

# Burden, clinical aspects and correlates of dyspepsia among the population in Jeddah, Saudi Arabia

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## Abstract

**Background:** Dyspepsia is a common medical disorder affecting the gastrointestinal system. It is common among the population, and contributes to a considerable impairment in quality of life by affecting the person's social and emotional functioning.

**Objectives:** To study the magnitude, clinical aspects and correlates of dyspepsia among the population in Jeddah, Saudi Arabia.

**Method:** This was a cross sectional study; the non-probability convenient sampling method was used to collect data on 248 subjects from 5 May 2021 to 26 August 2022 via online-Google form questionnaire on the population in Jeddah, Saudi Arabia. This questionnaire provided information on personal, sociodemographic characteristics, clinical aspects and eating habits. In addition, the Rome IV criteria for classifying functional GI disorders, and the Depression Anxiety Stress Scales-21 (DASS-21) questionnaires were used.

**Statistical analysis:** data were analyzed using SPSS version 23. The Chi square test of significance was used. The level of significance was 0.05.

**Results:** Dyspepsia was encountered among 40% of the subjects. The majority of them had dyspepsia of the functional type. Early satiation, upper abdominal pain, nausea, constipation and diarrhea were the significant symptoms associated with dyspepsia. The significant correlates of dyspepsia were using Aspirin and pain killers, eating heavy meals, particularly at night, and family history of dyspepsia. Also not drinking plenty of water and not eating vegetable and fruits were significant determinants of dyspepsia. Dyspepsia was significantly associated with increased score for anxiety ( $p < 0.05$ ), and was significantly associated with extremely severe depression ( $p < 0.05$ ).

**Conclusion:** Dyspepsia is a common gastrointestinal disorder among the population. It is associated with several gastrointestinal symptoms. Family history of dyspepsia, and dietary habits and intake of certain drugs were significant determinants of dyspepsia. It is significantly associated with impairment of the emotional state of the subjects. These findings may help the health care planners to consider these points when developing health education programs to combat dyspepsia among the general population.

**Keywords:** Dyspepsia, Jeddah, anxiety and depression, dietary habits

## Introduction

Dyspepsia frequently occurs more often in women than in men (1,2). Marital status and economic status and educational level were associated with dyspepsia (3). Women smokers were more likely than non-smokers to experience dyspepsia. Hypertension is frequently present in patients with reflux esophagitis or Barrett's esophagus but not in those with non-ulcer dyspepsia. Insulin- or non-insulin-dependent diabetics have delayed gastric emptying (diabetic gastroparesis). Some of them complain of epigastric pain, nausea, vomiting or postprandial fullness (diabetic dyspepsia). Asthma was significantly associated with dyspepsia (4). Endoscopy is recommended as the first investigation in the work up of a patient with dyspeptic symptoms and is essential in the classification of the patient's condition as organic or functional dyspepsia (5).

The most common symptoms of functional dyspepsia include upset stomach, discomfort or pain in the belly, bloating, and feeling full quickly when eating (6 - 8). Dyspepsia was strongly associated and often coincident in onset with generalized anxiety disorder and major depressive episodes in the community and with chronic morbidity, and smoking (9-15). Dietary habits, type of food and drinks as well as having irritable bowel syndrome were significantly associated with dyspepsia and its aggravation (16 - 24). Patients with functional dyspepsia are a heterogeneous group in whom psychological and environmental factors and stress may contribute to aggravation of their dyspeptic symptoms (24-27). The aim of the present study was to study the impact of dietary habit and lifestyle as determinants of dyspepsia among Medical Students in Jeddah Saudi Arabia.

## Methodology

This was a cross sectional study; the non-probability convenient sampling method was used to collect data through online-Google forms. Sample size: Using the G\*Power statistical power analysis to calculate the sample size; it was found that the minimum sample size according to Effect size = 0.3, alpha = 0.05, and Power = 95%, and 5 degrees of freedom was 227 (27). Thus the present study enrolled 248 adult subjects from Jeddah city, in Saudi Arabia. Information on the studied subjects was collected using a structured questionnaire which provided information on personal and sociodemographic characteristics as well as information on the morbid characteristics, and dietary habits of the respondents. Also the ROME IV questionnaire on criteria for diagnosis and classification of dyspepsia was used (28). The DASS21-Depression Anxiety Stress Scales was also used (29). Statistical analysis: data was analyzed using SPSS version 23. The Chi Square test of significance was used to assess the different associations. The level of significance was 0.05.

