.*, 2010) who conducted a cross-sectional study among medical Chinese students who reported a high prevalence of IBS among the females in both faculties as well as finding revealed by (Ibrahim *et al.*, 2013) who find a high prevalence of IBS (31.8%) among Saudi Medical students. The high prevalence of IBS among the faculty of Medicine students more than the non-medical students may refer to that having IBS is related to stress which is a critical aspect of the progression of irritable bowel syndrome (IBS). A growing amount of clinical and experimental research has shown that IBS is a mixture of irritable bowel and irritable brain; and there is strong evidence that IBS is a stress-sensitive condition. Surdea-Blaga *et al.*, 2012) showed that psychosocial stressors in up to one-third of IBS patients would worsen abdominal pain and abdominal distension Their observation and results justify a high prevalence of IBS among faculty of medicine rather than faculty of Commerce as there is a convergent result, A huge amount of information overloads the medical students. They have limited time to read all the studied details. The accumulation of information produces a sense of dissatisfaction because of the inability to retain all the information at once throughout the analysis process. Many

medical students find it challenging to satisfy medical demands with their capacity because of the personal stressors (family, friend, spouse, financial and relationship issues, also situational stressors (inordinate hours, sleep deprivation excessive workload) which affect all medical and nonmedical students. So the presence of professional psychologist in each faculty is mandatory to help students manage stress, as well as communication among third and fourth-year medical students prepares them for the stressors of real-life clinical practice, is compulsory (Hong-Yan *et al.*, 2014).

However, current findings conflicted with (Darweesh *et al.*, 2015) who found that IBS was more prevalent among nonmedical students. This may be due to the reason that an etiological agent for their condition is not related to stress or wrong feeding habits as we know IBS is a multifactorial disease. The prevalence of IBS in females is higher, as they are around twice likely to encounter IBS as men.

Several studies reveal that the cause for this may be sex hormones such as estrogen and progesterone. IBS symptoms can be triggered by them, and this could explain why you have more flare-ups at different points of your menstrual cycle. Besides that, we have to put into consideration the difference in the biological response for IBS in males & females (Shiotani *et al.*, 2006) and (Riedl *et al.* 2008).

The current study illustrated that prevalence rate of IBS among medical students (73%) and non-medical students (58%) was significantly (p. value 0.000) impacted by eating habits as all participant having IBS in both faculty eat outside their home (eating junk food), this result was in agreement with (Basandra, *et al.* 2014) found that consumption of fatty foods was significantly correlated with a higher prevalence of IBS. It is necessary to evaluate the potential role of gut microbiota in the etiology of IBS

has attracted much interest in recent times. In metabolic, defensive, and structural functions in the body, the GI tract plays a physiological role as a natural reservoir of microbiota, while dysbiosis can lead to several diseases, including IBS (Chang *et al.* 2011). Chronic stress can stimulate dysbiosis and increased bacterial adherence to the wall, whereas the interplay between the host and microbiota can alter the endocrine neuro-immune systems (Bradford *et al.* 2012), proposing that stress-induced microbiotic alteration of the intestine also tends to play a crucial role in the pathogenesis of IBS. So these studies may justify the current significant result as the study participants having different types of the stressor (family, financial and relationship issues, inordinate hours, sleep deprivation excessive workload) as well as their feeding habits (most of them eat outside their home) all these reasons may exaggerate the IBS symptoms.

On the other hand, IBS was significantly related to family history (97%) of medical and 73% of a nonmedical student having a family history of IBS. Several studies state the presence of high and low producer patients for pro and anti-inflammatory cytokines genes (a genes polymorphism directly) which is directly proportional to IBS (Bashashati *et al.* 2014).

Regarding IBS subtypes, constipation-predominant type (IBS C) was 9% and 7.5 % in faculty of medicine and Commerce respectively, Diarrhea predominant type was significantly prevalent among faculty of Medicine 76% (p-value 0.05), the Mixed type was 22.5%, more prevalent among faculty of Commerce. Yet, (Shiotani *et al.* 2006) demonstrate that the constipation-predominant type (IBS-C) is more prevalent (IBS-C) 128, diarrhea-predominant type (IBS-D) 117, unclassified 23 of total 268 diagnosed cases among Japanese students (Shiotani *et al.* 2006). A study conducted at the Jos University which their findings disagree with our result as the conclusion that more prevalence among the male participants (26.4%) than female (25.7%) (Okeke EN *et al.* 2009), but another study conducted in Sudan, researchers found that IBS more prevalent among females (Sara *et al.* 2016). This conflict in the findings could be related to different factors limiting the estimation of the actual number of students having IBS and their subtypes, such as the sample size and response rate and also differences in ethnic groups.

Conclusion and recommendation:

The study indicated that IBS was a prevalent illness among students at Al-Neelain University, more common in medical students than non-medical students. The significant relationship between gender and IBS. We advocate constructing national programs for students to be conscious of their balanced diet to reduce their IBS suffering and improve the educational programs to reduce students' stress which is play a crucial role in the exaggeration of IBS.

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Competing interests:

The author declare has no competing interests.

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