IRRITABLE BOWEL SYNDROME AMONGST PATIENTS WITH CHRONIC ABDOMINAL PAIN IN LAGOS, NIGERIA: THEIR PROFILE AND DIETARY ASSOCIATIONS

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ABSTRACT

Background: Irritable bowel syndrome (IBS) is a common functional gastrointestinal disorder in which bowel habits are altered in association with abdominal pain or discomfort. Reports of prevalence vary worldwide, with that of the sub-Sahara region ranging from 8% to 31% among apparently healthy subjects.

Aim: To determine the prevalence of IBS amongst patients presenting with chronic recurrent abdominal pain, their IBS sub-types and socio-demographic profile as well as their dietary habits. To determine the prevalence of small intestinal bacteria overgrowth (SIBO) in the cohort with IBS.

Subjects and Methods: Following ethical approval, 350 consecutive patients with recurrent abdominal pain who presented to the general outpatient departments of three (3) General hospitals in Lagos were evaluated for the presence of IBS, using the Rome III criteria via an interviewer administered questionnaire. 65 of them, who fulfilled the criteria, were clinically examined, with blood and fresh stool samples taken. Hydrogen breath test, after a lactulose drink, was performed and used to determine those IBS subjects with SIBO.

Results: The overall IBS prevalence was 18.6%. The IBS-subtypes were IBS-mixed (64.6%), IBS-constipatory type (24.6%) and IBS-diarrhoea type (10.8%). Most of the IBS patients (41.5%) were in the third decade of life, with a slight female preponderance (1.2: 1). Lower educational status ($p=<0.001$) and unskilled occupation ($p=0.01$) showed a statistically significant association with IBS, while there were no such associations with age, gender, religion, marital status and body mass index. Frequent consumption of bread, beans, egg, plantain, yam, spaghetti, orange, rice, cassava and vegetables, were observed to be statistically significant in their association with IBS symptoms. The prevalence of SIBO in these IBS subjects were 75.4%.

Keywords: Functional gastrointestinal disorder, Irritable bowel syndrome, Chronic abdominal pain, Small intestinal bacterial overgrowth

INTRODUCTION

Irritable bowel syndrome (IBS) is a common functional gastrointestinal disorder in which bowel habits are altered in association with abdominal pain and or discomfort. In addition to altered bowel habits, frequently reported symptoms include bloating, flatulence, faecal urgency, straining, sense of incomplete evacuation and relief of pain or discomfort upon defecation with usually no mechanical, biochemical or overt inflammatory condition to explain the symptoms.

IBS can be classified according to the predominant bowel habit into[1];

Diarrhoea-predominant **(IBS-D)**
Constipation-predominant **(IBS-C)**
Mixed stool pattern **(IBS-M)**

The term IBS-A (Alternating subtype), is one in which IBS-D changes to IBS-C over a period of time or vice-versa, is used interchangeably with IBS-M.

Irritable bowel syndrome is a common condition which represents 40-70% of referrals to Gastroenterologists and in the general population; IBS of the diarrhoea predominant type is more frequent than constipation predominant type. The proportion of the mixed subtype varied between 23-63%.[2]

The reported prevalence of IBS varies across different geographical settings, in different study population and also with the diagnostic criteria employed[3]. Prevalence rates in the Western world range from 12-16.7%[4,5] with fairly comparable reports from Asia[6]. While studies in African population show varied prevalence rates from 8-34%[7-11]. Some of the studies carried out in Africa[12,13] used the less specific Manning criteria and the more restrictive Rome II criteria[14] in determining the prevalence of IBS. Studies employing the Rome 111 criteria are scanty with the available study on a select population. Several studies[15] have shown that patients with IBS are predisposed to surgical intervention as a result of misdiagnosis and Increased surgery contributes to a cycle of events that often characterize the ineffective care of the syndrome.

Hence there is need to document the epidemiology of IBS in our setting especially amongst those presenting in the hospital with abdominal pain using the Rome 111 criteria.