## Results

Table 1 displays that dyspepsia was not significantly associated with age, gender, educational level or occupation and income, in the studied subjects ( $p > 0.05$ ). Dyspepsia was also irrelevant to smoking habit and was not significantly associated with hypertension, diabetes mellitus or asthma ( $p > 0.05$ ) Table 2 reveals that subjects with dyspepsia were significantly more likely to undergo abdominal endoscopy compared to those without dyspepsia ( $p < 0.05$ ). However only

4% had abnormal results. Table 3 displays that subjects with dyspepsia tended significantly to feel satiation after eating regular size meal, and were significantly more likely to have pain in the upper part of the stomach or burning sensation ( $p < 0.05$ ). Subjects with dyspepsia significantly felt that pain radiate to the chest ( $p < 0.05$ ). The majority of the subjects with dyspepsia felt the pain in the upper middle part of the epigastrium, and the pain was moderate to severe ( $p < 0.05$ ).

Subjects with dyspepsia, had significantly increased abdominal distension and nausea ( $p < 0.04$ ). Table 3 shows subjects with dyspepsia significantly use pain killers and aspirin ( $p < 0.05$ ). Table 4 shows subjects with dyspepsia had significantly higher incidence of family history of dyspepsia ( $p < 0.05$ ). Table 5 reveals that subjects with dyspepsia significantly feel burning pain in the abdomen in the morning ( $p < 0.05$ ); they significantly had heavy meals, and did not drink water or eat fruits and vegetables ( $p < 0.05$ ).

Table 1: Distribution of the subjects according to dyspepsia and personal, sociodemographic, and morbidity conditions

Variable	Categories	Dyspepsia				Total	$\chi^2$ p-value	
		No		Yes				
		N	%	N	%			
Gender	Female	78	71.6%	99	71.2%	177	71.4%	.003 .954
	Male	31	28.4%	40	28.8%	71	28.6%	
Social status	Married	40	36.7%	48	34.5%	88	35.5%	.330 .848
	Single	64	58.7%	86	61.9%	150	60.5%	
	Divorced	5	4.6%	5	3.6%	10	4.0%	
Income per month	0	0	0.0%	6	4.5%	6	2.5%	5.418 .144
	Less than 2000	40	37.4%	53	39.8%	93	38.8%	
	2000-5000	15	14.0%	17	12.8%	32	13.3%	
	more than 5000	52	48.6%	57	42.9%	109	45.4%	
Smoking habit	Yes	0	0.0%	1	5.0%	1	2.9%	.772 .380
	No	15	100.0%	19	95.0%	34	97.1%	
History of hypertension	Yes	8	7.3%	7	5.0%	15	6.0%	.570 .450
	No	101	92.7%	132	95.0%	233	94.0%	
History of DM	Yes	9	8.3%	7	5.0%	16	6.5%	1.050 .305
	No	100	91.7%	132	95.0%	232	93.5%	
History of Asthma	Yes	6	5.5%	10	7.2%	16	6.5%	.289 .591
	No	103	94.5%	129	92.8%	232	93.5%	

Table 2: Distribution of the subjects according to dyspepsia and abdominal clinical aspects

Variable	Categories	Dyspepsia		Total	p-value
		No	Yes		
Had Endoscopy in the last 3 months	Yes	0 0.0%	4 3.7%	4 1.6%	5.185* .023
	No	139 100.0%	105 96.3%	244 98.4%	
Abnormal in endoscopy	Yes	0 0.0%	2 4.0%	2 2.1%	1.798 .180
	No	44 100.0%	48 96.0%	92 97.9%	
Feel satiation after eating regular size meal	Yes	95 68.3%	89 81.7%	184 74.2%	5.649 .017
	No	44 31.7%	20 18.3%	64 25.8%	
Have pain in upper part of stomach or burning	Yes	38 27.3%	74 67.9%	112 45.2%	40.565 .000
	No	101 72.7%	35 32.1%	136 54.8%	
Pattern of pain	Continuous	8 17.4%	21 25.9%	29 22.8%	1.213 .271
	Intermittent	38 82.6%	60 74.1%	98 77.2%	
Feel the pain moves to another part of the stomach or chest	Yes	19 28.4%	45 47.4%	64 39.5%	5.941 .015
	No	48 71.6%	50 52.6%	98 60.5%	
The pain disappears after defecation	Yes	29 47.5%	34 36.2%	63 40.6%	1.983 .159
	No	32 52.5%	60 63.8%	92 59.4%	

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Table 2: Distribution of the subjects according to dyspepsia and abdominal clinical aspects (continued)

