Research Article

The prevalence and risk factors of non-ulcer dyspepsia in the western region of Saudi Arabia: Short form Leads dyspepsia questionnaire revisited

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ABSTRACT

Background: Non-ulcer dyspepsia is one of the most common gastrointestinal (GI) problems with a worldwide incidence of 21%. Although dyspepsia is not a life threatening condition, it can significantly impact the quality of life of affected patients. Several risk factors are suggested to increase the risk of dyspepsia such as smoking and over usage of non-steroidal anti-inflammatory drug's. **Objectives:** This study was conducted to assess the prevalence of dyspepsia among the population of Taif city in the western region of Saudi Arabia in addition to determining its potential risk factors. **Materials and Methods:** This was a cross sectional observational study. Data was collected using a self-administration questionnaire based on short form of Leads dyspepsia questionnaire. A total of 1408 participants took part in the study while only 1276 were eligible for the statistical analysis. **Results:** Results showed that 66.1% of the participants suffer from dyspepsia. The subtypes of dyspepsia revealed 62.1% were suffering from heartburn like pain, 50.5% suffer from regurgitation, 58.0% suffer from nausea with variant frequencies. Females showed high prevalence of dyspepsia ($P < 0.001$) compared to males and nausea was statistically significant among females ($P < 0.001$). Smoking was associated with higher prevalence of reflux like variant ($P = 0.017$) and over usage of pain killers was also associated with higher prevalence of dyspeptic symptoms ($P < 0.001$). **Conclusion:** It is important to minimize the unnecessary prescription of pain-killers to minimize the associated risks of developing GI disorders especially among females who are at a higher risk compared to males. In addition, raising the awareness about the risks associated with smoking can have a crucial role in lowering the prevalence and intensity of non ulcer dyspepsia.

KEY WORDS: Non-ulcer Dyspepsia; Short form Leads Dyspepsia Questionnaire; Pain abdomen,Smoking

INTRODUCTION

Functional dyspepsia is the presence of upper abdominal discomfort in the absence of any known structural cause and the discomfort has no association with bowel movement or passage of flatus differentiating it from Irritable bowel syndrome. There is a combination of visceral hypersensitivity, gastric motor dysfunction and psychological factors. Although functional dyspepsia is not life threatening but it has a significant impact on the health care system.[1-3]

Non Ulcer dyspepsia is one of the most common gastrointestinal (GI) problems as the worldwide incidence of dyspepsia reaches 21% with some differences between different populations and geographical regions.[4] The term uninvestigated dyspepsia is used to describe the patients who didn't undergo any investigations. While patients who had upper GI endoscope and were found to have pathologies responsible for their symptoms are described as patients with organic dyspepsia. And the patients without any causes of their symptoms are described as having functional dyspepsia.[4,5] Although

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dyspepsia is not considered a life threatening condition and has no effect on the life span and mortality of the patients;[6] its impact on the quality of life is noticeable. Several previous studies reported reduced quality of life in dyspepsia patients compared to the healthy population.[7-10]

Many studies also showed that dyspepsia has negative effect on patients life in terms of low productivity at work, high absence rate, and lesser daily activity which means that it has a considerable financial effect on the life of the patients.[11-13] The symptoms of Dyspepsia can be assessed by measuring either frequency or severity. The present study utilized short-form Leeds dyspepsia questionnaire (SF-LDQ) which has a sensitivity of 77% and specificity of 75%.[11] The focus was to rule out other causes of pain abdomen like gall stones, pancreatitis etc. The SF-LDQ contained the four questions from the LDQ which had the greatest validity compared with dyspepsia diagnosis by general practitioners and gastroenterologists. Each question comprised two stems concerning the frequency and severity of each symptom during the last 2 months. This time frame was a balance between reducing recall bias (requiring a shorter time frame) and maximizing data capture without unnecessary respondent burden (requiring a longer time frame). The SF-LDQ also contained a single question concerning the most trouble-some symptom experienced by the patient to enable categorization of patients on the basis of predominant heartburn or epigastric pain.

Due to the several effects of dyspepsia on the whole community, this observational study was carried out to determine the prevalence and various risk factors associated with dyspepsia in the Taif city in Saudi Arabia.

