ORIGINAL ARTICLE

PREDICTORS OF DEPRESSION IN PATIENTS PRESENTING WITH DYSPEPTIC SYMPTOMS IN A GI CLINIC

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Background: The association between dyspepsia, *H. pylori* and psychological distress has remained a topic of intense debate over the past several decades. In Pakistan, where depression is highly prevalent and dyspepsia is possibly present in a high percentage of population, little data exist about these common health problems. This study was conducted to determine the frequency and predictors of depression among patients presenting with dyspeptic symptoms in the Gastrointestinal (GI) Clinic of a tertiary care hospital in Pakistan. **Methods**: Two hundred and sixty-nine consecutive patients were enrolled in the study based on their presenting symptoms in the GI clinic at Shifa International Hospital, Islamabad. Subjects with prior history of peptic ulcer disease (PUD), gallstones and HCV infections were excluded from the study. Demographic and socioeconomic variables as well as dyspeptic symptoms and important causes of dyspeptic symptoms were recorded. Depression was analysed based on the Urdu version of Beck's Depression Inventory-II (BDI-II). The data were analysed using SPSS-10 for univariate and multivariate analyses. **Results**: Mild depression was associated with lower education status ($p<0.001$), lesser income ($p<0.018$), and lower socioeconomic status ($p<0.009$) as well as rural residence ($p<0.026$). Smoking, alcohol-use, *H. pylori* infection, gender and dyspepsia were not found to have any association with depression. On multivariate analysis, education and income group remained significantly associated with mild depression. Clinically significant depression was found to be associated with lower education and rural residence. **Conclusion**: Depression among dyspeptic patients was found to be associated with socioeconomic status rather than dyspeptic symptoms or important risk factors associated with dyspeptic symptoms.

Keywords: Depression, *H. pylori*, dyspeptic symptoms, education, income

INTRODUCTION

A high prevalence of depression has been reported from different segments of Pakistani population.[1] A burgeoning population, political instability, high illiteracy rates, decreased opportunity for education, poverty, unemployment and lack of control over day-to-day living have resulted in a sense of frustration in this country of more than 160 million citizens.[2]

Up to 25% of the population in Europe has been reported to have dyspepsia.[3] Psychological distress has been associated with dyspepsia, but does not discriminate between patients suffering from organic or functional dyspepsia (OD or FD). Furthermore, it remains debatable whether psychological distress causes dyspepsia or dyspeptic symptoms result in psychological distress.[4,5] Up to 87% of general population in the developing countries has been found to be positive for *H. pylori* antibodies.[6] In developed countries where the prevalence of *H. pylori* in general population is lower, no relationship has been found between *H. pylori*, functional health status, functional dyspepsia or intensity of dyspepsia.[7]

The association between dyspepsia, *H. pylori* and psychological distress has remained a topic of intense debate over the past several decades. In Pakistan, where depression is known to be highly prevalent and dyspepsia is possibly present in a high percentage of population little data exist about these common health problems. Dyspepsia is reported in one-third of population in Mumbai.[8] The present study was undertaken to assess the predictors of depression in the gastrointestinal (GI) clinic in Islamabad, Pakistan.

MATERIAL AND METHODS

This cross-sectional study was conducted in Shifa International Hospital, Islamabad. The study was approved by the Institutional Review Board (IRB). Consecutive patients with dyspeptic symptoms were evaluated in the gastrointestinal (GI) clinic from November 1, 2007 to March 15, 2008. Informed consent was obtained from all subjects. The subjects were logged in the database. Three hundred and eighty-five subjects with one or more dyspeptic symptoms (upper abdominal pain, bloating, early satiety and nausea/vomiting) present for more than 3 months were included in the study. All subjects were administered the Urdu translation of 21-item Beck's Depression Inventory-II (BDI-II)[9,10] when they presented to the GI clinic. The subjects independently filled out the BDI scale. The BDI-II scale has been validated for the population of Islamic countries.[11,12] Subjects with the BDI score of ≥14 were categorised as having mild depression whereas those with the BDI score of ≥18 were categorised as having clinically relevant depression.[11] A

total of 116 subjects were excluded because of having histories of peptic ulcer disease (PUD), gallstones and/or viral hepatitis or not having enough information on the BDI scale or regarding *H. pylori* infection.