<b>Site of the pain</b>	Upper right part of the stomach	10 6.7%	10 9.2%	20 7.8%	62.723 .000
	Upper middle part of the stomach	39 26.2%	75 68.8%	114 44.2%	
	Upper left part of the stomach	100 67.1%	24 22%	124 48.1%	
<b>Severity of the pain</b>	Mild	23 39.0%	16 17.2%	39 25.7%	13.598 .001
	Moderate	35 59.3%	63 67.7%	98 64.5%	
	Severe	1 1.7%	14 15.1%	15 9.9%	
<b>What aggravates pain?</b>	After food	33 60.0%	57 62.0%	90 61.2%	.546 .761
	The food	8 14.5%	16 17.4%	24 16.3%	
	Hunger	14 25.5%	19 20.7%	33 22.4%	
<b>Abdominal distension</b>	Yes	57 41.0%	68 62.4%	125 50.4%	11.169 .001
	No	82 59.0%	41 37.6%	123 49.6%	
<b>Nausea</b>	Yes	34 24.5%	46 42.2%	80 32.3%	8.800 .003
	No	105 75.5%	63 57.8%	168 67.7%	

Table 3: Distribution of the subjects according to dyspepsia and investigations and medication history

Variable	Categories	Dyspepsia				Total	X <sup>2</sup> (p-value)	
		Yes		No				
Have allergy to Food	Yes	14	12.8%	17	12.2%	31	12.5%	.021
	No	95	87.2%	122	87.8%	217	87.5%	.885
Had H pylori before	YES	17	12.2%	22	20.2%	39	15.7%	2.916
	No	122	87.8%	87	79.8%	209	84.3%	.088
Use pain killers	YES	13	9.4%	22	20.02%	35	14.1%	5.913
	NO	126	90.6%	87	79.8%	214	85.9%	.015
Take aspirin	YES	9	6.5%	15	13.8%	24	9.7%	3.711
	NO	130	93.5%	94	86.2%	224	90.3%	.045
Feel depression or stress in your life	YES	75	54.0%	72	66.1%	147	59.3%	3.704
	NO	64	46.0%	37	33.9%	101	40.7%	.054
Similar condition in the family	YES	51	36.7%	65	59.6%	116	46.8%	12.916
	NO	88	63.3%	44	40.4%	132	53.2%	.000

Table 4: Distribution of the subjects according to having dyspepsia and psychological life

Variable	Categories	Dyspepsia				Total		$\chi^2$ (p- value)
		No		Yes		N	%	
		N	%	N	%			
Activity during day	Little bit	27	19.4%	28	25.7%	55	22.2%	3.962 .138
	Middle	13	9.4%	4	3.7%	17	6.9%	
	High	99	71.2%	77	70.6%	176	71.0%	
Feel full early while eating	Yes	92	61.7%	78	71.6%	170	65.9%	6.218 .045
	No	47	31.5%	30	27.5%	77	29.8%	
Feel the urge to defecate	Yes	45	32.4%	47	43.1%	92	37.1%	3.023 .082
	No	94	67.6%	62	56.9%	156	62.9%	
Many times urge to defecate after eating	0	0	0.0%	1	0.9%	1	0.4%	8.947 .062
	Less than 3 times	59	39.6%	49	45.0%	108	41.9%	
	More than 3 times	10	6.7%	16	14.7%	26	10.1%	
Type of stool	Normal	115	82.7%	77	70.6%	192	77.4%	7.554 .023
	Constipation	17	12.2%	16	14.7%	33	13.3%	
	Diarrhea	7	5.0%	16	14.7%	23	9.3%	
Eat in place of low hygiene	Yes	10	7.2%	14	12.8%	24	9.7%	2.231 .135
	No	129	92.8%	95	87.2%	224	90.3%	
Eat chocolate	Yes	40	28.8%	32	29.4%	72	29.0%	.010 .920
	No	99	71.2%	77	70.6%	176	71.0%	

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Table 4: Distribution of the subjects according to having dyspepsia and psychological life (continued ...)

	No	129 92.8%	95 87.2%	224 90.3%	
Eat chocolate	Yes	40 28.8%	32 29.4%	72 29.0%	.010 .920
	No	99 71.2%	77 70.6%	176 71.0%	
Categories of stress	Normal	84 60.4%	46 42.2%	130 52.4%	9.393 .052
	Mild	26 18.7%	28 25.7%	54 21.8%	
	Moderate	17 12.2%	16 14.7%	33 13.3%	
	Severe	7 5.0%	10 9.2%	17 6.9%	
	Extremely severe	5 3.6%	9 8.3%	14 5.6%	
Categories of anxiety	Normal	82 59.4%	50 45.9%	132 53.4%	11.455 .022
	Mild	6 4.3%	6 5.5%	12 4.9%	
	Moderate	23 16.7%	15 13.8%	38 15.4%	
	Severe	14 10.1%	11 10.1%	25 10.1%	
	Extremely severe	13 9.4%	27 24.8%	40 16.2%	
Categories of depression	Normal	87 63.0%	47 43.1%	134 54.3%	12.332 .015
	Mild	15 10.9%	16 14.7%	31 12.6%	
	Moderate	22 15.9%	21 19.3%	43 17.4%	
	Severe	4 2.9%	10 9.2%	14 5.7%	
	Extremely severe	10 7.2%	15 13.8%	25 10.1%	



