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

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Authors' contributions

This was a collaborative work between all the authors. Author ACJ designed the study, wrote the protocol, performed the statistical analysis and wrote the first draft of the manuscript. Authors OA and PBA participated in the design of the study and reviewed the protocol and the manuscript. All the authors read and approved the final manuscript.

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ABSTRACT

Background: Irritable bowel syndrome (IBS) 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 IBS, and they have more debilitating illness than control populations. We examined the prevalence of IBS among

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a population of Nigerian medical students and its association with two common psychological conditions (anxiety and depression).

Methods: In a descriptive cross-sectional study, we enrolled 321 consenting medical students aged 20 to 50 years. A 34-item self-reporting questionnaire consisting of sociodemographic data, the Rome III IBS questionnaire, the Hospital Anxiety and Depression Scale and two IBS-related health-seeking behaviour 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 mean age of the participants was 26.3 ±4.1 years. The prevalence of IBS among the medical students was 14.4%, and 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]. The disease showed no significant association with other risk factors considered. IBS health-seeking behaviour was significantly associated with depression [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 characterised by recurrent abdominal pain or discomfort and a change in bowel habit in the absence of any demonstrable organic pathology [1].

IBS represents a socioeconomic burden on the individual and the society as it adversely affects the quality of life and the socioeconomic value of the patient through increased morbidity, medical consultation rate, healthcare cost and work absenteeism [2,3]. The prevalence of IBS within the community ranges from 10% to 25% [4]. A metanalysis yielded a pooled global prevalence rate of 11.2% for IBS with significant differences in prevalence between geographic regions [5]. Just like the prevalence of IBS 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 [6].

It has been observed that patients with psychological disturbances are more predisposed to symptoms of IBS and debilitating illness than control populations [7-9]. 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 [8-10]. It is, however, not clear whether these psychopathologies provoke the development of IBS or vice versa [7].

Several instruments like the Hospital Anxiety and Depression Scale (HADS) are available for assessing levels of anxiety and depression in patients in non-psychiatric settings and primary care clinics [11]. The HADS, which was developed by Zigmond and Snaith in 1983, has been validated by several studies that showed good case-finding properties for anxiety and depression. Bjelland et al. performed a review of 747 identified publications that used HADS which showed that the HADS performs well in assessing “caseness” and symptom severity of anxiety disorders and depression when “caseness” was defined by a score of ≥8 on both the anxiety and depression subscales [12]. The instrument has also been validated in Nigeria, and the optimum cut-off points for both subscales were found to be a score of 8 [13].

In Nigeria, the prevalence of IBS ranges from 8.6% to 45.2% [14-20]. These studies were conducted among different population groups with different diagnostic instruments. Only two of the studies tested IBS’ association with a psychological condition (depression) [16,19]. However, none of the studies tested IBS’ relationship with anxiety.

This study, therefore, examined the prevalence of IBS, IBS’ association with two common psychological conditions (anxiety and depression), and IBS-related health-seeking behaviour in a population of Nigerian medical students.

2. MATERIALS AND METHODS

2.1 Study Design and Population

The study was a descriptive cross-sectional survey conducted between October 2015 and March 2016. It was conducted among students in the clinical section of the Ladoke Akintola University of Technology (LAUTECH), Ogbomoso, medical school. These consisted of 321 consenting apparently healthy male and female students aged 20 to 50 years. The LAUTECH, Ogbomoso student population consists mainly of young men and women from the Southwest geopolitical zone of Nigeria and a minority from other regions of the country. There were four sets of clinical students with a total number of 369 at the time of the study.

2.2 Sample Size Determination

With using the Leslie-Fisher's formula and a proportion of 26.1% gotten from a previous study that evaluated the prevalence of IBS with the Rome II criteria among a university student population in another part of Nigeria, the calculated the sample size was 292.[23] Additional 10% (29 subjects) was added to take care of improperly filled questionnaires, making a total of 321 subjects.

2.3 Research Instruments and Data Collection

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

2.3.1 Irritable Bowel Syndrome's (IBS) definition and assessment

Diagnosis of IBS was made with the Rome III IBS criteria.[1] The Rome III IBS modular questionnaire was used.

IBS is defined by the questionnaire as:

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

1. Improvement with defecation
   - Pain or discomfort gets better after bowel movement at least sometimes
2. Onset of pain/discomfort associated with a change in frequency of stool
   - Onset of pain or discomfort associated with more stools at least sometimes, OR
   - Onset of pain or discomfort associated with fewer stools at least sometimes
3. Onset associated with a change in form (appearance) of stool
   - Onset of pain or discomfort associated with looser stools at least sometimes, OR
   - Onset of pain or discomfort associated with harder stools at least sometimes

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

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

The diagnosis of IBS can be reasonably made using the Rome IBS criteria as long as the individual does not have "red-flag" symptoms like drastic weight loss, a history of organic bowel disease, a history of digestive surgery, bloody stool, night awakening due to abdominal pain, anemia, fever or arthralgia [21,22].

