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Research Article

GASTRO-OESOPHAGEAL REFLUX PREVALENCE STUDY ON HOSPITAL STAFF

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ABSTRACT

Gastro-oesophageal reflux disease (GORD) is a common disorder of the upper gastrointestinal tract. GORD is often associated with the western lifestyle; however, its prevalence in eastern communities is increasing. However, there is not enough data describing the epidemiology of the disease and very little that relates specifically to healthcare workers. We performed a questionnaire-based survey on 622 hospital staff from five university and state hospitals in the city of Konya, Turkey to determine the prevalence of GORD in healthcare workers.

In total, 598 participants (81%) completed the questionnaire; 347 (58%) of them were female, and their mean age was 31.22 years. Monthly GORD symptoms were assessed, and the prevalence of symptoms was 7% per week, 15.4% per 2 weeks, and 73.6% per month. Age, marital status, education level, profession, smoking, alcohol consumption and income were not correlated with symptoms, whereas sex, body mass index, having a chronic disease and drug abuse were.

The prevalence of reflux symptoms among staff from the main hospitals is similar to that in western countries, where it is much higher in healthcare workers. Further research will improve our understanding of the relationship between GORD and stress.

INTRODUCTION

Gastro-oesophageal reflux disease (GORD) is a common and significant health problem. It is a chronic condition, defined as involuntary leaking of the stomach contents into the oesophagus and its main symptoms include regurgitation and heartburn (1). Reflux can occur in anyone, especially after meals, but it is usually resolved by oesophageal cleaning mechanisms and is only classified as GORD if it produces symptoms. The prevalence of GORD varies; in western countries it occurs in approximately 10–20% of the population, whereas in Asian countries < 5% of individuals are affected (2, 3). There have been no detailed studies in Turkey, but the prevalence of GORD is similar to that in western countries, with one survey estimating that approximately 10% of the population is affected (4). It is important to determine the prevalence of GORD in Turkey because it causes loss of working hours and negatively impacts on quality of life. GORD is particularly common among healthcare professionals and medical support staff due to the stress and irregular meal times that are often associated with working in a healthcare environment. However, there are no data on the prevalence of GORD among healthcare workers in Turkey. The aim of our study was to address this issue.

MATERIALS AND METHODS

We performed a cross-sectional study of hospital staff using a questionnaire that included 39 questions on demographic characteristics, reflux symptoms and their frequency. The study was performed between June and October 2012. Volunteer hospital staff were also recruited to the study. The study was approved by the Clinical Research Evaluation Committee of Selcuk University Meram Medical Faculty.

A novel 39-item questionnaire was generated from the following existing questionnaires: the GORD-health related quality of life (GORD-HRQL), the Reflux Disease Questionnaire (RDQ), and the GORD Impact Scale (GORD-IS) (Table 1) The novel questionnaire collected information on demographic characteristics, including age, sex, height, weight, marital status, education, income and chronic diseases.

The first five questions concerned the GORD diagnosis and questions 6, 7, 17 and 22 examined complications. Questions 1– 5, 9, 16 and 24 concerned oesophageal symptoms, whereas questions 8 and 10–24 were related to non-oesophageal symptoms.

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Table 1 (١) Questionnare sample

Name Surname		**Age**	**Gender**	**Marital status**	**Nationality**
Education level		**Profession**		**Mounthly income**	
High	**weight**	**cigarette**	**alcohol**	**sport**	
Chronic disease	Coronary arter disease	Serebro vasculary disease	Diabetes mellitus	Chronic obstrictive lung disease	Astma
Chronic renal disease	Chronic hepatic disease	Romotoid arthritis	osteoarthritis	Goitre	migraine
depression	anemia	cancer	hepatitis	gestation	other