Table 5: Distribution of the subject according to having dyspepsia and daily habit

Variable	Categories	Dyspepsia				Total		$\chi^2$ (p-value)
		NO		YES				
Eat heavy meals before bed	Yes	41	29.5%	46	42.2%	87	35.1%	4.330 .037
	No	63	57.8%	98	70.5%	161	64.9%	
Suffer from burning in the morning	Yes	16	11.5%	47	43.1%	63	25.4%	32.210 .000
	No	123	88.5%	62	56.9%	185	74.6%	
How many meals do you eat	Less than 3	71	53.8%	57	53.8%	128	53.8%	.745 .689
	3 meals	47	35.6%	41	38.7%	88	37.0%	
	4 meals	41	10.6%	8	7.5%	22	9.2%	
Type of meals	Snack	85	57.0%	53	48.6%	138	53.5%	11.532 .003
	Heavy	64	42.9%	56	51.4%	120	46.5%	
Eat fast food	Yes	57	41.0%	50	45.95	107	43.1%	.589 .443
	No	82	59.0%	59	54.1%	141	56.9%	
Times eat fast food	0	59	39.6%	39	35.8	98	38%	6.493 261
	1	30	20.1%	22	20.2%	52	20.2%	
	2	34	22.8%	19	17.4%	53	20.5%	
	3	13	8.7%	10	9.2%	23	8.9%	
	More than 3	13	8.7%	19	17.4%	32	12.4%	
Habit drinking fluid with food	Yes	103	74.1%	74	67.9%	177	71.4	1.153 .283
	No	36	25.9%	35	32.1%	71	28.6%	
Type of drink	Fruit juice	6	5.1%	10	11.2%	16	7.7%	11.769 019
	Soft drink	38	32.2%	34	38.2%	72	34.8%	
	Water	62	52.5%	31	34.8%	93	44.9%	
	Coffee or tea	11	9.3%	8	9.0%	19	9.2%	
	Milk	1	0.8%	6	6.7%	7	3.4%	
Eat vegetables and fruits	Yes	54	38.8%	29	26.6%	83	33.5%	4.113 .043
	No	85	61.2%	80	73.4%	165	66.5%	
Eat spicy food	YES	86	61.9%	73	67.0%	159	64.1%	.691 .406
	NO	53	38.1%	36	33.0%	89	35.9%	
Eat spicy food	YES	93	62.4%	68	62.4%	161	62.4%	8.164 .017
	NO	46	30.9%	41	37.6%	87	33.7%	
Eat fatty food	YES	73	52.5%	62	56.9%	135	54.4%	.469 .494
	NO	66	47.5%	47	43.1%	113	45.6%	

Table 5: Distribution of the subject according to having dyspepsia and daily habit (continued ...)

Like salty food	YES	75	54.0%	65	59.6%	140	56.5%	.801
	NO	64	46.0%	44	40.0%	108	43.5%	.371
Drink coffee and tea	YES	115	82.7%	94	86.2%	209	84.3%	.566
	NO	24	17.3%	15	13.8%	39	15.7%	.452
The time of drinking coffee and tea	Morning before breakfast	26	21.1%	21	21.4%	47	21.3%	1.276 .735
	After lunch	8	6.5%	6	6.1%	14	6.3%	
	Not have certain time	89	72.4%	70	71.4%	159	71.9%	
Eat sour foods and drink	YES	67	48.2%	58	53.2%	125	50.4%	.613
	NO	72	51.8%	51	46.8%	123	49.6%	.434
Smoker	YES	13	9.4%	17	15.6%	30	12.1%	2.240 .134
	NO	126	90.6%	92	84.4%	218	87.9%	
Habit smoke after eating	YES	15	10.1%	15	13.8%	30	11.6%	1.391a .499
	NO	38	25.5%	31	28.4%	69	26.7%	

## Discussion

The present study was carried out to determine the magnitude of the problem of Dyspepsia among the population in Jeddah city, in Saudi Arabia and to study its manifestations and its impact on the psychological aspects of the subjects.

Previous studies revealed that dyspepsia was frequently more common among women compared to men (1, 2). This was not in line with findings from the present study.

