

# Epidemiology of Dyspepsia and Irritable Bowel Syndrome (IBS) in Medical Students of Northern India

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## ABSTRACT

**Background:** Dyspepsia and Irritable Bowel Syndrome (IBS) are perhaps one of the most common gastrointestinal diseases universally. The prevalence of dyspepsia ranges from 7-40% while the prevalence of IBS ranges between 3-22% in population based studies worldwide.

**Aim:** This study was conducted to estimate the prevalence, socio-demographic and lifestyle associated risk factors of Dyspepsia and IBS among medical college students of urban Delhi, Northern India.

**Settings and Design:** It is a cross-sectional study and was carried out from January to March 2014 at Maulana Azad Medical College, New Delhi, India.

**Materials and Methods:** A total of 210 students from a Medical College were asked to complete a semi-structured questionnaire

based on identification and socio-demographic data, questions pertaining to lifestyle and Rome III criteria.

**Results:** Of the valid 200 subjects, 90(45%) were males and 110(55%) were females, with a mean age of 20.43± 1.05 y. Majority of the subjects (diagnosed with uninvestigated dyspepsia and IBS) were in the age group of 18-20 y with female gender having higher odds for both. The prevalence of dyspepsia was 18% while that of IBS was 16.5%. Consumption of fatty food, cigarettes and low physical activity were observed as most significant correlates.

**Conclusion:** Rome III criteria enables symptom based diagnosis of dyspepsia and IBS. The prevalence of dyspepsia and IBS in college students from Delhi is observed to be higher. Association with lifestyle related factors highlights the importance of modifications in their prevention.

**Keywords:** Gastrointestinal disease, Medical college students, Northern India, Rome III criteria

## INTRODUCTION

Functional Gastrointestinal Disorders (FGIDs) are a group of gastrointestinal disorders without an organic cause [1,2]. These are classified based on part of the Gastrointestinal (GI) system affected and symptomatology [2]. FGIDs are common in community with average prevalence rate of 40% with rates reported as high as 61.7% in a Canadian study and 36.1% in Australia using Rome II criteria respectively [2,3]. Among the functional gastrointestinal disorders, Functional Dyspepsia (FD) [4,5] and Irritable Bowel Syndrome (IBS) [6,7] are two most common disorders in the population.

The term 'dyspepsia' has originated from the Greek 'δυσ-' (dys-) and 'πεψη' (pepse), popularly known as indigestion. It was first recorded in the mid-18th century and since then it has been widely used [7]. Uninvestigated dyspepsia (UD) refers to patients with either new or possibly recurrent dyspeptic symptoms in whom no investigations have been undertaken. Organic dyspepsia means that there is a clear anatomic or pathophysiologic reason for the dyspeptic complaints, such as an ulcer disease or mass. When a diagnosis of FD has been made, it means that a number of investigations were performed including upper gastrointestinal endoscopy, and were found to be normal. In accordance with the latest Rome III criteria, FD is characterised by the presence of four cardinal symptoms: bothersome postprandial fullness, early satiation, epigastric pain and epigastric burning (considered specific for a gastroduodenal origin) being present for the past three months and onset at least six months prior to diagnosis in the absence of structural abnormality on upper GI endoscopy. In the majority of cases of UD, endoscopic studies have shown that subjects are affected by the functional type of dyspepsia [7].

The prevalence of uninvestigated dyspepsia ranges from 7-40% in population based studies globally and FD has been noted to vary between 11-29.9% with a 25% point prevalence reported for

USA [7]. These figures vary with the criteria used to define dyspepsia and also with survey methodology [7]. In the Asian region, frequency of UD and FD varies between 8%-30% and 8%-23% [8,9]. However, the frequency of FD is not known in several countries as upper GI endoscopy has not been done in most of community based studies [10,11].

