

# Prevalence of Irritable Bowel Syndrome, Psychological Ill-Health and Health-Seeking Behavior in a Population of Nigerian Medical Students

## ABSTRACT

**Background:** Irritable bowel syndrome is a functional gastrointestinal disorder with considerable morbidity and profound negative impact on quality of life. It has been observed that patients with psychological disturbances relate more frequently with the symptoms of irritable bowel syndrome (IBS) and they have more debilitating illness than control populations. We examined the prevalence of irritable bowel syndrome among a population of Nigerian medical students and the association between it and two common psychological conditions (anxiety and depression).

**Methods:** In a descriptive cross-sectional study, we enrolled 321 consenting medical students aged 20 years and above. A 34-item self-reporting questionnaire consisting of sociodemographic data, the Rome III irritable bowel syndrome questionnaire, the Hospital Anxiety and Depression Scale and two IBS-related health-seeking behavior questions was administered to the participants. Statistical analysis was done with the IBM-Statistical Package for Social Sciences (SPSS), version 20.

**Results:** A total of 320 participants were included in the analyses. The median (range) age of the participants was 25 (20-50) year. The prevalence of IBS among the medical students was 14.4%, IBS-M was the predominant subtype (58.7%). IBS had a significant relationship with the female gender [OR =2.19 (95% CI, 1.14 – 4.22), P =0.019] and anxiety [OR 1.18 (95% CI, 1.06-1.32), P =0.003]. Other risk factors considered showed no significant association with the disease. Depression was significantly associated with positive health-seeking behavior among the participants with IBS [OR = 8.89(95% CI, 1.66 - 47.51), P<0.001].

**Conclusion:** IBS is moderately prevalent among our study population and it is positively associated with the female gender and anxiety.

**Keywords:** Irritable Bowel Syndrome, Health Seeking Behavior, Anxiety and Depression, Medical Students, Nigeria

## 1. INTRODUCTION

Irritable bowel syndrome (IBS) is a functional gastrointestinal disorder (FGID) that is characterized by recurrent abdominal pain or discomfort and a change in bowel habit in the absence of any demonstrable organic pathology.<sup>1,2</sup>

IBS represents a socioeconomic burden to the individual and the society as it adversely affects the quality of life and the socio-economic value of the patient through increased morbidity, medical consultation rate, healthcare cost and work absenteeism.<sup>3,4</sup> The prevalence of IBS within the community ranges from 10% to 25%.<sup>5</sup> A metanalysis yielded a pooled global prevalence rate of 11.2% for IBS with significant differences in prevalence between geographic regions.<sup>6</sup> Just like the prevalence of IBS in the in the community, there is a wide variation in the prevalence of IBS among medical students from one region of the world to another. A review by Ibrahim showed a prevalence range of 9.3% to 35.5% for IBS among medical students.<sup>7</sup>

It has been observed that patients with psychological disturbances are more predisposed to having symptoms of IBS and they have more debilitating illness than control populations.<sup>8-10</sup> Individuals with IBS who seek medical care tend to have a higher incidence of anxiety disorder, panic disorder, major depression, and hypochondriasis than control populations.<sup>9-11</sup> It is, however, not clear whether these psychopathologies provoke the development of IBS or vice versa.<sup>12</sup>

31 Several instruments like the Hospital Anxiety and Depression Scale (HADS) are available for  
 32 assessing levels of anxiety and depression in patients in non-psychiatric settings and primary care  
 33 clinics.<sup>13</sup> The HADS, which was developed by Zigmond and Snaith in 1983 has been validated by  
 34 several studies that showed good case-finding properties for anxiety and depression.<sup>14-18</sup> A review by  
 35 Bjelland et al. showed that the HADS generally performs well in assessing “caseness” and symptom  
 36 severity of anxiety disorders and depression when “caseness” was defined by a score of  $\geq 8$  on both  
 37 the anxiety and depression subscales.<sup>19</sup> The instrument has also been validated in Nigeria and the  
 38 optimum cut-off points for both subscales were found to be a score of 8.<sup>20</sup>

39 In Nigeria, the prevalence of IBS ranges from 8.6% to 45.2%.<sup>21-27</sup> The studies were conducted among  
 40 different population groups with the use of different diagnostic instruments. Only two studies have  
 41 tested the association between IBS and a psychological condition (depression).<sup>23,27</sup> However, none of  
 42 the studies tested the relationship between IBS and anxiety.