2.3.2 Assessment of psychological conditions (anxiety and depression)

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

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

2.3.3 Assessment of IBS-related health-seeking behavior

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

2.4 Data Analysis

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

3. RESULTS

Of the 321 participants, one was excluded from data analysis because of incomplete data entry. The results of the remaining 320 (99.7%) participants are here presented. The mean age of the participants was 26.3 ±4.1 years [Table 1]. Two hundred and ten participants (65.6%) were males. In regard to the marital status of the participants, 274 (91.2%) were single while the others were married. One hundred and thirty-eight (43.1%) participants consumed coffee, 41 (12.8%) consumed alcohol and 5 (1.6%) smoked cigarettes.

Forty-six out of the 320 (14.4%) study participants had IBS [Table 1]. Of the 46 with IBS, 27 (58.7%) 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 to psychological ill-health, 50 (15.6%) participants had anxiety, 30 (9.4%) of which were borderline (maximum score 8-10) and 20 (6.3%) were clinically significant (maximum score >10) [Table 1]. Twenty-one (7.5%) of the respondents had depression, 17 of which were borderline while 7 were clinically significant.

On univariate analysis, IBS was associated with the female gender [OR =2.66 (95% CI, 1.40 - 4.99), P = 0.003], anxiety [OR = 1.18 (95% CI, 1.09 – 1.28), P = <0.001] and depression [OR = 1.12 (95% CI,1.01 -1.23), P = 0.023] [Table 2]. Both 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] retained the associated after multivariate analysis [Table 2].

Table 3 shows the IBS-related health-seeking behavior among the study participants. Only 2 of the 7 participants that had been previously diagnosed with IBS by a doctor satisfied the Rome III IBS criteria and the 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 a 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 that had IBS.

Table 4 depicts IBS-related health-seeking behavior's association with anxiety and depression. Among participants with IBS, those without anxiety frequently consulted a doctor than 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.

Table 1. Sociodemographic variables and psychological Ill-health among study participants

Variable	Total N =320	IBS n=46	No-IBS N= 274	P-value
Age [Mean± SD]	26.3 ±4.1	25.4 ±4.2	26.5 ±4.0	0.516†
Age group [n (%)]				
20 – 29	276(86.2)	43(93.5)	233(85.0)	1.000*
>29	44(13.8)	3(6.5)	41(15.0)	
Gender [n (%)]				
Male	210 (65.6)	21 (45.7)	189 (69.0)	0.003
Female	110 (34.4)	25(54.3)	85 (31.0)	
Marital Status [n (%)]				
Single	274 (91.2)	43 (93.5)	249 (90.9)	0.779*
Married	46 (8.8)	3 (6.5)	25 (9.1)	
Smoking [n (%)]				
No	315 (98.4)	46 (100)	269 (98.2)	1.000*
Yes	5 (1.6)	0 (0.0)	5 (1.8)	
Alcohol [n (%)]				
No	279 (87.2)	43 (93.5)	236 86.1)	0.233*
Yes	41(12.8)	3 (6.5)	38(13.9)	
Coffee [n (%)]				
No	182 (56.9)	22 (47.8)	160 (58.4)	0.200
Yes	138 (43.1)	24 (52.2)	114 (41.6)	
Anxiety [Mean ±SD]	4.1 ±3.6	6.0 ±4.3	3.7 ±3.3	0.053†
Anxiety [n (%)]				
0-7	270(84.3)	31 (67.4)	239 (87.2)	0.003
8-10	30(9.4)	8 (17.4)	22 (8.0)	
>10	20(6.3)	7 (15.2)	13 (4.8)	
Depression [Mean ±SD]	2.9 ±2.9	3.8 ±3.3	2.8 ±2.8	0.008†
Depression [n (%)]				
0-7	296(92.5)	38 (82.6)	258 (94.1)	0.009*
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, *Fisher Exact Test, † Independent T-test*

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 (%)]							
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)	0.003	2.19(1.14-4.22)	0.019
Marital status [n (%)]							
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)	0.565		
Smoking [n (%)]							
No	315 (98.4)	46 (100)	269 (98.2)	1(Reference)			
Yes	5 (1.6)	0 (0.0)	5 (1.8)	0.00	0.999		
Alcohol [n (%)]							
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)	0.179		
Coffee [n (%)]							
No	182 (56.9)	22 (47.8)	160 (58.4)	1.53(0.82-2.86)	1.183		
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 (range)]	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