MATERIALS AND METHODS

Study Design

This was cross sectional observational study conducted to assess the prevalence of non ulcer dyspepsia in Taif city, Saudi Arabia. The study included identifying the potential risk factors associates with non ulcer dyspepsia based on SF-LDQ. The SF-LDQ was modified and focused on following questions.

a. Reflux-like dyspepsia: Heartburn mostly acid regurgitation without any endoscopic documentation of esophagitis.
b. Ulcer-like dyspepsia: Three or more of the following symptoms, but upper abdominal pain must be predominant.
    i. Epigastric pain.
    ii. Pain relieved by food.
    iii. Pain relieved by antacids or acid reducing drugs Pain occurring before meals or when hungry Pain that at times wakes the patient from sleep Periodic pain with remission and relapses.

c. Dysmotility-like dyspepsia: Pain is not a dominant symptom but upper abdominal discomfort should be present, and characterised by three or more of the following:
    i. Early satiety postprandial fullness nausea.
    ii. Retching and/or vomiting that is recurrent.

Bloating in the upper abdomen not accompanied by visible distension Upper abdominal discomfort often aggravated by food.

d. Unspecified (non-specific) dyspepsia.

Dyspeptic symptoms that cannot be classified into the above three symptom profiles.

Exclusion Criteria

1. Alarming symptoms.
2. Gall stones.
3. Chronic pancreatitis.
4. Irritable bowel syndrome.
5. Peptic ulcer disease.

Data Collection

Data was collected through a self-administration questionnaire. Each participant included in the study was asked to fill the structured questionnaire (after receiving initial training). A total of 1408 participants responded to the questionnaire of whom data on 132 patients was excluded from statistical analysis as they were suffering from pancreatitis (n=13) gallstones (n=47)Peptic ulcer(n=72).

The questionnaire was designed to collect the following information:

1. Socio-demographic data: e.g., age, gender, occupation and education.
2. Factors related to special habits: e.g., smoking status.
3. Medical history and concomitant medications.
4. Frequency of suffering from GI disorders such as dyspepsia, heartburn, reflux like symptoms and nausea. In addition, information about the effect of these disorders on daily activities was collected.

Statistical Considerations

Data were statistically described in terms of frequencies (number of cases) and valid percentages for categorical variables. Mean, standard deviations, minimum and maximum were used to describe parametric numerical variable while median and inter-quartile range (IQR) were considered for non-parametric data. Comparison of categorical variables between the subgroups (cross-tabulation) was done using Chi-square test. While comparison of numerical variables between the subgroups was done using one way ANOVA test. $P < 0.05$ were considered statistically significant. All statistical calculations were done using computer program

IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) release 21 for Microsoft Windows.

Ethical Considerations

During the research activities, each participant was informed about the study objectives with stressing from our team on confidentiality of the collected data and results, and also on getting a verbal consent to participate in the study. Institutional review board approval was acquired prior to conducting any study-related procedures.

RESULTS

Descriptive Analysis

Study population

A total of 1408 participants from Taif city took part in this study. Of these participants, 132 were excluded from the statistical analysis because they were suffering from pancreatitis (n=13)gallstones (n=47)Peptic ulcer (n=72). And accordingly, 1276 were included in the statistical analysis.

Subjects' characteristics

Gender
Out of 1276 (100%) participating subjects, the majority (733 participants, 57.4%) were females while 543 participants (42.6%) were males.

Age
The mean ± SD age of participants was 25.8 ± 8.3 years with a minimum value of 16 and a maximum value of 90 years.

Occupation
The majority of participants (59.0%) were students, 25.2% were employed, 13.3% were unemployed while 2.4% were retired.

Education
Three quarters (75.1%) of the participants received University education, 19.4% received high school education, 2.7% received intermediate education, 1.4% received postgraduate education, and 0.9% received primary education while 0.5% of the participants were illiterate.

Smoking status
Data on smoking status was collected and the majority of the participants (85.5%) said that they are non-smokers while 14.5% were smokers. More than half of the smokers (53.9%) reported smoking more than 10 cigarettes per day while 46.1% smoke <10 cigarettes per day.

Number of smoking years ranged from 1 to 20 years with a median (IQR) value of 6 (8.8) years.