43 This study, therefore, examined the prevalence of IBS, IBS association with two common  
 44 psychological conditions (anxiety and depression), IBS-related health-seeking behavior and health-  
 45 seeking behavior in relation to anxiety and depression among individuals with IBS in a population of  
 46 Nigerian medical students.

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## 48 **2. MATERIAL AND METHODS**

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### 50 **2.1 Population and study design**

51 The study was a descriptive cross-sectional survey conducted between October 2015 and  
 52 March 2016. The study population consisted of 321 consenting apparently healthy clinical  
 53 students aged 20 to 50 years of the Ladoké Akintola University of Technology (LAUTECH),  
 54 Ogbomosho Medical School. The LAUTECH, Ogbomosho student population consists majorly of young  
 55 men and women from the southwest geopolitical zone of Nigeria and a minority from other regions of  
 56 the country.

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### 58 **2.2 Research instruments and data collection**

59 A 34-item composite self-reporting questionnaire consisting of socio-demographic variables  
 60 (8 items), the Rome III IBS questionnaire (10 items), the Hospital Anxiety and Depression  
 61 Scale (14 items) and IBS-related health-seeking behavior (2 items) was used. A convenience  
 62 sampling method was used. The questionnaire was filled by participants in the classrooms after a  
 63 brief introduction of the research subject by the principal investigator. It took about 10 minutes on the  
 64 average to complete the questionnaire.

#### 65 **2.2.1 Irritable Bowel Syndrome's (IBS) Definition and Assessment**

66 Diagnosis of IBS was made with the Rome III IBS criteria.<sup>2</sup> The Rome III IBS modular questionnaire  
 67 was used.

68 IBS is defined by the questionnaire as:

69 Recurrent abdominal pain or discomfort at least 2-3 days/month in the last 3 months associated with  
 70 two or more of:

71 1. Improvement with defecation

72 • Pain or discomfort gets better after bowel movement at least sometimes

73 2. Onset of pain/discomfort associated with a change in frequency of stool

74 • Onset of pain or discomfort associated with more stools at least sometimes, OR

75 • Onset of pain or discomfort associated with fewer stools at least sometimes

76 3. Onset associated with a change in form (appearance) of stool

77 • Onset of pain or discomfort associated with looser stools at least sometimes, OR

78 • Onset of pain or discomfort associated with harder stools at least sometimes

79 \*Criteria fulfilled for the last 3 months with symptom onset at least 6 months prior to diagnosis.

80 Irritable bowel syndrome is further classified into four subgroups by Rome III: the Constipation-  
 81 predominant IBS (IBS-C), the Diarrhea-predominant IBS (IBS-D), the Mixed constipation and diarrhea  
 82 IBS (IBS-M), and the Un-subtyped IBS (IBS-U).

83 The diagnosis of IBS can be reasonably made using the Rome IBS criteria as long as the individual  
 84 does not have “red-flag” symptoms like drastic weight loss, a history of organic bowel disease, a  
 85 history of digestive surgery, bloody stool, night awakening due to abdominal pain, anemia, fever or  
 86 arthralgia.<sup>28,29</sup>

87 **2.2.2 Assessment of Psychological Conditions (anxiety and depression)**

88 We assessed anxiety and depression in the participants with the Hospital Anxiety and  
 89 Depression Scale.

90 The HADS is a self-reporting questionnaire comprising 14 four-point scale items made of seven (7)  
 91 items for anxiety subset (HADS-A) and seven (7) items for depression subset (HADS-D). Each item  
 92 has a score of 0-3 with the lowest total score of zero and the highest total score of 21 for each subset.  
 93 A score between 0-7 indicates normal (no mood disorder), 8-10 indicates a borderline case and 11-21  
 94 abnormal case (clinically significant anxiety or depression).

95 **2.2.3 Assessment of IBS-Related Health-Seeking Behavior**

96 The study participants were asked two questions in order to elicit IBS-Related Health-Seeking  
 97 behavior from them. The first question asked whether they have been diagnosed of  
 98 IBS by a doctor in the past, to which they were to answer “Yes’ or “No”. The second  
 99 question asked if the participants sought medical consultation(s) in the last 6 months because of  
 100 recurrent lower abdominal pain/discomfort that was associated with diarrhea or  
 101 constipation (recent medical consultation suggestive of IBS), to which they were to answer  
 102 “Yes’ or “No”. Participants who met the Rome III criteria for IBS, who also answered “Yes”  
 103 to either or both questions were regarded as having appropriate IBS-Related Health-Seeking  
 104 Behavior.