IBS: Irritable bowel syndrome; OR: Odds ratio

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					
No	313 (97.8)	44 (95.7)	269 (98.2)	1 (Reference)	
Yes	7 (2.2)	2 (4.3)	5(1.8)	0.00	0.265*
Recent Med. Consultation†					
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)	<0.001
Total Med Consultation‡					
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)	<0.001

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

Table 4. IBS-related Health-seeking behavior with anxiety and depression (n = 46)

HADS*	Medical consultation		Odds ratio	P value
	Yes (n=11)	No (n=33)		
Anxiety				
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)	0.084
Depression				
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)	<0.0001

*IBS: irritable bowel syndrome, *Hospital Anxiety and Depression Scale*

4. DISCUSSION

The prevalence of IBS varies greatly from one region of the world to another and from one population subgroups to another. Variation also exists within the same country even when the same diagnostic criteria were used [5,23]. We obtained a prevalence of 14.4% among the study population. This falls within the prevalence range obtained from previous studies among medical students around the world (9.3% to 35.5%) [6]. The wide IBS prevalence disparities observed across the world may be a reflection of the variation in the prevailing local risk factors, the study design and the type of survey instrument used in conducting the studies [4]. The Manning criteria have been shown to account for the highest reported prevalence of IBS whilst the Rome iterations are associated with lower prevalence estimates [4]. Two decades ago (1995), Olubuyide et al. obtained a prevalence of 43.5% in the first IBS study conducted among medical students in Nigeria with the Manning criteria.[14] A decade after (2005), Okeke et al. obtained a prevalence of 26.4% in a study conducted among a combination of medical students and medical laboratory technology students in northcentral Nigeria with the Rome II IBS questionnaire [16]. The observed prevalence disparities in these studies and ours could be explained by the aforementioned reasons. We used a different instrument apart from the ones used in the previous Nigerian studies. Our study was also conducted in another region of the country (southwestern region) in contrast to some of the cited Nigerian studies.

We found the IBS-M subtype (58.7%) to be predominant among our study population. Whereas Okeke et al. previously found IBS-A (IBS with alternating diarrhea and constipation) as the predominant subtype with the Rome II criteria in a community study in northcentral Nigeria, Ladep et al. [17] found IBS-C as the predominant subtype in a hospital patient population with the same instrument and in the same geographical location as the former [19]. While Dong et al. found IBS-C as the predominant subtype among college students with the Rome III criteria in northern China [24], Liu et al. found IBS-M as the predominant subtype with the same instrument in Beijing, China [25]. It has been established that the pattern and prevalence of IBS subtypes vary within the same country, from country to country and from study to study [5]. The geographical location, the established bowel habits of the population and the diagnostic

instrument used seem to influence this observation [26].

In regard to gender distribution, our study showed IBS to be more associated with the female gender (54.3%) as compared to the male (45.7%) and this was statistically significant (p = 0.019). Gender difference in IBS prevalence is well established. Generally, the Female/Male ratio of IBS approaches 2:1 but within the population of patients that seek consultation with primary care physicians the ratio is as high 3:1 [27]. In most populations, women tend to report more IBS symptoms than men irrespective of the diagnostic criteria employed [4-6]. This gender difference in the prevalence of IBS could be due to differences in gender-related illness perception and health-seeking behavior. It could also be due to gender-related physiologic and psychological differences.

In the present study, IBS was significantly associated with both anxiety and depression on univariate analysis, although depression did not sustain the significance after multivariate analysis. Two previous studies conducted in Nigeria showed IBS to be positively associated with depression on univariate analysis, though the studies neither considered anxiety nor conducted multivariate analysis to eliminate the effect of possible confounders. Our findings are in tandem with several studies conducted both at the community level and among medical students that found positive association between psychological factors (anxiety, depression and stress) [4,6,16]. A review of literature showed more than one-half of all patients with IBS reported depression or anxiety and such individuals experience more severe somatic symptoms [4].

We observed that 11 (23.9%) of the 46 participants with IBS had sought medical attention. The proportion of individuals with IBS in the community that has sought medical attention varies widely from country to country and from study to study but an average of 30% seek medical attention because of their symptoms [4]. Oluboyide et al. [14] two decades ago observed that about two-thirds of medical students with IBS had sought medical advice during the study period and the consultation behavior was influenced by factors such as the presence of other symptoms. Although our current finding is close to the global average of 30%, it may suggest a poor health-seeking behavior among the study population since they were medical students who ought to pay prompt attention to their health. It may be a reflection of poor illness perception in the participants' environment such that majority of those who suffer from IBS do not see it as diseases state. Another possibility is that some of the participants with IBS may have self-medicated since they have some knowledge in this regard.