On the other hand, IBS is a functional gastrointestinal disorder characterized by recurrent abdominal pain, discomfort and alteration in bowel habits in the absence of any organic disorder. The current data indicates a community prevalence of IBS ranging from 3%-22% with wide variations between countries, varying from 3.5% in Iran to 30% in Nigeria [11]. It has been observed that the prevalence of IBS is increasing in the Asia-Pacific region, particularly in developing countries [11]. The prevalence has been observed as 0.82% in Beijing [12], 6.6% in Hong Kong [13], 8.6% in Singapore [14] and 22.1% in Taiwan [15]. A study in China found that the prevalence of IBS (as defined by the Rome III criteria) in outpatient clinics was 15.9% [16].

The large burden of illness of dyspepsia including its high population prevalence and impact on quality of life leads to over \$14 billion annually in direct costs of care while that of IBS accounts for an economic burden of \$1.6 billion annually [17].

There has been paucity of studies in India on the epidemiology of Dyspepsia and Irritable Bowel Syndrome (IBS) among medical students although in the western countries this problem has been extensively studied.

## OBJECTIVES

1. To study the prevalence of Dyspepsia and Irritable Bowel Syndrome (IBS) among medical college students of urban Delhi, India.

2. To study the socio-demographic and lifestyle associated risk factors of Dyspepsia and IBS in the same population.

## MATERIALS AND METHODS

This study was carried out from January to March 2014 at Maulana Azad Medical College, Delhi University, New Delhi, India. The study population consisted of all the undergraduate medical students studying in VI<sup>th</sup> semester in Maulana Azad Medical College, New Delhi. It also included those already diagnosed or on treatment for dyspepsia. Those intellectually disabled or differently abled and not in a position to be interviewed were excluded from the study.

A total of 210 undergraduate students, from VI<sup>th</sup> Semester batch, were asked to voluntarily complete a pre-designed, pre-tested and semi-structured questionnaire by the researcher. The trained researcher answered any questions on the spot.

The questionnaire included identification and socio-demographic data such as age, gender, religion, type of family and family income. Questions pertaining to lifestyle included items to assess intake of tea, coffee, fatty food, alcohol, cigarettes and NSAIDs. For assessment of physical activity, International Physical Activity Questionnaire (IPAQ) was used and classified into high, moderate and low as per guidelines of IPAQ. Rome III criteria were used for the diagnosis of dyspepsia and IBS.

Rome III diagnostic criteria of FD require one or more of the following symptoms: (1) bothersome postprandial fullness (2) early satiation (3) epigastric pain and (4) epigastric burning. And no evidence of structural diseases (including on upper gastrointestinal endoscopy) that is likely to explain the symptom was necessary. All the above criteria should be fulfilled for the last 3 months with symptom onset at least six months prior to diagnosis. If upper GI endoscopy is excluded from these criteria, diagnosis of UD can be ascertained.

Similarly, in accordance with Rome III criteria of IBS, patients must have recurrent abdominal pain or discomfort for at least 3 months with onset for past 6 months, with 2 or more of the following symptoms: (1) relief with defecation (2) onset associated with a change in frequency of stool and (3) onset associated with a change in form (appearance) of stool.

All participants gave their written informed consent prior to data collection. The study was approved by the Ethics Committee of Maulana Azad Medical College, New Delhi, India.

## STATISTICAL ANALYSIS

All eligible responses were coded. Data analysis was performed using the Statistical Package for Social Science Software for Windows (SPSS 16.0 version). Qualitative data was expressed by percentages and quantitative data was expressed by mean and standard deviation.

The prevalence of Dyspepsia (UD) and IBS was determined and those diagnosed were compared with the others with regard to socio-demographic and lifestyles related factors by univariate analysis (chi-square test and crude odds-ratios) followed by multivariate logistic regression modeling of significant variables. All calculated p-values were two-tailed and p<0.05 was considered statistically significant.