H. Pylori IgG was tested by ELISA using Genesis kit (UK). The manufacturer's instructions were followed and a titer equal to or above the cut off value of 6.25 U/ml was considered positive. All subjects who underwent upper gastrointestinal endoscopy (EGD) had two biopsies taken from the gastric antrum and one from the gastric body. The histopathological confirmation of *H. pylori* infection was accomplished by Giemsa staining of paraffin-embedded tissue sections. The grading and severity of gastritis was documented based on the Sydney system.[13] Subjects who had either serological or/and histological evidence of *H. pylori* were lumped together in a composite group called *H. pylori* status. The information including socio-demographic data, dyspeptic symptoms, heart burn, tobacco or alcohol use, proton pump inhibitor (PPI) and/or histamine receptor blockers (H_2RB) use, exposure to non steroidal anti-inflammatory drugs (NSAIDs), consumption of mineral or municipal water, the BDI score, serological and histopathological findings of *H. pylori* infection was entered into data collecting forms (DCFs). Education was categorised as either less than or greater than 12 grades. Income was categorised as either less than Pak Rupees 25,000/month or greater than Pak Rupees 25,000/month. A composite variable comprising of income and education was termed socioeconomic status. Subjects who reported use of smoking and/or chewing tobacco were lumped together in the tobacco user category.

The data were entered and analysed using SPSS-10 for windows. For continuous variables such as Age and BMI, Mean±SD have been reported. For categorical variables, Number (%) have been reported. Association of risk factors with the outcome of interest (depression) was tested by Chi-Square test. Odds ratios and 95% confidence intervals (CI) were also calculated. The variables that were significantly associated with the outcome of interest as well as age and gender were put in the logistic regression model. Odds ratios, and 95% CI have been reported, and $p<0.05$ was taken as significant.

RESULTS

Two hundred and sixty-nine subjects were included in the final analysis. There were 150 men and 119 women. The mean age and body mass index (BMI) of subjects were 41±15 years and 26.44±5.02 respectively. There was no statistically significant difference in age or BMI between subjects with or without depression. The associations of mild depression with socioeconomic and demographic variables, symptoms as well as risk factors associated with dyspepsia are summarised in Table-1. Nineteen subjects were tested for both serology and

histopathology of *H. pylori*. Four subjects were positive for serology but negative for histopathology, whereas six were positive for histopathology but negative for *H. pylori* serology. Nine subjects were positive for both *H. pylori* serology and histopathology. Histopathological examination of 93 patients revealed chronic gastritis in 89 (95.6%); mild in 51 and moderate in 38, evidence of activity in 37 (39.8%), atrophy in 66 (71%) and intestinal metaplasia in 4 (4.3%).

On univariate analyses depression was found to be significantly associated with lesser education ($p<0.001$), rural residence ($p<0.026$), lower income ($p<0.018$) and lower socioeconomic status ($p<0.009$) Table-1. There was no significant association of depression with risk factors for dyspepsia (Table-1). Among dyspeptic symptoms, vomiting achieved significance for depressed subjects on univariate analysis, but nausea or nausea and vomiting together did not achieve statistical significance. Because only 37/269 subjects complained of vomiting, it was excluded from the multivariate analysis and age, gender, residence, education level, income group as well as socioeconomic status were included in the final analysis. Lower education level and lower income group were found to be significantly associated with depression (Table-2). Out of 269, 65 subjects were found to be clinically depressed on the BDI-II scale. Rural residence, lower education and lower income were significant on the univariate analysis and lower education and rural residence remained significant on the multivariate analysis using the same variables that were used for mildly depressed subjects (Table-2).

DISCUSSION

The present study highlights that depression is highly prevalent (46.5%) in patients with dyspeptic symptoms in Pakistan. Depression was found to be associated with socioeconomic factors rather than gastrointestinal symptoms. The study is unique as it reports important data related to status of *H. pylori* infection, dyspeptic symptoms, depression and socioeconomic factors in the understudied Pakistani population. We have not come across any published manuscript where predictors of depression were reported from a GI Clinics in South Asia.

