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Factors Associated with Irritable Bowel Syndrome (IBS) Among Students at Université des Montagnes in Cameroon: A Cross-Sectional Study

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ABSTRACT

Introduction: *Irritable Bowel Syndrome (IBS) is a common functional gastrointestinal disorder, with a significant impact on quality of life, particularly among young adults. The objective was to determine the prevalence and associated factors of IBS among students at Université des Montagnes (UdM), Cameroon.*

Methods: *A cross-sectional study was conducted from February to May 2024 among 450 students from the Banekane campus, UdM. The sampling method used was cluster sampling. The diagnosis of IBS was based on the Rome IV criteria. Data analysis was performed using SPSS 20.0 software. Associated factors were identified by multivariate logistic regression ($p < 0.05$).*

Results: *The prevalence of IBS was 17.6%. The IBS-C subtype was predominant (44%). Factors significantly associated with IBS included: regular alcohol consumption (OR = 1.79; 95% CI [1.08-2.9], p = 0.02), magnesium-rich diet (OR = 1.64; 95% CI [1-2.69], p = 0.049), probiotics (OR = 6.64; 95% CI [2.81-15.68], p < 0.001), and soluble fiber intake (OR = 1.46; 95% CI [1-2.69], p = 0.049).*

Conclusion: *IBS is common among UdM students. Specific diet and consumption habits may influence its onset. Nutritional awareness and early management are necessary.*

Keywords

IBS, ROME IV, Associated factors, Students, UdM.

Introduction

Irritable Bowel Syndrome (IBS) is a chronic functional gastrointestinal disorder characterized by abdominal pain associated with altered bowel habits without an identifiable organic cause. It affects up to 15% of the world's population, with a higher prevalence among young adults. Among students, factors such as stress, changes in lifestyle, and unbalanced eating habits can favor the onset of IBS.

The prevalence of IBS is approximately 4.4% to 4.8% in the United States [1], and in Europe and South America, it ranges from 10% to 15%. In Africa, studies have reported IBS frequencies of 14%, 13%, and 21%. While this pathology affects the general population, the literature reports a higher prevalence in the student population. For instance, two studies in Algeria reported a prevalence of 5.8% in the general population [2-4] compared to 31.2% in medical students [5].

Studies have identified risk factors for this digestive disorder, including stress, anxiety, sleep disorders, nocturnal awakenings and lack of physical exercise [2]. Students, facing enormous cognitive and emotional changes due to increasingly difficult studies and exams, thus form a risk group susceptible to developing Irritable Bowel Syndrome [2].

This study aimed to evaluate the prevalence of IBS among students at Université des Montagnes and to identify associated factors in order to propose adapted prevention strategies.

Methods

Study Type, Duration, and Location: this was an analytical cross-sectional study conducted from February to May 2024 on the Banekane campus of Université des Montagnes (UdM).

Study Population

The target population consisted of regularly enrolled students who provided informed consent. Students with an ongoing gastrointestinal or gynecological pathology were excluded. The sampling method used was cluster sampling. The diagnosis of IBS was based on the Rome IV criteria.

The dependent variable was Irritable Bowel Syndrome, which was diagnosed using the ROME IV criteria [3], defined by:

- Chronic abdominal pain (lasting more than 6 months) or occurring at least once per week during the last 3 months, combined with at least two of the following three elements:
- Pain related to defecation.
- Pain associated with a change in stool frequency.
- Pain associated with a change in stool appearance.

Independent variables included epidemiological and clinical data

Epidemiological Data:

- Age: This was calculated by subtracting the student's date of birth from the year of the study.
- Sex: This variable was presented with two categories, male and female.
- Faculty: This specified the faculty in which the student was regularly enrolled.
- Program of Study: This was the course of study the student was pursuing within the faculty. Six programs were distinguished: general medicine, dental Surgery, pharmacy, veterinary Medicine, medico-Sanitary Sciences, and engineering.
- Study Level: This specified the level of study. There was a total of seven levels, which were: bachelor 1, bachelor 2, bachelor 3, Master 1, Master 2, Doctorate 1, and Doctorate 2.