## RESULTS

Out of 210 students enrolled, 206 completed the questionnaire. Valid responses were obtained from 200 subjects with a response rate of 95.2%. Of the valid 200 subjects, 90(45%) were males and 110(55%) were females, with a mean age of 20.43± 1.05 y.

Out of 200 students, 36 (18%) were diagnosed with dyspepsia (UD) and 33(16.5%) were diagnosed with IBS.

As described in [Table/Fig-1], majority of the subjects (diagnosed with dyspepsia) were in the age group of 18-20 y (22.1%) with female

gender having higher odds for dyspepsia. From socio-economic perspective, lower income (per capita< Rs 2500) was significantly associated with dyspepsia while other correlates were insignificant. In accordance with [Table/Fig-2], among the subjects (diagnosed with IBS), female gender was observed to be a significant factor associated with IBS.

As described in [Table/Fig-3], lifestyle related factors like consumption of fatty food, cigarettes, NSAIDs and low physical activity were the most significant correlates for dyspepsia. Similarly for IBS, intake of fatty food, cigarettes and low physical activity were the most significant factors [Table/Fig-4].

Age (years)	N	Dyspepsia		Chi-square value, df, p value	Crude OR,95%CI
		Number	%		
18-20	104	23	22.1	2.48,1,0.14	1 0.55 (0.26-1.26)
21-23	96	13	13.5		
<b>Gender</b>					
Male	90	8	8.9	9.20, 1, 0.00	1 3.50 (1.50-8.13)
Female	110	28	25.5		
<b>Religion</b>					
Hindu	172	35	20.3	5.10, 2, 0.07	1 0.48 (0.05-4.04)
Muslim	9	1	11.1		
Sikh	19	0	0		
<b>Type of family</b>					
Nuclear	176	35	19.9	3.53, 1, 0.06	1 0.17 (0.02-1.34)
Joint	24	1	4.2		
<b>Income class (B G Prasad)*</b>					
>16900	36	1	2.8	9.44,4,0.05 (6.73,1,0.00)	1 10.83 (1.34-86.92) 9.28 (1.16-74.30) 5.83 (0.64-52.7) 17.50 (1.71-178.44)
8450-16899	55	13	23.6		
5000-8449	62	13	21.0		
2500-4999	35	5	14.3		
<2500	12	4	33.3		

<b>*BG Prasad Classification</b>			
	(Original)	Base year=100	(Revised)
Class	1960	2004	2012
Upper High	>100	>10,000	>=16900
High	50-99	5000-9999	8450-16899
Upper Middle	30-49	3000-4999	5000-8449
Lower Middle	15-29	1500-2999	2500-4999
Poor	<15	500-1499	<2500

**[Table/Fig-1]:** Socio-Demographic Correlates of Dyspepsia  
 \*BG Prasad Classification (modified as per All India Consumer Price Index 2012)  
 2012: AICPI (All India Consumer Price Index, July 2012) X 0.53 (Multiplication factor)  
 x 1.89 =AICPI for July 2012=168  
 =168x0.53x1.89=169.06x100 ≈/≈ 16900

Age (years)	N	IBS		Chi-square value, df, p value	Crude OR,95%CI
		Number	%		
18-20	104	20	19.2	1.17,1,0.34	1 0.65(0.30-1.40)
21-23	96	13	13.5		
<b>Gender</b>					
Male	90	8	8.9	6.88, 1, 0.00	1 3.01(1.28-8.13)
Female	110	25	22.7		
<b>Religion</b>					
Hindu	172	28	16.3	0.48, 2, 0.78	1 0.64(0.07-5.34) 1.37(0.42-4.44)
Muslim	9	1	11.1		
Sikh	19	4	21.1		
<b>Type of family</b>					
Nuclear	176	33	18.8	5.38, 1, 0.01	1 -
Joint	24	0	0		
<b>Income class (B G Prasad)*</b>					
>16900	36	7	19.4	1.87,4,0.75	1 0.92(0.31-2.69) 0.52(0.16-1.64) 1.03(0.32-3.33) 0.82(0.14-4.66)
8450-16899	55	10	18.2		
5000-8449	62	7	11.3		
2500-4999	35	7	20.0		
<2500	12	2	16.7		