Depending upon the source of data collection, the adjusted prevalence of depression and anxiety disorders is reported in 44.4% of rural population, while the prevalence of depression is reported in 5.9% of urban population, and in 18 to 24% of individuals presenting to traditional healers in Pakistan.[15]

Women have been consistently reported to have a higher prevalence of depression in Pakistan. In addition to gender, unemployment, divorce, aging, low family income and having many children are other predictors of depressive and anxiety disorders reported from Pakistan.[14]

Table-1: Association of demographic and socioeconomic factors, clinical symptoms and risk factors of dyspepsia with depression

	Value	Depression with Beck Score ≥14		Total	Odds Ratio	p
		Yes (n=125)	No (n=144)			
Demographic and socioeconomic factors						
Gender	Male	64 (42.7%)	86 (57.3%)	150	0.708 (.436–1.148)	0.160
	Female	61 (51.3%)	58 (48.7%)	119		
Marital Status	Single	28 (47.5%)	31 (52.5%)	59	1. 052 (.590–1.877)	0.863
	Married	97 (46.2%)	114 (53.8%)	210		
Residential Status	Rural	37 (58.7%)	26 (41.3%)	63	1.908 (1.076–3.383)	0.026
	Urban	88 (42.7%)	118 (57.3%)	206		
Educational Categories	Up to intermediate	82 (55.4%)	66 (44.6%)	148	2.254 (1.376–3.692)	0.001
	Above intermediate	43 (35.3%)	78 (64.5%)	121		
Income Group	Up to Rs. 25,000	44 (57.9%)	32 (42.1%)	76	1.901 (1.111–3.255)	0.016
	Above Rs. 25,000	81 (42%)	112 (58%)	193		
Socioeconomic Status	Low	91 (52.3%)	83 (47.7%)	174	2.967(1.176–3.290)	0.009
	High	34 (35.8%)	61 (64.2%)	95		
Symptom						
Upper abdominal pain	Yes	75 (60%)	63 (64.6%)	168	0.823 (0.502–1.349)	0.439
	No	50 (40%)	51 (35.4%)	101		
Heartburn	Yes	47 (37.6%)	53 (36.8%)	100	1.035 (0.630–1.698)	0.893
	No	78 (62.4%)	91 (63.2%)	169		
Early satiety	Yes	19 (15.2%)	19 (13.2%)	38	1.179 (0.594–2.343)	0.638
	No	106 (84.8%)	125 (86.8%)	23		
Nausea	Yes	45 (36%)	49 (34%)	94	1.091 (0.660–1.802)	0.735
	No	80 (64%)	95 (66%)	175		
Bloating	Yes	64 (51.2%)	88 (61.1%)	152	0.668 (0.411–1.084)	0.102
	No	61 (48.8%)	56 (38.9%)	117		
Vomiting	Yes	23 (18.4%)	14 (9.7%)	37	2.094 (1.026–4.272)	0.039
	No	102 (81.6%)	130 (90.3%)	232		
Nausea or Vomiting	Yes	59 (47.2%)	53 (36.8%)	112	1.535 (0.942–2.500)	0.085
	No	66 (52.8%)	91 (63.2%)	157		
Risk factors of Dyspepsia						
Serology	Positive	55 (59.1%)	49 (48%)	104	1.566 (.880–2.761)	0.121
	Negative	38 (40.9%)	53 (52%)	91		
Histopathology	Positive	37 (88.1%)	46 (90.2%)	83	0.804 (0.216–2.990)	0.745
	Negative	5 (11.9%)	5 (9.8%)	10		
Composite *H. pylori*	Positive	86 (68.8%)	89 (61.8%)	175	1.363 (.821–2.761)	0.230
	Negative	39 (31.2%)	55 (38.2%)	94		
NSAIDs	Yes	43 (34.4 %)	40 (27.8%)	83	1.363 (.812–2.291)	0.241
	No	82 (65.6%)	104 (72.2%)	186		
PPIs	Yes	47 (37.6%)	45 (31.3%)	92	1.326 (.800–2.197)	0.274
	No	78 (62.4%)	99 (68.8%)	177		
H₂ Receptor blocker	Yes	16 (12.8%)	18 (12.5%)	34	1.028 (0.5–2.112)	0.941
	No	109 (87.2%)	126 (87.5%)	235		
Smoking	Yes	36 (28.8%)	36 (25%)	72	1.213 (.707–2.083)	0.483
	No	89 (7.2%)	108 (75%)	197		
Diabetes mellitus	Yes	10 (8%)	17 (11.8%)	27	0.650 (.286–1.476)	0.300
	No	115 (92%)	127 (88.2%)	242		