Medical history
The majority of participants (79.9%) reported that they don't suffer from any chronic diseases while 20.1% reported suffering from at least one disease. Cardiovascular disorders were the most common disorders as reported in 6.4% of the participants, GI disorders were reported in 3.6%, joints diseases were reported in 3.0%, diabetes mellitus in 2.4%, respiratory disorders in 1.9% and hypothyroidism was reported in 1% of the participants while other conditions such as anemia, skin disorders, neurological disorders and renal disorders were reported with frequencies <1%.

When asked if they use pain killers or not, 71.3% answered "no" and 28.7% answered "yes." None of the participants eligible for analysis were using medications for gastric or duodenal ulcers.

More details about characteristic of the study participants are provided in Table 1.

GI Disorders

Participants were asked about the frequency of having some GI disorders such as dyspepsia, heartburn and nausea during the last 2 months. In addition, they were asked about the extent of symptoms' interference with their normal daily activities.

Answers are summarized in Table 2.

Participants were asked about the most troublesome GI disorders from their point of view where indigestion (22.4%), nausea (20.6%) and heartburn (17.7%) were the most frequent disorders. More details are shown in Figure 1.

Risk Factors Associated with Each of GI Symptoms

Effect of age on GI symptoms

From collected data, it was revealed that the mean ± SD age of participants with dyspepsia didn't differ significantly from that of participants without dyspepsia ($P = 0.282$). The same was revealed for heartburn ($P = 0.061$) and reflux like symptoms ($P = 0.811$).

On the other hand, the mean ± SD age of participants with nausea (25.0 ± 7.3 years) was significantly lower ($P < 0.001$) than that of participants without nausea (26.9 ± 9.4 years).

Effect of gender on GI symptoms

The potential effect of gender on having dyspepsia, heartburn or Nausea was studied.

It was revealed that dyspepsia was significantly ($P < 0.001$) more prevalent among females (72.7%) compared to males (57.1%).

Table 1: Demographic data of the study participants

Variable	Range	Mean±SD
Age (in years)	16–90	25.8±8.3
Gender	Count	Valid percentage
Males	543	42.6
Females	733	57.4
Male to female ratio (M: F)	0.74	-
Occupation	Count	Valid percentage
Student	753	59.0
Employed	322	25.2
Unemployed	170	13.3
Retired	31	2.4
Are you a smoker?	Count	Valid percentage
Yes	184	14.5
No	1084	85.5
Education*	Count	Valid percentage
Postgraduate studies	18	1.4
University degree	956	75.1
High school	247	19.4
Intermediate education	34	2.7
Primary school	11	0.9
Illiterate	7	0.5
Do you use pain killers?		
Yes	366	28.7
No	910	71.3
Concomitant disease	Count	Valid percentage
Cardiovascular disorders	82	6.4
GI disorders	46	3.6
Joints disorders	38	3.0
Diabetes mellitus	30	2.4
Respiratory disorders	24	1.9
Hypothyroidism	13	1.0
Anemia	8	0.6
Skin disorders	5	0.4
Neurological disorders	3	0.2
Renal disorders	1	0.1
Miscellaneous	6	0.5

*n=1273 (3 participants with missing data). **n=1268 (8 participants with missing data). GI: Gastrointestinal

The same was found for nausea; as the percentage of females with nausea (69.4%) was significantly higher ($P < 0.001$) than that of males with nausea (42.5%).

On the other hand, gender distribution didn't show a significant effect on the prevalence of heartburn ($P = 0.176$) or reflux like symptoms ($P = 0.153$).

Effect of occupation on GI symptoms

Unlike age and gender, occupation was found to have a significant effect on all GI disorders.

Regarding dyspepsia, the prevalence among retired individuals (77.4%) and unemployed individuals (74.1%) were significantly higher ($P = 0.029$) than those among employees (66.8%) and students (63.5%).

And regarding heartburn, the prevalence among retired individuals (80.6%) and unemployed individuals (74.1%) were significantly higher ($P > 0.001$) than those among employees (63.7%) and students (58.0%).

While the prevalence of reflux like symptoms among retired individuals (71.0%) was significantly higher ($P = 0.019$) than that among students (51.4%), employees (50.9%) and unemployed individuals (42.4%).