Clinical Data:

- Past medical history:
- Inflammatory Bowel Diseases (IBD): Refers to two entities (Ulcerative Colitis and Crohn's Disease) characterized by chronic abdominal pain associated with digestive bleeding, diagnosed by a gastroenterologist using an endoscope.
- Digestive Surgery: Defined as any surgical operation in the abdominal region.
- Intestinal Parasitosis: Manifestations included symptoms such as diarrhea, abdominal pain, and bloating. The diagnosis was confirmed through a stool examination performed in a laboratory.
- Gastroduodenal Ulcer: Diagnosed by a gastroenterologist using upper digestive endoscopy.
- Gynecological Conditions: Including metrorrhagia, dysmenorrhea or menstrual cycle disorders.
- Diet Type: Categorized by the intake of foods rich in spices (like chili pepper, white pepper, turmeric), magnesium (like banana, spinach, black beans), probiotics (like fermented yogurts, cheese, sauerkraut, fermented pickles), antioxidants (like strawberries, nuts, tea, and coffee), soluble fibers (like avocados, carrots, oranges).

• Clinical Signs:

Body Mass Index (BMI): BMI is a measure used to assess an individual's body size. It is calculated from body weight and height, and is used to categorize individuals according to body mass while considering the health risks associated with different weight levels. The BMI is calculated using the following formula: $BMI = Weight\ (kg)/ Height\ (m)^2$

BMI results are interpreted according to the World Health Organization (WHO) classification: Underweight: BMI < 18.5; Normal weight: BMI 18.5–24.9; Overweight: BMI 25–29.9; moderate obesity: BMI 30–34.9; severe obesity: BMI 35–39.9: morbid obesity: BMI ≥ 40.

Abdominal pain was considered chronic when it had been present for more than 6 months or occurred at least once per week during the previous 3 months.

- Diarrhea: stools were classified as loose with ragged edges (Bristol type 6) or watery (Bristol type 7).
- Constipation: stools were hard and lumpy with difficult evacuation (Bristol type 1) or firm, sausage-shaped, and nodular (Bristol type 2).
- Bloating: accumulation of gas in the intestines.
- Borborygmi: sounds produced by the movement of gas through the stomach or intestines.
- Flatulence: expulsion of foul-smelling gas through the anal canal.

Asthenia (fatigue) and anorexia (loss of appetite).

- Duration of symptoms: assessed in hours, measured from the onset of abdominal pain to the period of relief.

Types of Irritable Bowel Syndrom (IBS)

The Bristol stool scale and symptom duration were used to classify IBS into subtypes:

- IBS with predominant constipation (IBS-C): Bristol types 1–2 ≥ 25% of bowel movements in 50% of times and Bristol types 6–7 ≤ 25% of times; IBS with predominant diarrhea (IBS-D): Bristol types 6–7 ≥ 25% of times and Bristol types 1–2 ≤ 25% of times and Mixed IBS (IBS-M): Bristol types 1–2 ≥ 25% and Bristol types 6–7 ≥ 25% of bowel movements [5].

NB: Students who were unable to select one of the three preceding descriptions were classified as having Undifferentiated Irritable Bowel Syndrome.

Statistical Analysis

Data were collected using a self-administered questionnaire. Analyses were performed using SPSS version 20.0. Qualitative variables were expressed as counts and frequencies, whereas quantitative variables were expressed as means or medians. Logistic regression, conducted first in univariate and then in multivariate analyses, was used to identify associated factors. Statistical significance was set at $p < 0.05$ with a 95% confidence interval.