105 **2.3 Data analyses**

106 Data analyses was done with the IBM-Statistical Package for Social Sciences (SPSS), version 20.  
 107 Continuous variables were presented as median or range. Categorical variables were expressed as  
 108 frequencies and percentages. Univariate analysis was initially done to determine the unadjusted odds  
 109 ratios of the possible risk factors of IBS. Adjustment for potential confounders through multivariate  
 110 logistic regression analysis was done for the risk factors that were found significant during univariate  
 111 analysis. Variables with  $p < 0.05$  were considered significant.

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113 **3. RESULTS**

114 Of the 321 participants, one was excluded from data analyses because of incomplete data entry. The  
 115 results of the remaining 320 (99.7%) participants are here presented. The median (range) age of the  
 116 participants was 25 (20-50) year [Table 1]. Two hundred and ten participants (65.6%) were males. In  
 117 regard to the marital status of the participants, 274 (91.2%) were single while the others were married.  
 118 One hundred and thirty-eight (43.1%) participants consumed coffee, 41 (12.8%) consumed alcohol  
 119 and 5 (1.6%) smoked cigarettes.

120 Forty-six out of the 320 (14.4%) study participants had IBS [Table 1]. Of the 46 with IBS, 27 (58.7%)  
 121 had IBS-M subtype, 9 (19.6%) had IBS-D, 8 (17.4%) had IBS-C and 2 (4.3%) had IBS-U. With respect  
 122 to psychological ill-health, 50 (15.6%) participants had anxiety, 30 (9.4%) of which was borderline  
 123 (maximum score 8-10) and 20 (6.3%) was clinically significant (maximum score >10) [Table 1].  
 124 Twenty-one (7.5%) of the respondents had depression, 17 of which was borderline while 7 was  
 125 clinically significant.

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128 **Table 1: Sociodemographic variables and Psychological Ill-Health among Study**  
 129 **participants**

Variable	Total N =320	IBS n=46	No-IBS N= 274
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Age [ Median (range)]	25 (20-50)	24 (22-28)	26 (20-50)
Age group [n (%)]			
20 – 29	276(86.2)	43(93.5)	233(85.0)
>29	44(13.8)	3(6.5)	41(15.0)
Gender [n (%)]			
Male	210 (65.6)	21 (45.7)	189 (69.0)
Female	110 (34.4)	25(54.3)	85 (31.0)
Marital Status [n (%)]			
Single	274 (91.2)	43 (93.5)	249 (90.9)
Married	46 (8.8)	3 (6.5)	25 (9.1)
Smoking [n (%)]			
No	315 (98.4)	46 (100)	269 (98.2)
Yes	5 (1.6)	0 (0.0)	5 (1.8)
Alcohol [n (%)]			
No	279 (87.2)	43 (93.5)	236 86.1)
Yes	41(12.8)	3 (6.5)	38(13.9)
Coffee [n (%)]			
No	182 (56.9)	22 (47.8)	160 (58.4)
Yes	138 (43.1)	24 (52.2)	114 (41.6)
Anxiety [ Median (range)]	3 (0-18)	6 (0-18)	3 (0-16)
Anxiety [n (%)]			
0-7	270(84.3)	31 (67.4)	239 (87.2)
8-10	30(9.4)	8 (17.4)	22 (8.0)
>10	20(6.3)	7 (15.2)	13 (4.8)
Depression [ Median (range)]	2 (0-14)]	3(0-12)	2(0-14)
Depression [n (%)]			
0-7	296(92.5)	38 (82.6)	258 (94.1)
8-10	17(5.3)	7 (15.2)	10 (3.7)
>10	7(2.2)	1(2.2)	6 (2.2)

IBS: Irritable bowel syndrome; OR: Odds Ratio

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131 On univariate analysis, the factors associated with IBS were the female gender [OR =2.66 (95% CI,  
132 1.40 - 4.99), P = 0.003], anxiety [OR = 1.18 (95% CI, 1.09 – 1.28), P = <0.001] and depression [OR =  
133 1.12 (95% CI,1.01 -1.23), P = 0.023] [Table 2]. However, on multivariate analysis the female gender  
134 [OR =2.19 (95% CI, 1.14 – 4.22), P =0.019] and anxiety [OR 1.18 (95% CI, 1.06-1.32), P =0.003]  
135 were associated with IBS [Table 2].