Studies of association of IBS with age are conflicting while some suggest a higher prevalence in the third decade others show no significant association. Gender differences have also been reported in several studies,[2,3,16] although some studies applying the Rome II criteria show no sex difference,[6,] .However a report from Kenya, indicate a male predominance.[12] Socio-economic status has been shown to play a role in the occurrence of IBS, as studies have shown a higher prevalence of IBS amongst those that have a lower educational status, unemployed or in the low income brackets[2,17,] Studies of association of IBS with marital status indicate higher prevalence of IBS in unmarried and divorced individuals.[2]

The exact cause of IBS is unknown. The most common theory[18,19], propounded to explain this syndrome is a disorder of the interaction between the brain and the gut, although there are several mechanisms involved that may be linked to specific symptoms of IBS. These mechanisms include abnormal visceral perception, dysmotility or smooth muscle disturbance, stress or psychological disturbance**,** post-intestinal infection, dietary triggers and fibre deficiency.

Small intestinal bacterial overgrowth (SIBO) has been implicated in the pathogenesis of IBS with the publication by Pimentel et al in 2000,[20] which played a pivotal role in establishing the concept that SIBO is a major pathogenic mechanism underlying IBS. Though analysis of jejunal aspirate is the gold standard for diagnosis of SIBO, this is however invasive and expensive, hence the use of the simpler and non-invasive Hydrogen breath test[21].

In addition, dietary components form a small part of the pathophysiological complexion of IBS. Most individuals with IBS believe diet plays a significant role in their symptoms, they often complain of food-related gastrointestinal symptoms secondary to consumption of more than one specific food. Some dietary triggers that have been well established by clinical studies to exacerbate IBS symptoms include caffeine, lactose, alcohol, fatty food, wheat corn, citrus, food rich in carbohydrates and hot spices[22], though in a recent study amongst Chinese students there was no significant association between the dietary factors and IBS.[23] This association with certain foods has led to the concept of exclusion of foods which contain the fermentable oligo-di-monosaccharides and polyols (the so-called FODMAP) from diet as they have been shown to exacerbate IBS symptoms. The low FODMAP diet provides an effective approach to the management of IBS and current strategies entails identification and withdrawal of such foods.[24]

AIM

In light of present knowledge, we set out to document the prevalence of IBS in those patients reporting with recurrent chronic abdominal pain attending general hospitals in Lagos State using the recent Rome III criteria, their sociodemographic profile as well as their dietary habits and also note any role of small intestinal overgrowth in them.

METHODS

Study population: The study population consisted of consecutive consenting subjects (within the age range 18-60years) with recurrent abdominal pain who presented in the three large referral hospitals

located in Lagos State, Nigeria from January – December 2011. Using a previously reported IBS prevalence of 26% in Nigeria [8] a minimum sample size of 296 was derived using the World health Organisation formula ($N=Z^2 \times PQ/D^2$. N - desired sample size, Z - standard normal deviate, usually set at 1.96, corresponding to 95% confidence level, P - proportion of patients with) for determining study sample. A sample of 350 was collected to improve the power of the study and also to allow for attrition.

Study area

The study was carried out in Lagos state, the nation's largest and most populous urban area. The study was stratified across the three politically delineated districts of Lagos State, South-West Nigeria, each of which is served by a big referral hospital to give a well rounded representation. Patients were recruited as subjects for the study, through the general out-patient clinics of General Hospital Gbagada (Lagos-East), General Hospital Lagos (Lagos-Central) and Lagos State University Teaching Hospital (LASUTH) (Lagos-West).

Ethical Consideration

Study complied with the National Human Rights and Ethical Commission guideline of Nigeria (NHREC) with ethical approval obtained from research and ethics committee of the Lagos state University teaching hospital and the Lagos state health service commission and consent also obtained from individual subjects.

Inclusion criteria

- Subjects aged 18-60 years.
- Patients who fulfil the Rome III criteria.

Exclusion criteria

- Older age (>60years)
- Patients with co-morbidities – Diabetes Mellitus(DM), Peptic Ulcer Disease(PUD), Thyrotoxicosis, Colorectal cancer, Family history of colorectal cancer, Inflammatory bowel disease, Coeliac disease.
- Patients with alarm symptoms – weight loss, fever, anorexia, gastrointestinal bleeding (especially lower) and evidence of gastrointestinal infection.
- Patients using laxatives for any reason
- Pregnant women.
- Psychotic patients.
- Previous intestinal surgery.