Results

A total of 450 students were included in this study. Table 1 presents the general characteristics of the study population. The mean age was 21.5 ±5 years, and females represented 64.7% of the participants. The general medicine program accounted for 57.8% of the cases, and the second year of the Bachelor's degree was the most frequent academic level, in 31.8%. A prior history of digestive parasitosis was reported by 19.8% of the students.

Table 1: General characteristics of the study population.

Variables	Value
Age (years)	21.5 ± 5
Sex (female)	N = 291/450 (64.7%)
Study program:	
- Medicine	N = 260/450 (57.8%)
- dental surgery	N = 61/450 (13.5%)
- Pharmacy	N = 42/450 (9.3%)
Study level: Bachelor 2	N = 143/450 (3188%)
Past medical history:	
- Intestinal Parasitosis	N = 89/450 (19.8%)
- Traditional Purge	N = 26/450 (5.8%)
Diet type:	
- Probiotics	N = 313/450 (89.4%)
- Spices	N = 287/450 (63.8%)
- Minerals	N = 228/450 (50.7%)
- soluble fibres	N = 228/450 (50.7%)
- Antioxidant	N = 149/450 (33.1%)
BMI:- Obese	N = 15/450 (3.3%)
- Overweight	N = 120/450 (26.7%)
Symptoms:	
Abdominale pain	N = 79/79 (100%)
Diarrhea	N = 37/79 (46.8%)
Constipation	N = 42/79 (53.2%)
Bloating	N = 56/79 (70.9%)
Flatulence	N = 41/79 (51.9%)
Stimulating factors: food	N = 48/79 (60.8%)
Aggravating factors: Stress	N = 32/79 (40.5%)

Regarding dietary habits, consumption of probiotics (89.4%), spices (63.8%), and soluble fiber (50.7%) were observed. Overweight students represented 26.7% of the cases. Diarrhea and constipation were present in 46.8% and 53.2% of the students respectively.

The prevalence of Irritable Bowel Syndrome (IBS) was 17.6% (Table 2). The subtypes IBS-D and IBS-C were present in 42% and 44% of the students respectively (Figure 1).

Table 2: Prevalence of IBS.

IBS N= 450	Male N (%)	Female N (%)	Total N (%)
Yes	21 (4.7)	58 (12.9)	**79 (17.6)**
No	138 (30.7)	233 (51.7)	371 (82.4)

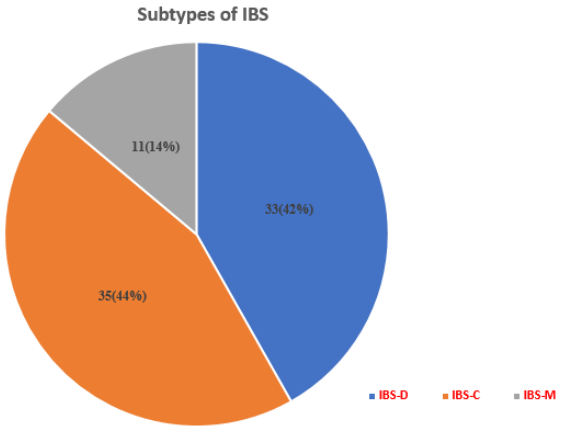

Figure 1: Distribution of IBS subtypes.

Factors associated with IBS (Table 3) were alcohol consumption (OR = 1.79; 95 CI [1.08-2.9], p=0.02), a diet rich in magnesium (OR=1.64; 95% CI [1-2.69], p=0.049), probiotic consumption (OR=6.64; 95% CI [2.81-15.68], p < 0.001), and a diet rich in soluble fiber OR=1.46; 95% CI [1-2.69], p=0.049).

Table 3: Factors associated with IBS.

