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Contribution to the Study of Irritable Bowel Syndrome in Medical Students at the University of Parakou in Republic of Benin

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Abstract

Introduction: Irritable bowel syndrome is the most common functional gastrointestinal disorder. The objective of this work is to contribute to improving the medical follow-up of medical students at the University of Parakou through a study of irritable bowel syndrome. **Study Methods**: This was a descriptive and analytical cross-sectional study with prospective data collection. Data were collected from medical students from May 2018 to July 2018 using a pre-established questionnaire. Sampling was probabilistic using a two-stage survey. The diagnostic tools were: Rome IV criteria, Bristol scale and HAD (hospital anxiety and depression) scale. Data analysis was performed using Epi Info 7.1.3.14 software. CDC. **Results**: Thirty-two (7.55%) of the 424 students included had irritable bowel syndrome. Out of the 32 students with IBS, 24 (75%) were female. Their average age was 21.38 ± 2.39 years. For 24 students (75%), the symptoms occurred at the same time as exam preparation or the intense course period. Of the 32 students with IBS, 1 (3.12%) was regularly physically active. In this series, 8 students (28%) consulted a doctor for their symptoms. The factors associated with this syndrome were female sex (p = 0.022), sleep disorders (p = 0.008) and the presence of a doubtful depression (p = 0.021). Absenteeism due to irritable bowel syndrome was noted in 18 (56.25%) students. **Conclusion**: Irritable bowel syndrome is a common condition among medical students in Parakou. Support for better management of psychological disorders could improve the quality of life of these students.

Keywords

Irritable Bowel Syndrome, Medical Students, Parakou, Republic of Benin

1. Introduction

Functional gastrointestinal disorders are a major public health problem. It is a heterogeneous group of frequent chronic diseases, which can be debilitating and induce a social and economic burden [1]. Irritable bowel syndrome (IBS) is the most common of these disorders [1] [2] [3]. Although described more than 150 years ago, it remains a medical challenge of the 21st century [1] [4]. Lack of knowledge of the diagnosis in some patients can lead to unnecessary surgical interventions [2]. Among hepato-gastroenterologists, it represents about a third of the reasons for referral [5] [6] [7]. Its diagnosis is based on clinical criteria that have evolved over time, the latest being Rome IV criteria [8] [9].

Although IBS is not a serious condition, it is a source of significant morbidity because it considerably alters the quality of life of those who suffer from it. It interferes with their education, work ability and social life. IBS is considered the second leading cause of work absenteeism [2] [7] [10] [11]. It constitutes an economic burden for both patients and health systems. Its management is expensive due to a large number of examinations, frequent medical visits and significant use of medicines [7].

IBS is a multifactorial pathology whose pathophysiology is poorly understood [3] [9]. The relationship between psychiatric disorders and IBS is well-established [3].

Although IBS is a fairly common condition, it remains a very poorly documented subject in sub-Saharan African countries and particularly among students. Many students are subject to psychological factors such as stress and anxiety [11]. Medical students are a special group characterized by enormous cognitive and emotional changes, thus predisposing them to IBS [4]. In Saudi Arabia, in 2016, Alaqeel *et al*., found that the overall prevalence of IBS was 21% among medical students with a higher prevalence among females [3]. A systematic review of the prevalence and risk factors of irritable bowel syndrome among medical students, including 16 studies found that the prevalence of IBS among medical students ranged from 9.3% to 35.5% [4]. The relatively high prevalence among medical students may be attributed to their special stressful learning environment [4].

The objective is to improving the medical follow-up of medical students at the University of Parakou through a study on irritable bowel syndrome.

2. Study Methods

2.1. Type and Period of Study

This was a descriptive and analytical cross-sectional study with prospective data collection in medical students, conducted from May 2018 to July 2018 at the University of Parakou, in a probabilistic way.

2.2. Study Framework

The study took place at the Faculty of Medicine of the University of Parakou, in

Republic of Benin.

2.3. Study Population

The study population consisted of medical students from the University of Parakou, regularly enrolled in 2017-2018 academic year.

2.4. Inclusion Criteria

All medical students (from the first to the seventh year) of the University of Parakou enrolled in the academic year of 2017-2018 were included, having given their free and informed verbal consent to participate in the study.

2.5. Non-Inclusion Criteria

Students absent at the time of data collection were not included.