Several studies reported that married status and unemployment seemed to increase the risk of functional dyspepsia (4,5). These findings contradict the findings of the present study. Job stress has been reported as a risk factor of psychological changes, which have been shown to be related to gastrointestinal diseases and symptoms such as functional dyspepsia (10). This is not in line with the findings from the present study. In the present study, smoking was not significantly associated with occurrence of dyspepsia. This is not in line with findings of previous studies (4,8)

Previous study found that hypertension was frequently present in patients with reflux esophagitis or Barrett's esophagus, but not in those with non-ulcer dyspepsia (4). In the present study we also found no significant association between hypertension and dyspepsia. Previous study revealed that patients with diabetes mellitus suffered from diabetic dyspepsia (9). However in the present study no such association between diabetes mellitus and dyspepsia was found. Endoscopy is recommended as the

first investigation in the work up of a patient with dyspeptic symptoms and is essential in the classification of the patient's condition as organic or functional dyspepsia. Although the correlation between mucosal alterations and symptom pattern is difficult, endoscopy will remain the initial investigation of choice for clinically relevant abnormalities that need proper detection and biopsy (5). In the present study a very low percentage of the population with dyspepsia had endoscopy done (4%). Early satiety was significantly associated with dyspepsia in the studied subjects. This is in line with findings from previous studies (13, 15). In dyspepsia the patient suffers from pain or discomfort, in the upper middle part of the stomach area. The pain might come and go, but it is there most of the time with distention and nausea (5). This is in line with findings from the present study. H. pylori infection may cause dyspeptic symptoms through other mechanisms such as: (1) alterations of gastric acid secretion; (2) persistent and active inflammation of gastric mucosa; and (7) post-infective changes in gastroduodenal mucosa (6). This was not in line with findings from the present study, as H. pylori infection was not significantly associated with dyspepsia. Opioid analgesics are commonly and in most cases effectively used to manage chronic pain of moderate to severe intensity. Apart from analgesia, opioids exert numerous adverse effects, several of which affect the gastrointestinal tract (7). In the present study, intake of painkillers were significantly associated with occurrence of dyspepsia. Aspirin can lead also, to adverse gastrointestinal effects ranging from dyspepsia with endoscopically normal gastric mucosa, asymptomatic and symptomatic lesions such as erosions and ulcers, and complications of ulcers

including bleeding and perforation (8,14). This is in line with the present study where intake of aspirin was significantly associated with occurrence of dyspepsia.

Independent risk factors for dyspepsia adjusted for age, sex, body mass index and anti-secretory therapy were a positive family history of abdominal pain (10). This is in line with findings from the present study, where family history of dyspepsia was significantly associated with having dyspepsia. Functional dyspepsia is a chronic disease that is frequently encountered in everyday clinical practice and is characterized by four epigastric symptoms: epigastric pain, epigastric burning, early satiety, and postprandial fullness (11). In the daily lives of patients, abnormal eating, such as rapid or large volume behavior meal ingestion (conditions that are reproduced during the rapid drinking test), may overload the gastric accommodation process, thus generating symptoms (17). This is in line with findings from the present study. A previous study described an impaired drinking capacity for both water and nutrient liquid meal in functional dyspepsia patients compared to healthy volunteers, even though no association with specific symptoms pattern had emerged (18). Similar findings were observed in the present study. High consumption of spicy foods is associated with greater odds of frequent postprandial fullness and epigastric pain (13). Spicy food ingestion was significantly associated with dyspepsia in the present study. Exercise is being widely recommended as part of the first-line treatment for functional dyspepsia by some experts (20). This is not in line with the present study. Previous studies found that patients with functional dyspepsia have a higher rate of anxiety and depression (25,26). In the present study we found that severe anxiety and extremely severe depression scores were significantly associated with dyspepsia.

### Limitations

There are some limitations to this study: as this study is cross-sectional, the causal relationship remains unknown, and we do not know if the effects of these variables on dyspepsia during the COVID-19 pandemic will persist in the long term. It is also a nonprobability convenient sample, and its generalization to the population may be defective; however, it is an exploratory study.

### Acknowledgments

We thank all the participants for their cooperation throughout the study.

### Conclusion

Dyspepsia is a common gastrointestinal disorder among the population of Jeddah city in Saudi Arabia. It is associated with several gastrointestinal symptoms, namely pain and satiation. It is significantly common among those with family history of dyspepsia, and among those who did not drink enough water or commonly used painkillers and aspirin. It was significantly associated with severe anxiety and depression. These findings may help the health care planners to consider these points when developing health education programs to combat dyspepsia among the general population.

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