Table-2: Determinants of mild and clinical depression (Multivariate analyses)

	Mild Depression				Clinical Depression			
		95.0% CI				95.0% CI		
Risk factors	Odds Ratio	Lower	Upper	p	Odds ratio	Lower	Upper	p
Age	1.009	0.989	1.030	0.362	0.693	0.384	1.251	0.224
Gender	0.693	0.384	1.251	0.224	0.726	0.433	1.218	0.225
Residential status	2.044	1.081	3.868	0.028	1.683	0.920	3.079	0.091
Education	4.112	1.053	16.055	0.042	5.104	1.810	14.394	0.002
Income group	1.323	0.616	2.840	0.473	2.442	1.160	5.143	0.019
Socioeconomic status	0.351	0.076	1.611	0.178	0.317	0.097	1.044	0.059

Table 3: Association of NSAIDs use with dyspeptic symptoms (Uni-variate analyses)

Symptom	Value	NSAIDs Use		Total	Odds Ratio	p
		Yes (n=83)	No (n=186)			
Upper abdominal pain	Yes	49 (59%)	119 (64%)	168	0.811 (0.418–1.379)	0.439
	No	34 (41%)	67 (36%)	101		
Early satiety	Yes	9 (10.8%)	29 (15.6%)	38	0.658 (0.297–1.461)	0.302
	No	74 (89.2%)	157 (84.4%)	231		
Bloating	Yes	48 (57.8%)	104 (55.9%)	152	1.081 (0.641–1.824)	0.770
	No	35 (42.2%)	82 (44.1%)	117		
Nausea/vomiting	Yes	33 (39.8%)	72 (42.5%)	112	0.894 (0.528–1.514)	0.677
	No	50 (60.2%)	107 (57.5%)	157		

In line with the available data in Pakistan, data presented in this study showed association of lower income, relatively lower level of education, rural living and female gender; however, the prevalence of depression in dyspeptic patients was found to be more than seven times higher than in the urban Pakistani population. Even compared to individuals presenting to traditional healers, the prevalence of depression was higher in the presented sample.[15]

It has been reported that patients with functional gastrointestinal disorders (FGID) and irritable bowel syndrome (IBS) consult health care providers because they become alarmed by their symptoms as a result of underlying psychological stress or psychiatric diagnoses. Whether psychiatric distress or underlying psychopathology plays a causative role in their symptoms is debatable; thus far no clear and conclusive evidence has linked any psychiatric condition with FGID and/or IBS.[3] The patients seen with dyspeptic symptoms in the GI clinic in Islamabad did not show any association of depression with their GI symptoms. Many psychological factors can result in dyspepsia: stressful life events (bereavement, marital separation, court appearance), personality and coping styles, psychiatric disorders, physical or sexual abuse, health beliefs and illness behaviour as well as hereditary.[16] In this particular study, only one psychiatric disorder–depression–was studied and did not show any association with dyspeptic symptoms. However, one can speculate that factors associated with depression: low income, education, as well as rural living may cause environmental stress, affect coping mechanisms and result in dyspeptic symptoms.

NSAIDs (34.4% versus 27.8%) and PPI (37.6% versus 31.3%) use was more frequently reported by depressed compared to non-depressed subjects. One can speculate that NSAIDs were more often used by depressed subjects because of either a preponderance of somatic symptoms or a higher prevalence of coronary artery disease; moreover, because of NSAID use, depressed subjects used PPIs more frequently as well. We analysed use of NSAIDs and abdominal symptoms, and did not find any relationship between NSAID use and abdominal symptoms (Table-3).

The limitations of this study include recruitment of relatively lower number of subjects with less income and lower education level, and arbitrary cut off levels for education (<12 grade) and income (<PKR 25,000) levels. Because SIH provides care to greater than 80% patients based on fee-for-service, we could not recruit more patients with lower socioeconomic status. Nonetheless, association of depression with socioeconomic status and not dyspeptic symptoms or *H.*

pylori status in this unique population as presented in this manuscript adds important observations that can help understand pertinent issues of these patients while caring for them.

CONCLUSION

Depression among dyspeptic patients was found to be associated with socioeconomic status rather than dyspeptic symptoms or important risk factors associated with dyspeptic symptoms.

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