	YES (IBS+)		NO (IBS-)			
	N	%	N	%	P-value	Ajusted OR [CI=95%]
Alcohol	49	62	177	47.7	**0.02**	1.9 [1.08-2.9]
Minerals (Magnésium)	48	60.8	180	48.5	**0.049**	1.64 [1-2.69]
Probiotics	73	92.4	240	64.7	**<0.001**	6.64 [2.81-15.68]
Soluble Fiber	48	60.8	180	48.5	**0.049**	1.46 [1-2.69]

Discussion

Using the ROME IV criteria for diagnosis, the prevalence of IBS in students at the Université des montagnes (UdM) was 17.55%. This prevalence was slightly higher than that found by Sehonou et al. [6], which was 14% (Rome IV) among medical students at the Cotonou Faculty of Health Sciences. It was even higher than the 11.9% reported by Sehonou and Amahoni [7] among students at the University of Abomey-Calavi. However, our prevalence is lower than that reported in a Nigerian university [8], which was 26.1% using the ROME II criteria.

Internationally, our prevalence is similar to the 18.1% reported by Gulewitsch et al. [9] in Germany, who used the ROME III criteria. We also note different results internationally: 10.05% in a Colombian university [10]; 12.4% in a medical university in Lima, Peru [11] and 13.7% among medical students at Qassim University in Saudi Arabia [12], all using ROME III criteria, and 12.6% at Gilan University of Medical Sciences in Iran (Rome II) [13].

The differences in prevalence can be explained by several factors: Firstly, the methodology adopted by these studies differed from ours, resulting in varying sample sizes and sampling methods. Secondly, socioeconomic factors differ across the world, contributing to the observed prevalence differences by modifying dietary habits and the psychology of the inhabitants. Furthermore, our diagnostic method used the ROME IV criteria, which was not the case for many of these comparison studies. Finally, various biases inherent in the different studies contribute to the observed variation in prevalence.

We found an association between alcohol consumption and the occurrence of IBS symptoms ($p=0.022$; OR=1.790; 95% CI [1.088-2.945]). Song et al. [14] in Korea also found an association between IBS and alcohol consumption.

This study revealed several associations between IBS and specific dietary habits:

- An association was found between IBS and a diet rich in minerals, specifically magnesium ($p=0.049$; RR=1.643; 95% CI [1.001-2.696]). Therefore, students with a diet rich in minerals were 1.6 times more likely to develop IBS than others. An association also existed between IBS and a probiotic-rich diet ($p < 0.001$; RR=6.641; 95% CI [2.813-15.681]). This suggests that a student who regularly consumes probiotics has a 6.6 times higher chance of developing IBS compared to another student. Finally, an association was found between the consumption of foods rich in soluble fiber and the occurrence of IBS ($p=0.049$; RR=1.643; 95% CI [1.001-2.696]).

According to Sehonou and Amahoni. [7] and Chang et al. [15], gas-producing foods exacerbate IBS symptoms. Sehonou et al. [6] and Basandra et al. [16] found that the consumption of high-fat foods is a risk factor for IBS. In Korea, Song et al. [14] demonstrated a link between the consumption of fatty or salty foods and IBS.

In contrast to our study, which found no link between regular spice consumption and IBS, Esmaillzadeh et al. [17] established that regular spice consumption increases the risk of IBS in women. However, other studies have found no link between IBS and dietary habits. For example, Ibrahim et al. [18] and Tan et al. [19] showed that the consumption of spices and fiber in Malaysia did not affect IBS prevalence. Dong et al. [16] also reported that IBS is not linked to the consumption of dairy products or ice cream.

In conclusion, several elements suggest a link between IBS and diet, such as an increase in symptoms after meals or an intolerance to certain foods. However, the poor methodological quality and variable results of the studies complicate any definitive conclusion.

The limitations of this study include the bias associated with the self-administered questionnaire and the geographic restriction to a single campus. Nevertheless, the data collected provide a solid foundation for targeted prevention campaigns in the university setting.

Conclusion

Irritable Bowel Syndrome is frequent among students at the Université des Montagnes. Dietary factors and lifestyle habits appear to influence its onset. Improved nutritional education and targeted interventions could help reduce its prevalence and enhance student's quality of life.

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