Only 18.2% of the IBS subjects who sought medical attention was previously diagnosed with IBS by doctors. This may suggest a low IBS index of suspicion among Nigerian doctors. Despite the fact that a community-based study conducted in northcentral Nigeria showed IBS to be relatively common in the community [17], a previous survey of Nigerian physicians confirms the rarity of hospital diagnosis of IBS in that 83.3% of the Specialist Physicians interviewed make the diagnosis of IBS "rarely" [28]. We posit that those who sought medical attention because of lower abdominal pain with diarrhea and/or constipation but did not fulfill Rome III criteria for IBS may have had alternative diagnoses like gastroenteritis or functional constipation while those who were previously diagnosed with IBS by physicians but did not fulfill the diagnostic criteria may have had symptoms amelioration due to the treatment they have received.

Our study showed that participants with IBS and depression sought medical consultation more than those with IBS but had no depression, although we did not find a similar association among participants with IBS and depression. It has been previously observed that individuals with IBS who seek medical care tend to have higher incidence of depression, anxiety disorder, panic disorder, and hypochondriasis than control populations [7-10].

The strength of this study lies in three aspects which to the best of our knowledge have not been explored in regard to IBS in Nigeria: that we evaluated IBS' association with anxiety in addition to depression, that we conducted a logistic regression analysis to eliminate the effects of confounders on IBS' association with the psychological conditions, and that we tested IBS-related health-seeking behavior's association with the psychological conditions. The limitations of this study lie in the fact that our study population consisted of medical students who are knowledgeable about IBS. Hence, the findings may not absolutely represent what obtains in the general populace. Although we could not perform colonoscopy on those who

fulfilled the criteria for IBS to eliminate a differential of IBS like early inflammatory bowel disease (IBD), it is important to note that IBD is a rare disease in sub-Saharan Africa and Nigeria in particular [29,30].

5. CONCLUSION

Our study shows that IBS was moderately prevalent among the medical student population we studied, IBS-M was the predominant subtype, the female gender and anxiety were significant risk factors for IBS while depression was significantly associated with IBS-related health-seeking behaviour. These findings bring to the fore the need for Nigerian physicians to heighten their suspicion index for IBS and FGIDs in general. The psychological health needs of the general populace and the youths, in particular, ought to be properly addressed as this could help to ameliorate the severity of IBS or reduce the prevalence. Further research in the community is needed to test IBS' association with psychological disorders in Nigeria.

CONSENT

Written informed consent was obtained from all the participants.

ETHICAL APPROVAL

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

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Longstreth GF, Thompson WG, Chey WD, Houghton LA, Mearin F, Spiller RC. Functional bowel disorders. Gastroenterology. 2006;130(5):1480–91.
2. Canavan C, West J, Card T. Review article: The economic impact of the irritable bowel syndrome. Aliment Pharmacol Ther. 2014;40(9):1023–34.
3. Martin BC, Ganguly R, Pannicker S, Frech F, Barghout V. Utilization patterns and net direct medical cost to Medicaid of irritable bowel syndrome. Curr Med Res Opin. 2003;19(8):771–80.
4. Canavan C, West J, Card T. The epidemiology of irritable bowel syndrome. Clin Epidemiol. 2014;6:71–80.
5. Lovell RM, Ford AC. Global prevalence of and risk factors for irritable bowel syndrome: A meta-analysis. Clin Gastroenterol Hepatol Off Clin Pract J Am Gastroenterol Assoc. 2012;10(7):712–721.
6. Ibrahim NK. A systematic review of the prevalence and risk factors of irritable bowel syndrome among medical students. Turk J Gastroenterol Off J Turk Soc Gastroenterol. 2016;27(1):10–6.
7. Surdea-Blaga T, Băban A, Dumitrascu DL. Psychosocial determinants of irritable bowel syndrome. World J Gastroenterol. 2012;18(7):616–26.
8. Saha L. Irritable bowel syndrome: Pathogenesis, diagnosis, treatment, and evidence-based medicine. World J Gastroenterol WJG. 2014;20(22):6759–73.
9. Lee Y-T, Hu L-Y, Shen C-C, Huang M-W, Tsai S-J, Yang AC, et al. Risk of psychiatric disorders following irritable bowel syndrome: A nationwide population-based cohort study. PloS One. 2015; 10(7):e0133283.
10. Fadgyas-Stanculete M, Buga A-M, Popa-Wagner A, Dumitrascu DL. The relationship between irritable bowel syndrome and psychiatric disorders: From molecular changes to clinical manifestations. J Mol Psychiatry. 2014; 2(1):4.
11. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand. 1983;67(6):361–70.
12. Bjelland I, Dahl AA, Haug TT, Neckelmann D. The validity of the hospital anxiety and depression scale. An updated literature review. J Psychosom Res. 2002;52(2):69–77.
13. Abiodun OA. A validity study of the hospital anxiety and depression scale in general hospital units and a community sample in Nigeria. Br J Psychiatry J Ment Sci. 1994;165(5):669–72.
14. Olubuyide IO, Olawuyi F, Fasanmade AA. A study of irritable bowel syndrome diagnosed by Manning criteria in an African population. Dig Dis Sci. 1995;40(5):983–5.
15. Onyekwere CA, Asiyanbi A, Obi J. PWE-002 IBS in Nigeria; is there a decline in prevalence? Gut. 2012;61(Suppl 2):297.
16. Okeke EN, Agaba EI, Gwamzhi L, Achinge GI, Angbazo D, Malu AO. Prevalence of