Unlike dyspepsia, heartburn and reflux like symptoms, the highest prevalence of nausea was found among the unemployed individuals (73.5%) which significantly differed ($P < 0.001$) from the prevalence among students (59.1%), retired individuals (54.8%) and employees (47.5%).

Effect of smoking on GI symptoms

Smoking was found to have no significant effect on all GI disorders except reflux like symptoms.

The prevalence of dyspepsia among smokers (69.6%) didn't differ significantly ($P = 0.154$) from that among non-smokers (65.4%).

The same was reported for heartburn as the prevalence among smokers (66.3%) didn't differ significantly ($P = 0.119$) from that among non-smokers (61.4%).

While for reflux like symptoms, the prevalence among smokers (58.2%) was significantly higher ($P = 0.017$) than that among non-smokers (49.4%).

The same as dyspepsia and heartburn, prevalence of nausea among smokers (53.8%) didn't differ significantly ($P = 0.129$) from that among non-smokers (58.6%).

Effect of using pain killers on GI symptoms

Using pain killers was found to be associated with a higher risk of all GI disorders.

More details about the risk factors associated with each GI disorder are provided in Table 3.

DISCUSSION

This study was an observational, cross-section study aiming to assess the prevalence and identify the risk factors associated with the incidence of dyspepsia in Taif city in Saudi Arabia. From collected data, it was revealed that the

Table 2: Endorsement frequencies for each response category of the SF-LDQ (*n*=1276)

Symptom	Not at all	Less than monthly	Between monthly and weekly	Between weekly a daily	More than daily
Indigestion frequency (%)	33.9	28.1	19.0	12.6	6.3
Heartburn frequency (%)	37.9	27.0	20.2	9.0	6.0
Regurgitation frequency (%)	49.5	28.4	13.1	6.9	2.2
Nausea frequency (%)	42.0	28.1	16.5	7.4	6.0
Indigestion severity (%)	46.5	25.0	16.5	7.1	5.0
Heartburn severity (%)	52.0	23.7	12.5	6.3	5.5
Regurgitation severity (%)	65.4	19.1	7.9	5.6	2.0
Nausea severity (%)	52.9	22.5	12.9	5.6	6.1

SF-LDQ: Short-form Leeds dyspepsia questionnaire

Table 3: Risk factors of GI disorders

Variable	Indigestion (upper abdominal discomfort)			Heartburn			Regurgitation			Nausea		
	Yes (%)	No (%)	*P* value	Yes (%)	No (%)	*P* value	Yes (%)	No (%)	*P* value	Yes (%)	No (%)	*P* value
Age* (years)	26.0±7.8	25.4±9.1	0.282	25.5±8.3	25.2±8.3	0.061	25.8±8.0	25.7±8.6	0.811	25.0±7.3	26.9±9.4	<0.001
Gender**												
Male	57.1	42.9	<0.001	60.6	39.4	0.176	52.3	47.7	0.153	42.5	57.5	<0.001
Female	72.7	27.3		63.3	36.7		49.2	50.8		69.4	30.6	
Occupation**												
Student	63.5	36.5	0.029	58.0	42.0	<0.001	51.4	48.6	0.019	59.1	40.9	<0.001
Employed	66.8	33.2		63.7	36.3		50.9	49.1		47.5	52.5	
Un-employed	74.1	25.9		74.1	25.9		42.4	57.6		73.5	26.5	
Retired	77.4	22.6		80.6	19.4		71.0	29.0		54.8	42.5	
Smoking**												
Yes	69.6	30.4	0.154	66.3	33.7	0.119	58.2	41.8	0.017	53.8	46.2	0.129
No	65.4	34.6		61.4	38.6		49.4	50.6		58.6	41.4	
Usage of pain killers**												
Yes	79.0	21.0	<0.001	74.3	25.7	<0.001	60.1	39.9	<0.001	74.6	25.4	<0.001
No	60.9	39.1		57.3	42.7		46.7	53.3		51.3	48.7	

*One way ANOVA test was used to compare between the subgroups. **Chi-square test was used to compare between the subgroups.
GI: Gastrointestinal