Study design

This was a cross-sectional descriptive study carried out over a period of one year. The investigator and trained health personnel took demographics, clinical history and clinically examined every potential study subject to elicit information which then determined if the subjects fulfilled the inclusion and exclusion criteria including the presence of alarm symptoms. All subjects were fluent in the use of English and were communicated with using the West African Pidgin English. Subjects were adjudged to have IBS if they fulfilled the Rome III criteria which are defined as recurrent abdominal pain or discomfort with a marked change in bowel habits for at least six months, with symptoms experienced on at least three days of at least three months. Two or more of the following must apply:

- Improvement with defecation.
- Onset associated with change in the frequency of stool.
- Onset associated with change in the form of stool.

Patients who satisfied these Rome III criteria were adjudged to have IBS.

The investigator and other health personnel further administered questionnaires on the IBS subjects to elicit their dietary habits. This relied on dietary recall of frequent consumption (more than five times a week) of such meals over a period of one week and which covered most of the food classes in the Nigerian diet including grains (rice),tubers (cassava, yam, potatoes), dairy products (egg), vegetables, etc.

All IBS subjects underwent the hydrogen breath test to determine the presence of small intestinal bacterial overgrowth (SIBO) following a preceding 8-12 hrs fast or usually an overnight fast. This entailed using the E-Z Breath analyzer to take baseline reading of hydrogen levels in his/her breath. A subject is then given 10g (30mls) of lactulose syrup and then required to take breath sample readings every 15 mins for 2-3 hours. **(details of test are as according to the manufacturers protocol- available at www. breathe E-Z systems inc.com).* A positive test is when the subject produces approximately 20ppm (parts per million) of hydrogen within the first 2 hours[+]

Five millilitres of blood was taken from each subject for full blood count (FBC) and erythrocyte sedimentation rate (ESR, Wester green method) to exclude an infective process, **random blood sugar (RBS) was done to exclude Diabetes Mellitus (RBS <200)[25] and** fresh stool sample was examined for ova and parasites as well as occult blood, this was done to exclude the presence of parasitic worm infestation (e.g. giardiasis) which is quite endemic in Nigeria and could mimic features of IBS. Abdominal Ultrasound Scan was also performed on all IBS subjects to exclude other gastrointestinal pathologies such as gallstone disease or appendicitis that could mimic IBS.

STATISTICAL ANALYSIS

The data was analyzed using SPSS VERSION 16.0, a statistical computer program. Descriptive statistics (minimum, maximum, mean, standard deviation, range, percentages, etc) were calculated for continuous variables.

During data analysis, the Rome III Criteria was used to determine the IBS sub-types.

Pearson's Chi-square (a non-parametric inferential statistical procedure) was used to assess relationships between categorical variables. Binary logistic regression was used to assess the role of dietary habits of IBS subjects and hence the risk factors. P-value less than 0.05 was considered to be significant. (Confidence level =95%)

RESULTS

Of the 350 subjects recruited, (56% males and 44% females), the mean age of the population was 35.1± 10.0 years within the age range 18-60 years . One hundred and thirteen, 126, and 111 subjects were from lASUTH, general hospitals Lagos and Gbagada respectively. Table 1 shows the frequency distribution of the demographics of the subjects.

Prevalence of IBS

Sixty-five (18.6%) of 350 evaluated subjects fulfilled the Rome III criteria for IBS. Table 2 shows the distribution of the IBS subjects according age, gender, educational status, occupation and BMI.

IBS Subtypes

Forty-two (64.6%) had the mixed/alternating pattern of bowel habit, comprising diarrhoea and constipation; whereas 16 (24.6%) and 7 (10.8%) had constipation and diarrhoea subtypes, respectively

Diet and IBS

Frequently consumed food items (more than 5 times a week) by study subjects and their association with occurrence with IBS showed bread, beans, egg, yam, vegetable, rice, potato and cassava were found to be significant with IBS; while the association with the frequent consumption of bread, beans, egg, yam and potato were observed to be protective (beneficial), the relationship between IBS and vegetable and rice were observed to be hazardous (i.e. causal). [Table 3]

Relative OR Range	Interpretation
0 - 0.3	Strong benefit
0.4 - 0.5	Moderate benefit
0.6 - 0.8	Weak benefit
0.9 - 1.1	No effect
1.2 - 1.6	Weak hazard
1.7 - 2.5	Moderate hazard
>2.6	Strong hazard

SIBO and IBS

Of the 65 IBS subjects, 37 were found to have SIBO .Of those that have SIBO, 20 (54.05%) was of the mixed bowel pattern (IBS-M), 10(27.03% -IBS-C), 7(18.92%-IBS-D) were constipation and diarrhoea subtypes respectively.