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**Table 2: Unadjusted and adjusted odds ratios of risk factors for IBS**

Variable	Total N =320	IBS n=46	No-IBS N= 274	Unadjusted OR	P-value	Adjusted OR	P- value
Age [ Median (range)]	25 (20-50)	24 (22-28)	26 (20-50)	0.91(0.81-1.01)	0.086		
Gender [n (%)]					0.003		0.019
Male	210 (65.6)	21 (45.7)	189 (69.0)	1(Reference)		1(Reference)	
Female	110 (34.4)	25(54.3)	85 (31.0)	2.65(1.40-4.99)		2.19(1.14-4.22)	
Marital Status [n (%)]					0.565		
Single	274 (91.2)	43 (93.5)	249 (90.9)	1(Reference)			
Married	46 (8.8)	3 (6.5)	25 (9.1)	0.70(0.20-2.40)			
Smoking [n (%)]					0.999		
No	315 (98.4)	46 (100)	269 (98.2)	1(Reference)			
Yes	5 (1.6)	0 (0.0)	5 (1.8)	0.00			
Alcohol [n (%)]					0.179		
No	279 (87.2)	43 (93.5)	236 86.1)	1(Reference)			
Yes	41(12.8)	3 (6.5)	38(13.9)	0.43(0.13-1.47)			
Coffee [n (%)]					1.183		
No	182 (56.9)	22 (47.8)	160 (58.4)	1.53(0.82-2.86)			
Yes	138 (43.1)	24 (52.2)	114 (41.6)				
Anxiety [ Median (range)]	3 (0-18)	6 (0-18)	3 (0-16)	1.18(1.09-1.28)	<0.001	1.18(1.06-132)	0.003
Depression [ Median	2 (0-14)]	3(0-12)	2(0-14)	1.12(1.01-1.23)	0.028	0.97(0.85-1.11)	0.654

(range)]

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*IBS: Irritable bowel syndrome; OR: Odds Ratio* Results should be clearly described in a concise manner. Results for different parameters should be described under subheadings or in separate paragraph. Table or figure numbers should be mentioned in parentheses for better understanding.

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Table 3 shows the IBS-related health-seeking behavior among the study participants. Only 2 of the 7 participants who had been previously diagnosed with IBS by a doctor satisfied the Rome III IBS criteria in this study and relationship was not significant ( $p = 0.265$ ). Twenty participants had sought medical consultation(s) in the last 6 months because of recurrent lower abdominal pain or discomfort that was associated with diarrhea or constipation (recent medical consultation because of symptoms suggestive of IBS). Among these, 10 (50%) satisfied the Rome III IBS criteria and the relationship was significant ( $p < 0.001$ ). In all, 25 participants had either been previously diagnosed with IBS by a doctor or had recent medical consultation because of symptoms suggestive of IBS (total number with IBS symptoms related medical consultation). Among these, 11 (44%) were diagnosed with IBS with the Rome III criteria in this study and the relationship was significant ( $p < 0.001$ ). Hence, 11(23.9%) participants sought medical attention among the 46 participants who had IBS.

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**Table 3: IBS-Related Health-seeking behavior among participants (n =320)**

Variable	Total (%) 320 (100)	IBS (%) 46 (14.4)	Non-IBS (%) 274 (85.6)	Odds ratio	P-value
Known IBS patient					0.265
No	313 (97.8)	44 (95.7)	269 (98.2)	1 (Reference)	
Yes	7 (2.2)	2 (4.3)	5(1.8)	0.00	
Recent Med. Consultation <sup>†</sup>					<0.001
No	300 (93.8)	36 (78.3)	264 (96.3)	1 (Reference)	
Yes	20 (6.2)	10 (21.7)	10 (3.7)	7.33(2.86-18.83)	
Total Med Consultation <sup>‡</sup>					<0.001
No	295 (92.2)	35 (76.1)	260 (94.9)	1 (Reference)	
Yes	25 (7.8)	11(23.9)	14 (5.1)	5.84(2.46-13.86)	

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*IBS: irritable bowel syndrome, <sup>†</sup>Fisher Exact Test; <sup>‡</sup>Medical consultation in the last 6 months because of symptoms suggestive of IBS; <sup>‡</sup>Total possible IBS-related medical consultation (combined known IBS and recent medical consultation)*

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Table 4 depicts the health-seeking behavior in relation to Anxiety and Depression among participants with IBS. Among participants with IBS, those without anxiety frequently consulted a doctor compared to those with anxiety (60 vs 40%,  $p = 0.1$ ) but this was not significant. In contrast to this, those with depression frequently consulted a doctor than those without depression (62.5 vs 37.5%,  $p < 0.001$ ) and the relationship was significant.