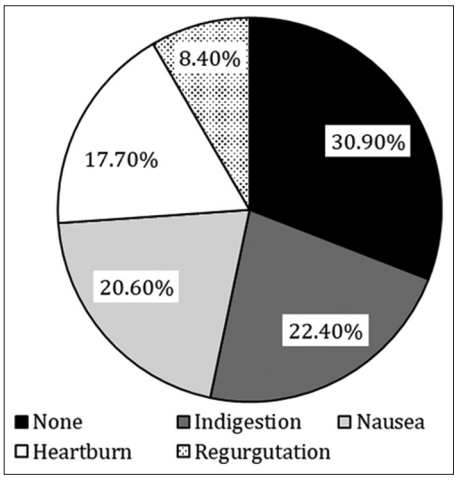

Figure 1: The most troublesome gastrointestinal disorders

mean ± SD age of participants with dyspepsia didn't differ significantly from that of participants without dyspepsia (P = 0.282). The same was revealed for subtypes based on SFLDQ, heartburn (P = 0.061) and reflux like pain (P = 0.811). Previous study showed similar results regarding the age of the participants and the incidence of dyspepsia.[14] While other previous studies noted some kind of association between age and the incidence of dyspepsia where dyspepsia was more prevalent among participants aged of 45–54 years in Canada.[15] those aged 41–50 years in China.[16] and those aged 50–59 years in Japan[17] where dyspepsia subtypes were associated with different age groups. Data from Other studies in different populations showed a lower prevalence of dyspepsia with older age in Britain,[18] Taiwanese.[19] and Danish population.[20] The last study showed significantly lower prevalence of dyspepsia in the extremely old ages; were the incidence of dyspepsia in 70 years old subjects was 10% lower than 60 years old subjects. Having said this it will be not out of place to mention that dyspeptic symptoms

must be evaluated especially in adults to rule out any organic cause.

About 57.4% of the participants in our study were females and non ulcer dyspepsia was found to be significantly ($P < 0.001$) more prevalent among females compared to males. The same was found for nausea; as the percentage of females with nausea was significantly higher ($P < 0.001$) than that of males with nausea. Previous studies showed associations between female gender and higher incidence of dyspepsia.[19-23] In addition, occupation was found to have a significant effect on most of GI disorders. The prevalence of dyspepsia among retired and unemployed individuals was significantly higher ($P = 0.029$) than that among employees and students. Similar results were found regarding the prevalence of reflux like symptoms and heartburn. Several previous studies suggested similar results where low household income,[24] unemployment,[15] bad accommodation, living and education conditions,[25] financial dissatisfaction[16] and having a large family[26] were found to be associated with increased incidence of dyspepsia. About 85.5% of the participants said that they were non-smokers and smoking was found to have no significant effect on the prevalence of dyspeptic symptoms in this study. Contrary to this for reflux like discomfort, the prevalence among smokers was significantly higher ($P = 0.017$) than that among non-smokers. Other studies showed similar results regarding smoking as a risk factor.[16,23,27] The prevalence of current smoking among the Saudi population ranges from 2.4% to 52.9% (median 17.5%) and reflux associated with smoking is well known. This highlights that there is a need of wide spread mass health education about hazards of smoking to prevent dyspepsia and other disorders associated with smoking. Dyspepsia was significantly associated with non-steroidal anti-inflammatory drug (NSAID) intake suggesting that over the counter medication may be playing a role in increased prevalence of Non ulcer dyspepsia in the region. Another study in the United States.[28] showed consistent results as the regular use of NSAIDs was strongly associated with non ulcer dyspepsia.[21] Data from UK found that the use of NSAIDs was responsible for 4% of dyspepsia in the community.[25]

The drawback of this study is that it focused only on educated population of this region and thus the prevalence among illiterate could not be estimated. Secondly this study didn't focus psychological aspects as the psychological factors are known to affect dyspepsia as demonstrated by Li *et al*.[29]

CONCLUSION

From the discussed results, it is concluded that the non ulcer dyspepsia is common among the population of Taif city with higher prevalence among females, smokers and frequent users of NSAIDs. Raising the awareness of healthcare professionals and the population on the symptoms and modifiable risk factors of dyspepsia will result in lower rate and better management of the disease. We recommend conducting additional studies that estimates the prevalence and risk factors of dyspepsia in the different cities of Saudi Arabia so that impact of non ulcer dyspepsia on the quality of life is improved.

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