DISCUSSION

Irritable bowel syndrome continues to be a cause of morbidity amongst the afflicted, and a diagnostic challenge sometimes to the clinician especially the primary care doctor.[4] Understanding the demographics as well as associated factors will help avert misdiagnosis and be of use in formulating management guidelines including awareness improvement. It has been reported that IBS prevalence varies in different geographical setting, and in different population depending on the diagnostic criteria [3]. The

Table 1: Biodata of the study subjects (n=350)

BIO-DATA	FREQUENCY	PERCENTAGES
AGE GROUP		
<21 years	23	6.6
21 – 30 years	117	33.4
31 – 40 years	125	35.7
41 – 50 years	59	16.9
51 – 60 years	26	7.4
Total	350	100
GENDER		
Male	196	56
Female	154	44
Total	350	100
BMI		
Under weight (< 18.5 Kg/m^2)	5	1.4
Normal (18.5 – 24.9 Kg/m^2)	204	58.3
Overweight (25.0 - 29.9 Kg/m^2)	113	32.3
Obese (30.0 Kg/m^2 and above)	28	8
Total	350	100
OCCUPATIONAL CLASS		
Skilled worker	190	54.3
Semi-skilled worker	13	3.7
Unskilled worker	92	26.3
Unemployed/ student	55	15.7
Total	350	100
MARITAL STATUS		
Single	125	35.7
Married	220	62.9
Divorced/separated /widowed	5	1.4
Total	350	100
EDUCATIONAL STATUS		
Primary	17	4.9
Secondary	63	18
Post-secondary	270	77.1
Total	350	100

recently launched Rome 1V criteria was not out at the time of this study , hence is not mentioned in this write up

Our study has shown an overall prevalence of 18.6% in a cohort of hospital patients presenting with chronic or recurrent abdominal pain in the Lagos metropolis. Lagos is made up of three politically delineated zones and we have recruited subjects presenting in the main referral hospital in each zone and we believe this is a representative cohort.

Our finding appears lower than the earlier reports from Ibadan (South West, Nigeria) which used the older less specific Manning criteria with a prevalence of 30% amongst apparently healthy medical students, and the ones from Jos by Ladep, *et al* and Okeke, *et al*

Table 2: Descriptive data of IBS subjects

Biodata	IBS
Age (years)	N = 65 (%)
<21years	0 (0%)
21 - 30 years	**27 (41.5)**
31 – 40 years	17 (26.2)
41 - 50 years	10 (15.4)
51 - 60 years	11 (16.9)
Gender	
Male	29 (44.6)
Female	**36 (55.4)**
BMI – Kg/m²	
Underweight	2 (3.1)
Normal	**40 (61.5)**
Overweight	19 (29.2)
Obese	4 (6.2)
Occupation	
Skilled worker	18 (27.7)
Semi-skilled worker	8 (12.3)
Unskilled worker	**25 (38.5)**
Unemployed/Students	14 (21.5)
Educational Status	
Primary	9 (13.8)
Secondary	**33 (50.8)**
Tertiary	23 (35.4)
Marital Status	
Single	25 (38.5)
Married	**37 (56.9)**
Divorced/Seperated	0 (0.0)
Widowed	3 (4.6)

with prevalence's ranging from 26.1% to 33% using the more stringent Rome II criteria[14]. Possible explanation for this observation includes the different study populations as two of the studies from Jos were on apparently healthy population; one among students[8] whiles the other in a rural population[10]. Earlier reports indicate that only 10-20% of IBS sufferers in the general population seek medical help in hospital[26] as some

indulge in self medication or seek alternative health care. The third report[9] was among hospital outpatients similar to the present study with a finding of 33% prevalence. Environmental factors including differences in dietary habits have been suggested as possible reason as the main staples in Jos North Central Nigeria