2.6. Exclusion Criteria

Those excluded from our study were students with a history of digestive pathology (gastric or duodenal ulcer, chronic inflammatory bowel disease, digestive tuberculosis, celiac disease, lactose intolerance); a warning sign (presence of blood in the stool or anemia, nocturnal symptoms, significant involuntary weight loss, recent onset/change in symptoms, family history of colorectal cancer, celiac disease or IBD, presence of fever); a history of recent digestive surgery (<6 months).

2.7. Sampling

The minimum sample size was calculated using Schwartz formula.

$$n = \frac{\varepsilon^2 \times p \times q}{i^2} = 273$$

$\varepsilon = 1.96$ for $\alpha = 5\%$; $p = 23.07\%$ [12]; $q = (1 - p) = 0.7693$; $i = 0.05$ (precision).

Assuming a non-response rate of 10%, the minimum required sample size is $n = 301$.

The two-stage probabilistic sampling method was used. The first stage consisted of distributing the students by level of study (stratum) and calculating the number of students to be surveyed in each stratum. The second stage consisted in selecting the students to be surveyed in each stratum. $\varepsilon = 1.96$ for $\alpha = 5\%$; $p = 23.07\%$ [12]; $q = (1 - p) = 0.7693$; $i = 0.05$ (precision).

➢ **First degree**

This was a stratified random sampling of students from grades 1 to 7. The sizes of the different levels of study were provided to us by the decanal authorities. Each level of study constituted a stratum (7 strata in total). The minimum number of students to be surveyed within each stratum was proportional to the number of study levels and calculated with the following formulas:

❖ Proportion of students by level of study:

$$P_{ne} = \frac{ne \times 100}{N}$$

P_{ne} = P_{ne} = proportion of students by level of study;

ne = number of students by level of study;

N = Total number of students.

❖ Number of students to be surveyed by level of study:

$$N_{ne} = \frac{P_{ne} \times n}{100}$$

N_{ne} = Number of students to be surveyed by level of study;

n = the sample size.

➢ **Second degree**

The selection of students within each stratum was made by simple random sampling without replacement from the list of students of each level.

2.8. Diagnostic Criteria

The diagnosis of IBS was based on Rome IV criteria [8]:

❖ the presence of abdominal pain for at least 6 months and occurring at least one day a week during the last 3 months; associated with

❖ the presence of at least 2 of the following 3 criteria:

- a pain related to defecation;
- a change in stool frequency;
- a change in the consistency of the stools assessed by Bristol scale and which makes it possible to distinguish 4 subtypes of IBS:
  - IBS with predominant Diarrhea (IBS-D);
  - IBS with predominant Constipation (IBS-C);
  - Mixed IBS with alternating diarrhea and constipation (IBS-M);
  - Unclassified IBS (IBS-U), without obvious transit disorders.

Anxiety and depression were assessed using HADS scale (Hospital Anxiety and Depression Scale). It has 14 items rated from 0 to 3. Seven questions relate to anxiety (total A) and seven others to the depressive dimension (total D), thus allowing two scores to be obtained (maximum score for each score = 21). To screen anxiety and depression symptomatology, the following interpretation has been proposed for each of the scores (A and D) [13]:

❖ ≤7: absence of symptomatology;

❖ 8 to 10: doubtful symptomatology;

❖ ≥11: definite symptomatology.

The other variables studied were sociodemographic data, personal and family history, clinical signs, lifestyle habits and medical follow-up.

2.9. Collection of Data

An appointment has been set with each promotion at the training sites and in amphitheaters. Each consenting student had a structured face-to-face interview lasting approximately 15 minutes. The information was collected by us using a questionnaire previously developed and tested. The questionnaire was designed by us and is attached. The student was also asked to complete an anxiety and

depression rating scale (HAD scale).

2.10. Bias

Sampling was not done by drawing lots, but consenting students present at the time of the survey were included. This could constitute a source of selection bias.

Confounding bias exists in this study. The search for a possible painful life event (divorce, bereavement, sexual abuse) has not been researched even though it can trigger and/or accentuate the symptoms of IBS.

2.11. Statistical Analysis

Data were collected using Epi Info 3.5.4 software from the Center of Disease Control (CDC) and then analyzed with Epi Info 7.1.3.14 software.

The qualitative variables were expressed in number and percentage and the quantitative variables in mean ± standard deviation. Statistical Chi-square or Fisher tests were used as appropriate to determine the p-value. The main variables associated with IBS in bivariate analysis were simultaneously included in a logistic regression model for multivariate analysis. The strength, direction and stability of the association were estimated using odds ratios with their confidence intervals at 95%. The significance threshold was set at 5%.