irritable bowel syndrome in a Nigerian student population. Afr J Med Med Sci. 2005;34(1):33–6.
17. Okeke EN, Ladep NG, Adah S, Bupwatda PW, Agaba EI, Malu AO. Prevalence of irritable bowel syndrome: A community survey in an African population. Ann Afr Med. 2009;8(3):177–80.
18. Akere A, Oyewole A. Prevalence of irritable bowel syndrome among psychiatric patients. Nigerian Journal of Gastroenterology and Hepatology. 2013; 5(2):85–89.
19. Ladep NG, Obindo TJ, Audu MD, Okeke EN, Malu AO. Depression in patients with irritable bowel syndrome in Jos, Nigeria. World J Gastroenterol. 2006;12(48):7844–7.
20. Akere A, Akande KO. Association between irritable bowel syndrome and shift work: Prevalence and Associated Factors Among Nurses. J Gastroenterol Hepatol Res. 2014;3(11):1328–31.
21. Kang JY. Systematic review: The influence of geography and ethnicity in irritable bowel syndrome. Aliment Pharmacol Ther. 2005;21(6):663–76.
22. Saito YA, Locke GR, Talley NJ, Zinsmeister AR, Fett SL, Melton LJ. A comparison of the Rome and Manning criteria for case identification in epidemiological investigations of irritable bowel syndrome. Am J Gastroenterol. 2000;95(10):2816–24.
23. Chang F-Y, Lu C-L, Chen T-S. The current prevalence of irritable bowel syndrome in Asia. J Neurogastroenterol Motil. 2010; 16(4):389–400.
24. Dong YY, Zuo XL, Li CQ, Yu YB, Zhao QJ, Li YQ. Prevalence of irritable bowel syndrome in Chinese college and university students assessed using Rome III criteria. World J Gastroenterol. 2010; 16(33):4221-6.
25. Liu Y, Liu L, Yang Y, He Y, Zhang Y, Wang M, et al. A school-based study of irritable bowel syndrome in medical students in Beijing, China: Prevalence and some related factors. Gastroenterology Research and Practice. 2014;2014:124261.
26. Anbardan SJ, Daryani NE, Fereshtehnejad S-M, Taba Taba Vakili S, Keramati MR, Ajdarkosh H. Gender role in irritable bowel syndrome: A comparison of irritable bowel syndrome module (ROME III) between male and female patients. J Neurogastroenterol Motil. 2012;18(1):70–7.
27. Mulak A, Taché Y. Sex difference in irritable bowel syndrome: Do gonadal hormones play a role? Gastroenterol Pol. 2010;17(2):89–97.
28. Okeke E. Frequency of irritable bowel syndrome diagnosis made by consultant physicians in Nigeria. International Journal of Medicine and Health Development. 2010;15(1):51–5.
29. Alatise OI, Otegbayo JA, Nwosu MN, Lawal OO, Ola SO, Anyanwu SN, et al. Characteristics of inflammatory bowel disease in three tertiary health centers in southern Nigeria. West Afr J Med. 2012(1):28–33.
30. Alatise OI, Arigbabu AO, Agbakwuru EA, Lawal OO, Ndububa DA, Ojo OS. Spectrum of colonoscopy findings in Ile-Ife Nigeria. Niger Postgrad Med J. 2012; 19(4):219–24.

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