Table 3: Odds ratio between food items consumed and occurreence of IBS

Food Consumed by Subjecs	Odds Ratio	95.0% C.I.		p-value
		Lower	Upper	
Bread	0.329	0.189	0.571	**0.017****
Beans	0.237	0.134	0.418	**< 0.001****
Egg	0.228	0.122	0.425	**0.016****
Fish	1.327	0.683	2.579	0.429
Plantain	0.451	0.260	0.781	0.994
Yam (including poundo yam)	0.352	0.199	0.623	0.010**
Vegetable	1.846	0.939	3.630	< 0.001**
Vegetable salad	1.342	0.626	2.879	0.761
Pineapple, pawpaw	0.835	0.484	1.441	0.077
Orange	0.435	0.250	0.756	0.059
Rice (in all forms of preparation)	2.791	1.151	6.763	0.001**
Potato	0.174	0.053	0.573	0.033**
Spaghetti	0.286	0.153	0.532	0.512
Cereals (cornflakes etc)	0.790	0.352	1.772	0.684
Cassava (including garri/eba)	1.098	0.626	1.926	0.002**

***Significant at 95% confidence level with binary logistic regression*

is dairy products while Lagos in the South west is Yam, rice and plenty of vegetables which are fibre rich.

However our finding is slightly similar to one[11] from Enugu (South-East, Nigeria) employing the Rome II1with prevalence of 13.7%. Dietary habit is similar in both regions of study. This contrast with finding in Egypt where Abdulmajeed[7] reported prevalence of 34% among hospital outpatients using the restrictive Rome 11 criteria. Host and environmental factors including dietary habits, stress as well as psychological factors may explain[3] this.

We have noted a significant association with lower educational as well as lower socioeconomic status in line with Andrews *et al*,[16] while no significant association with the female gender or age contrary to earlier reports[3,27,28]. IBS of the mixed type appeared the predominant form in our setting, a finding contrary to a study carried out in an Asian urban community.[6] The reason for this observation is not clear and may warrant further studies.

We observed an association between IBS and some dietary habits; the relationship between IBS and the frequent consumption of bread, beans, egg, yam and potato were observed to be protective (beneficial), while the relationship between IBS and vegetable and rice were observed to be hazardous (i.e. causal). The high fibre content of the earlier food items may in part explain the beneficial effect while lack of similar association with rice and vegetables is difficult to explain. However the method of preparation and consumption of these food items could partly explain this as they are cooked and consumed with oil. This observation relating IBS with dietary habits in our setting requires further investigation in the light of the role of FODMAP in the management of IBS.[29,]

A limitation of this aspect of the study however could be in obtaining dietary history which relied on the subjects ability to recall over a period one week which could cause a bias. This may require further

studies to validate this finding as an earlier study in a Chinese population using similar diagnostic criteria found no significant differences between the IBS-group and the non-IBS group in respect to dietary habits and nutritional intake.[23]

We noted also a high prevalence of SIBO (54%) using the hydrogen breath test amongst our study subjects. This may have aetiological as well as management implications as some studies have suggested a role of SIBO in the aetiopathogenesis of IBS.[30] We were constrained in not using the gold standard of measuring jejunal aspirate colony count in assessing the prevalence of SIBO partly because of its invasive nature and limited resources available to us. If this were confirmed in further studies it will certainly have therapeutic implications. The high prevalence of SIBO found amongst our IBS subjects could also be ascribed to limitation of HBT[31] in which an earlier peak rise (indicating a positive result) could be seen in those with rapid gut transit time. It could mean the actual prevalence may be lower than our present observation.

Overall our study suggest that IBS is still an important cause of patients presenting with chronic or recurrent abdominal pain in Lagos and is associated with lower socio economic status and high prevalence of SIBO. An association has also been noted with certain dietary habits; while frequent consumption of vegetables, cassava and rice were hazardous, a protective role was noted with beans, bread, egg, potato consumption. These findings will require validation in future studies.

CONCLUSION

Irritable bowel syndrome is an important cause of patients presenting with chronic abdominal pain especially in the third decade of life in Lagos with a slight female preponderance, and a significant association with low socio-economic status. The commonest IBS-subtype was IBS-M with a high prevalence of SIBO in IBS subjects. A significant association is noted between occurrence of IBS symptoms and some dietary habits.

Competing Interests – None

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