**[Table/Fig-2]:** Socio-Demographic Correlates of IBS:  
 \* BG Prasad Classification (modified as per All India Consumer Price Index 2012)

Lifestyle factor	N	Dyspepsia		Chi-square value, df, p value	Crude OR, 95%CI
		Number	%		
<b>Tea Intake (no. of cups per day)</b>					
0	82	14	17.1	1.03, 2, 0.59	1
1-2	93	19	20.4		1.24(0.58-2.67)
>2	25	3	12.0		0.66(0.17-2.52)
<b>Coffee Intake (no. of cups per day)</b>					
0	100	20	20.0	2.59, 2, 0.27	1
1-2	95	14	14.7		0.69 (0.32-1.46)
>2	5	2	40.0		2.66(0.41-2.04)
<b>Fatty food consumption (average frequency per week)</b>					
0	19	0	0	10.15, 3, 0.00	-
<1	9	4	44.4		1
1-2	98	15	15.3		0.22 (0.05-0.93)
>3	74	17	23.0		0.37(0.08-1.54)
<b>Alcohol consumption (average no. of pegs per week)</b>					
0	190	34	17.9	1.55,2, 0.46	1
1-3	8	1	12.5		0.65 (0.07-5.50)
>4	2	1	50		4.58(0.28-75.14)
<b>Bidi/cigarettes consumption (average no. per day)</b>					
0	194	33	17.0	6.32,2,0.04	1
1-5	5	2	40.0		3.25 (0.52-20.23)
>5	1	1	100		-
<b>NSAIDs Intake (Duration)</b>					
0	161	29	30.6	18.41, 3, 0.00	1
6 months	22	5	48.3		2.11(1.23-3.60)
1 year	14	2	36.8		1.32(0.51-3.39)
>1 year	3	0	66.7		4.53 (1.53-13.38)
<b>Physical activity</b>					
High	4	0	-	3.48,2,0.04	-
Moderate	80	12	15		1.14(0.56-2.98)
Low	116	24	20.7		3.27(2.47-4.86)

[Table/Fig-3]: Association of Lifestyle Related Factors with Dyspepsia

Lifestyle factor	N	IBS		Chi-square value, df, p value	Crude OR, 95%CI
		Number	%		
<b>Tea Intake (no. of cups per day)</b>					
0	82	15	18.3	1.03, 2, 0.59	1
1-2	93	14	15.1		0.79(0.35-1.75)
>2	25	4	16.0		0.85(0.25-2.84)
<b>Coffee Intake (no. of cups per day)</b>					
0	100	17	17.0	1.01, 2, 0.60	1
1-2	95	16	16.8		0.98 (0.46-2.09)
>2	5	0	0		-
<b>Fatty food consumption (average frequency per week)</b>					
0	19	0	0	9.96, 3, 0.00	-
<1	9	4	44.4		1
1-2	98	14	14.3		0.20 (0.04-0.87)
>3	74	15	20.3		0.31(0.07-1.33)
<b>Alcohol consumption (average no. of pegs per week)</b>					
0	190	33	17.4	2.08,2, 0.35	1
1-3	8	0	0		-
>4	2	0	0		-
<b>Bidi/cigarettes consumption (average no. per day)</b>					
0	194	32	16.5	6.04,2,0.04	1
1-5	5	0	0		-
>5	1	1	100		-
<b>NSAIDs Intake (Duration)</b>					
0	161	26	16.1	0.89, 3, 0.82	1
6 months	3	0	0		-
1 year	14	3	21.4		1.41(0.36-5.42)
>1 year	22	4	18.2		1.15 (0.36-3.68)
<b>Physical activity</b>					
High	4	0	0	1.96,2,0.51	-
Moderate	80	11	13.7		0.96 (0.38-0.98)
Low	116	22	18.9		1.32(0.51-3.39)

[Table/Fig-4]: Association of Lifestyle Related Factors with IBS

## DISCUSSION

To our knowledge, this is the first college-based epidemiological study on uninvestigated dyspepsia and IBS in Delhi university students. The prevalence of UD and IBS (using Rome III criteria) was observed as 18% and 16.5% respectively. As per our research, more female students suffered from dyspepsia as well as IBS than male students, which is similar to that in previous studies [18].