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**Table 4: Health-seeking Behavior with Anxiety and Depression among participants with Irritable Bowel Syndrome (n = 46)**

HADS <sup>*</sup>	Medical Consultation		Odds Ratio	P value
	Yes (n=11)	No (n=33)		
Anxiety				0.084
No (n =31)	5 (16.1)	26 (83.9)	1 (Reference)	
Yes (n =15)	6 (40.0)	9 (60.0)	3.47(0.85 -14.17)	
Depression				<0.0001
No (n =38)	6 (15.8)	32 (84.2)	1(Reference)	
Yes (n =8)	5 (62.5)	3 (37.5)	8.89(1.66 - 47.51)	

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<sup>\*</sup>Hospital Anxiety and Depression Scale

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#### 4. DISCUSSION

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The prevalence of IBS varies greatly from one region of the world to another and from one population subgroups to the other. Variation also exists within the same country even when the same diagnostic criteria were used.<sup>6,30</sup> We obtained a prevalence of 14.4% among the population of medical students we surveyed. This falls within the prevalence range obtained from previous studies among medical students around the world (9.3% to 35.5%).<sup>7</sup> The wide IBS

172 prevalence disparities observed across the world may be a reflection of the variation in the prevailing  
173 local risk factors, the study design and the type of survey instrument used in conducting the studies.<sup>5</sup>  
174 The Manning criteria have been shown to account for the highest reported prevalence of IBS whilst  
175 the Rome iterations are associated with lower prevalence estimates.<sup>5,31</sup> Olubuyide et al., in 1995  
176 obtained a prevalence of 43.5% in the first IBS study conducted among medical students in Nigeria  
177 with the Manning criteria.<sup>25</sup> A study conducted by Okeke et al. among a combination of medical  
178 students and medical laboratory technology students in northcentral Nigeria in 2005 with the use of  
179 the Rome II IBS questionnaire obtained a prevalence of 26.4%.<sup>23</sup> The observed prevalence disparities  
180 in the previous Nigerian studies and ours could be explained by reasons already stated above. We  
181 used a different instrument apart from the ones used in the previous Nigerian studies. Our study was  
182 also conducted in another region of the country (southwestern region) in contrast to some of the cited  
183 Nigerian studies.

184 We found the IBS-M subtype (58.7%) to be predominant among our study population.  
185 Whereas Okeke et al. previously found IBS-A (IBS with alternating diarrhea and  
186 constipation) as the predominant subtype with the Rome II criteria in a community study in  
187 northcentral Nigeria; Ladep et al. found IBS-C as the predominant subtype in a hospital  
188 patient population with the same instrument and in the same geographical location as the  
189 former. While Dong et al. found IBS-C as the predominant subtype among college students  
190 with the Rome III criteria in northern China, Liu et al. found IBS-M as the predominant  
191 subtype with the same instrument in Beijing, China. It has been established that the pattern  
192 and prevalence of IBS subtypes differ within the same country, from country to country and  
193 from study to study.<sup>6</sup> The geographical location, the established bowel habits of the  
194 population and the diagnostic instrument used seem to influence these.<sup>32</sup>

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196 In regard to gender distribution, our study showed IBS to be more associated with the female  
197 gender (54.3%) as compared to the male (45.7%) and this was statistically significant ( $p = 0.019$ ).  
198 Gender difference in IBS prevalence is well established. Drossman et al. noted that the Female/Male  
199 ratio of IBS could be as high as 2:1,<sup>33</sup> although others researchers have reported a rather lower  
200 ratio.<sup>34</sup> In most populations, women tend to report more IBS symptoms than men irrespective of the  
201 diagnostic criteria employed.<sup>5-7,35</sup> This gender difference in the prevalence of IBS could be due to  
202 differences in gender-related illness perception and health-seeking behavior. It could also be due to  
203 gender-related physiologic and psychological differences.<sup>36</sup>