2.12. Ethical Considerations

Before carrying out this study, the protocol obtained an approval of the local ethics committee for biomedical research of the University of Parakou (111/CLERB-UP/P/SP/R/SA). Free and informed verbal consent was obtained from each participant. Medical secrecy and the rights of participants were respected throughout the study. Students meeting the criteria of Rome IV benefited from a free consultation in Hepato-gastroenterology.

3. Results

In 1098, students regularly enrolled at the Faculty of Medicine in 2017-2018 academic year, 427 students were included. Three (03) students were excluded because of their pathological history (02 cases of duodenal ulcer and one case of familial colorectal cancer). Thus, our sample consisted of 424 students.

3.1. Prevalence of IBS

32 out of 424 students included, met Rome IV criteria, representing an IBS prevalence of 7.55%.

3.2. Sociodemographic Characteristics

Among the 32 students with IBS, 24 (75%) were female or a sex ratio of 0.33. Their average age was 21.38 ± 2.39 years with the extremes of 17 and 27 years. The predominant age group was 22 - 24 years (43.75%). Thirty-one students (96.87%) were single and 25 (78.12%) were living in a rented house. **Table 1**

Table 1. Sociodemographic characteristics of medical students with IBS, Parakou, 2018 (n = 32).

	Number	Percentage
Gender		
Male	8	25
Female	24	75
Age		
≤18	5	15.62
[19 - 21]	11	34.38
[22 - 24]	14	43.75
[25 - 27]	2	6.25
Nationality		
Beninese	22	68.75
Foreign	10	31.25
Marital status		
Single	31	96.87
Living with a partner	1	3.13
Place of residence		
Rented	25	78.12
Family	5	15.63
University residence	2	6.25
Level of study		
1	14	43.75
2	2	6.25
3	2	6.25
4	4	12.50
5	2	6.25
6	5	15.62
7	3	9.38

summarizes the socio-demographic characteristics of students with IBS.

3.3. Clinical Characteristics

IBS-D, IBS-C, IBS-M and IBS-U were diagnosed respectively in 13 (40.62%), 9 (28.13%), 8 (25%) and 2 (6.25%) students.

In students with IBS, 22 (68.75%) had a normal body mass index (BMI), 8 (25%) were overweight, and 2 (6.25%) were obese.

In the present study, stress was present in 31 students (96.88%) with IBS. Ten (31.25%) had a definite anxiety state, 4 (12.50%) a depressive syndrome and 17 (53.13%) had reported sleep disorders. For 24 students (75%), the symptoms

occurred during a period of intense courses or exam preparation.

The symptoms experienced by these students impacted their lifestyle, such as absenteeism from classes in 18 cases (56.25%) and limitation of daily activities in 7 cases (21.87%).

Fourteen (43.75%) of the 32 students with IBS reported regular medication including nonsteroidal anti-inflammatory drugs in 50% of cases.

3.4. Lifestyle Data

In 32 students with IBS, 1 (3.12%) practiced regular physical activity, 6 (18.75%) took alcoholic beverages and 5 (15.63%) were smokers. Eighteen (56.25%) students reported a sleep duration greater than 8 hours per day.

3.5. Data Relating to the Medical Follow-Up

In this series, 8 students (25%) consulted a doctor for their symptoms, including 3 (37.5%) consultations with a medical specialist. Among the 24 students who had no consultation, 16 (83.33%) self-medicated.

As for those who received treatment (after a medical consultation or by self-medication), 83.33% of them reported a modern medical treatment. Antispasmodics were the most used symptomatic treatment (52.17%).

3.6. Factors Associated with IBS

In bivariate analysis, as shown in **Table 2**, there was a statistically significant association between female sex (p = 0.001; OR = 3.72), absence of overweight (p = 0.023; OR = 0.38), definite anxiety (p = 0.005; OR = 3.58), doubtful depression (p = 0.002, OR = 3.54) or definite depression (p = 0.015; OR = 4.39), sleep disorders (<0.001; OR = 3.97), smoking (p = 0.011; OR = 3.64) on the one hand and the presence of IBS on the other hand.

Factors statistically associated with the presence of IBS, in bivariate analysis, were included in a logistic regression model for multivariate analysis. It appears that female sex, doubtful depression and sleep disorders are the real factors associated with IBS in medical students at Parakou (**Table 3**).

4. Discussion

This study made it possible to know the prevalence of IBS in medical students at Parakou, to describe the profile of students with IBS and to identify the associated factors.