The prevalence of dyspepsia and IBS varies greatly among different studies, which may be due to the differences in varied study population from different countries and different diagnostic criteria used. Since Rome III criteria for dyspepsia and IBS are more stringent than other criteria, their prevalence in the current study is higher than other studies. Furthermore, dyspepsia and IBS are functional disorders with organic gastrointestinal damage excluded. The usual method of using Rome III questionnaires for a population without any further examination is too baseline to judge the accuracy of diagnosis.

Several asian studies have evaluated the rate of dyspepsia and IBS among college students, who represent a unique stress-heavy lifestyle model consisting of long hours of focused physical and cognitive activity under significant social-competitive pressure. A study of college students in Japan found the prevalence rate of 6.7% using the Rome II criteria [19], while the frequency of dyspepsia found in students from Beijing using Rome III and Anhui using Rome II was 1.6% and 8.3%, respectively [20,21].

Surprisingly, the prevalence rate reported by our study is higher than that of other studies from Asia-pacific region. The general clinical observation of gastrointestinal symptoms increasing with age (as reflected by other studies [22]) has been refuted by our study, probably, due to a limited sample size. The college students assessed in the current survey resided in an economically developed region; a blend of relatively younger age group and features of the modern urban lifestyle (including high consumption of fatty food, cigarettes, NSAIDs and low physical activity) that characterize college life which may have, probably, contributed to a higher rate of dyspepsia and IBS in our research. This is similar to other studies where, regular smoking was identified as a risk factor of dyspepsia in North Americans [23]. Moreover, female college students in the current study showed a predominance of UD and IBS. In general, functional gastrointestinal disorders have a higher prevalence in women [24], possibly because women are more likely to present for diagnosis and undertake clinical management of such functional disorders.

As per our research, dyspepsia and IBS were observed to be significantly associated with lifestyle factors like consumption of fatty food, cigarettes, NSAIDs and low physical activity. This has been further supported by studies among college students of Japan and North America [19,23]. The latter studies also found a significant association between alcohol with dyspepsia and IBS.

Though dyspepsia and IBS are not fatal, they are associated with substantial impairment of quality of life thereby posing a significant

burden on society with sufferers experiencing higher rates of work absenteeism, reduced productivity, and higher reliance on healthcare resources [25]. This is of even greater concern for medical college students who are at an underlying risk due to heavy stress and shift work. For them, the symptoms associated with dyspepsia and IBS may have a marked impact on the individual's study habits, ability to concentrate or attend classes and performance in tests. To the best of our knowledge, no Indian university currently has a student outreach program to enhance their students' knowledge of digestive health; by providing campus-wide health lectures, which would include symptoms and management of common stress-related psychological, physical and gastrointestinal disorders (like dyspepsia and IBS). Incorporation of lifestyle modifications based on dietary habits and physical activity holds a key in the management these disorders and hence needs to be further explored in the future research.

Although this study provides new insights into the prevalence and characteristics of dyspepsia and IBS in Indian medical college students, it relied solely on data gathered from a self-report questionnaire. Thus, the physical and disease-related data may have been underreported or exaggerated.

## CONCLUSION

In conclusion, the prevalence of dyspepsia and IBS in undergraduate medical college students from Delhi was higher, more so over in female students. Association with lifestyle related factors reflects its possible role in etiology of these disorders.

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