204 In the present study, both anxiety and depression were significantly associated with IBS on univariate  
205 analysis, although depression did not sustain the significance on multivariate analysis. Two previous  
206 studies conducted in Nigeria showed positive associations between depression and IBS on univariate  
207 analysis, though the studies neither considered anxiety nor conducted multivariate analysis to  
208 eliminate the effect of possible confounders. Our findings are in tandem with several studies  
209 conducted both at the community level and among medical students that found positive association  
210 between psychological factors (anxiety, depression and stress).<sup>5,7,37</sup> A review of literature showed  
211 more than one-half of all patients with IBS reported depression or anxiety and such individuals  
212 experience more severe somatic symptoms.<sup>5</sup>

213 We observed that 11 (23.9%) of the 46 participants with IBS had sought medical attention.  
214 The proportion of individuals with IBS in the community that has sought medical attention  
215 varies widely from country to country and from study to study but an average of 30% seek  
216 medical attention because of their symptoms.<sup>5</sup> Olubuyide et al., two decades ago observed  
217 that about two-thirds of medical students with IBS had sought medical advice during the  
218 study period and the consultation behavior was influenced by factors such as the presence of other  
219 symptoms.<sup>25</sup> Although our current finding is close to the global average of 30%, it may suggest a poor  
220 health-seeking behavior among the study population since they were medical students who ought to  
221 pay prompt attention to their health. It may be a reflection of poor illness perception in the participants'  
222 environment such that majority of those who suffer from IBS do not see it as diseases state. Another  
223 possibility is that some of the participants with IBS may have self-medicated since they have some  
224 knowledge in this regard.

225 Only 18.2% of the IBS subjects who sought medical attention were previously diagnosed  
226 with IBS by doctors. This may suggest a low IBS index of suspicion among Nigerian doctors.  
227 Despite that a community-based study conducted in the northcentral part of Nigeria showed  
228 IBS to be relatively common in the community,<sup>22</sup> a previous survey of Nigerian physicians  
229 confirms the rarity of hospital diagnosis of IBS in that 83.3% of the Specialist Physicians

230 interviewed make the diagnosis of IBS “rarely”.<sup>38</sup> We posit that those who sought medical  
231 attention because of lower abdominal pain with diarrhea and/or constipation but did not fulfill  
232 Rome III criteria for IBS may have had alternate diagnoses like gastroenteritis or functional  
233 constipation while those who were previously diagnosed with IBS by physicians but did not  
234 fulfill the diagnostic criteria may have had symptoms amelioration due to the treatment they have  
235 received.

236 Our study showed that there was a positive association between depression and seeking for  
237 medical consultation among participants with IBS, although we did not find similar  
238 association among participants with anxiety and IBS. It has been previously observed that  
239 individuals with IBS who seek medical care tend to have higher incidence of depression,  
240 anxiety disorder, panic disorder, and hypochondriasis than control populations.<sup>8–11,39</sup>

241 The strength of this study lies in three aspects which to the best of our knowledge have not been  
242 explored in regard to IBS in Nigeria: that we evaluated the association between anxiety and IBS in  
243 addition to depression, that we conducted a logistic regression analysis to  
244 eliminate the effects of confounders on the association between IBS and the psychological  
245 conditions, and that we tested the association between the psychological conditions and the health-  
246 seeking behavior among participants with IBS. The limitations of this study lie in the fact that our study  
247 population consisted of only medical students who are knowledgeable about IBS. Hence, the findings  
248 may not absolutely represent what obtains in the general populace. Although we could not perform  
249 colonoscopy on those who fulfilled the criteria for IBS to eliminate a differential of IBS like early  
250 inflammatory bowel diseases (IBD), it is important to note that IBD is a rare disease in sub-Saharan  
251 Africa<sup>40</sup> and Nigeria in particular.<sup>41</sup>

252

## 253 5. CONCLUSION

254 Our study shows that IBS was moderately prevalent among the medical student population  
255 we studied, IBS-M was the predominant subtype, the female gender and anxiety were significantly  
256 risk factors for IBS while depression was significantly associated with health-seeking behavior among  
257 the participants with IBS. Further research in the community is needed to test the association between  
258 IBS and psychological disorders in Nigeria.

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## 260 CONSENT

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262 Written informed consent was obtained from all participants.

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## 264 ETHICAL APPROVAL

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266 Ethical approval was obtained from the ethics review committee of the LAUTECH Teaching Hospital,  
267 Ogbomoso. The study was performed in accordance with the ethical standards laid down in the 1964  
268 Declaration of Helsinki.

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