The results obtained in populations of medical students are mostly higher than ours. Indeed, according to Sehonou *et al.* [14] at Cotonou (Benin) in 2017; Hasosah *et al.* [15] in Saudi Arabia in 2017 and Atidi [12] in Morocco in 2016, the prevalences are 14%, 15.64% and 23.07%, respectively. The variability of sampling techniques (study population, sample size); the use of different diagnostic criteria (Rome IV in our study, different in other studies [12] [16]); socio-cultural habits of populations that differ from one region to another (academic

Table 2. Factors associated with IBS in medical students, in bivariate analysis, Parakou, 2018 (N = 424).

	IBS		Total	OR	CI 95%	*p*
	Yes	No				
Sex						0.001
Female	24	175	199	3.72	[1.63; 8.48]	
Male	8	217	225	1		
BMI						0.023
Normal						
Overweight	8	46	54	0.38	[0.16; 0.90]	
Obesity	2	12	14	0.40	[0.08; 1.88]	
Depression						0.002
Absent	17	317	334	1		
Doubtful	11	58	69	3.54	[1.58; 7.94]	
Definite	4	17	21	4.39	[1.33; 14.47]	
Anxiety						0.005
Absent	12	232	244	1		
Doubtful	10	106	116	1.82	[0.76; 4.25]	
Definite	10	54	64	3.58	[1.47; 8.72]	
Sleep disorders						<0.001
Yes	17	87	104	3.97	[1.91; 8.28]	
No	15	305	320	1		
Smoking						0.011
Yes	5	19	24	3.64	[1.26; 10.49]	
No	27	373	400	1		

environment, eating habits and level of stress) may explain these differences.

In the present study, the prevalence of IBS is significantly higher among female students. Our results are similar to those of Sehonou *et al.* [14] in Cotonou in 2017, Alaqeel *et al.* [3] in Saudi Arabia in 2016, and Basandra *et al.* [17] in India in 2014. Several studies have reported that women have a higher risk of having IBS than men; the relative risk varied from 2 to 4 [14] [17] [18] [19] [20]. In our work, female subjects were approximately four times more likely to have IBS than male subjects. The hypothesis that female sex hormones are a risk factor associated with the condition could explain this outcome [14] [19] [21].

In this study, the prevalence of IBS increased with the level of depression. In a meta-analysis, nine studies reported the prevalence of depression and anxiety in patients with IBS [22]. The prevalences of depression and anxiety in subjects with IBS were 36% and 44%, respectively. Considering IBS subgroups, the prevalences of depression in IBS-M, IBS-C, IBS-D, and IBS-U were 34%, 38%, 37%,

Table 3. Factors associated with IBS in medical students, in logistic regression, Parakou, 2018, (N = 424).

	IBS		Total	Oradjusted	CI 95%	*p*
	Yes	No				
Sex						0.022
Female	24	175	199	2.81	[1.16; 6.80]	
Male	8	217	225	1		
Sleep disorders						0.008
Yes	17	87	104	2.94		
No	15	305	320	1		
Dépression						0.021
Absent	17	317	334	1		
Doubtful	11	58	69	2.90	[1.17; 7.14]	
Definite	4	17	21	2.46	[0.65; 9.26]	

and 22%, respectively [22]. As for anxiety, the prevalences in IBS-M, IBS-C, IBS-D and IBS-U were 37%, 40%, 37% and 11% respectively [22].

In the present study, there was an association between IBS and depression; the risk of developing IBS increases approximately fourfold with levels of depression.

The prevalence of IBS is significantly higher among students with sleep disorders in this study. Our assessment of sleep disorders was subjective. However, our results are similar to those of Liu *et al.* [19] in China in 2014 who reported high Pittsburgh Sleep Quality Index (PSQI) scores in students with IBS unlike others, with a significant association between sleep disorders and IBS. Moreover, Cremonini *et al.* [23] in United States in 2006 showed that sleep disorders were associated with a higher risk of developing gastrointestinal symptoms.

There is an interaction between sleep disorders leading to an exacerbation of gastrointestinal symptoms and gastrointestinal pathologies that affect the sleep cycle [24].

Like any survey, our work has certain limitations: the symptoms of IBS being subjective, the data collected from students could therefore be subject to bias. Sleep disorders and stress were not assessed by a standardized score.

5. Conclusion

Irritable bowel syndrome (IBS) is a common condition in medical students at the University of Parakou. In fact, about 8 out of 100 students suffer from it. The students who meet Rome IV criteria were mostly female, single, not living with family, with a particular psychological profile (stress, anxiety, depression, sleep disorders). But in these students, the factors associated with IBS were female sex, the presence of a doubtful depressive state and sleep disorders. Support for better management of psychological disorders could improve their quality of life.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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