Drug

	In last three mounths; how often…	**none**	**Once per 3 mounths**	**< 2 per mounth**	**Twice per mounth**	**Twice iper week**	**everyday**
1	have you felt a burning sensation above your stomach?						
2	have you felt a pain behind your chest bone?						
3	have you felt a burning sensation above your chest bone?						
4	have you felt food coming from your stomach?						
5	have you felt salty, bitter water in your mouth?						
6	have you swallowed with pain?						
7	have you swallowed hard?						
8	have you had cough, midnight cough?						
9	have you had nausea, vomiting?						
10	have you heard a whistle in your breath?						
11	have you had a voice annoyance?						
12	have you had a prickles?						
13	have you felt bad smell in your mouth?						
14	have you felt bitter taste in your throat?						
15	have you felt a notch in your throat?						
16	have you produced more saliva?						
17	have you lost weight?		**Yes**			**No**	
18	have you gained weight?		**Yes**			**No**	
19	have your dreams been splitted?						
20	have you had allergenic cough?						
21	have you felt shortness of breath?						
22	have you been sinusitis?						
23	have you felt post-nasal drilling?						
24	have you felt swelling?						
25	have you taken ant medication?		**Yes**			**No**	

Questions 17, 18, 25 and 30 could be answered by 'yes' or 'no', whereas the other questions were responded to via a rating scale (0–5) according to the severity of symptoms, as shown in Table 2.

Table 2 (٢) Question rating scale

0	1	2	3	4	5
None	Once every 3 months	Once per month	Twice per month	Twice per week	Every day

Individuals who responded to the first five questions with ratings of 4 or 5 were included in the reflux-positive group. We also evaluated similar studies, and one performed in India that reported a GORD prevalence of 16.2%, and which had a sample size of 508 and statistical power of 90 ± 5%, was chosen for comparison.

Individuals who were private hospital staff, had been working shifts for only a short time, or had been hospitalised within the last 3 months were excluded. We did not implement any age restriction but only included individuals who lived in Konya during the past year. Body mass index (BMI) was used to classify study participants into four categories according to TEMD (Turkiye Endokrinoloji ve Metabolizma Derneği) guidelines.

Statistical analysis

The data were evaluated using SPSS software (ver. 15.0; SPSS, Inc., Chicago, IL, USA). Age data are reported as means ± standard deviation, whereas other variables are reported as means ± standard error. Pearson's correlation coefficient was used to identify relationships between continuous data and abnormally distributed variables. A p-value <0.05 was considered statistically significant. The "backward" method was used to identify relationships between reflux level and categorical variables. Regregation analysis was used to analyse relationships between participants and questionnaire responses.

RESULTS

In total, 598 individuals completed the questionnaire and 347 (58%) of them were female. The mean age was 31.22 ± 7.68 years and the median age was 30 years. There were 341 (57%) married participants and the remaining 257 (43%) were single or widowed. The highest education level attained by 8% of the healthcare workers was primary school, whereas 18.6% had graduated from high school and 73.4% from university. A total of 22.6% of the staff were smokers, and 30.3% of them had at least one chronic disease. The participants' professions were classified into five categories, as shown in Figure 1.

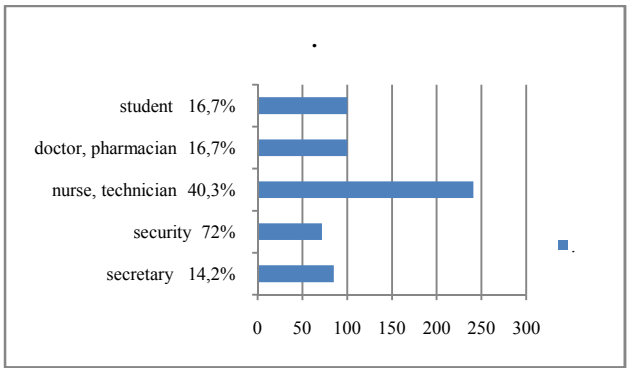

Figure 1(١) Distribution of professions

The questionnaire responses demonstrated that the GORD prevalence across all five hospitals was 15.4%. The weekly and monthly reflux symptoms prevalence rates were 7% and 73.6%, respectively. The distributions of participants by hospital and reflux prevalence are shown in Figure 2. There were no significant differences in reflux levels between hospitals ($p > 0.05$).

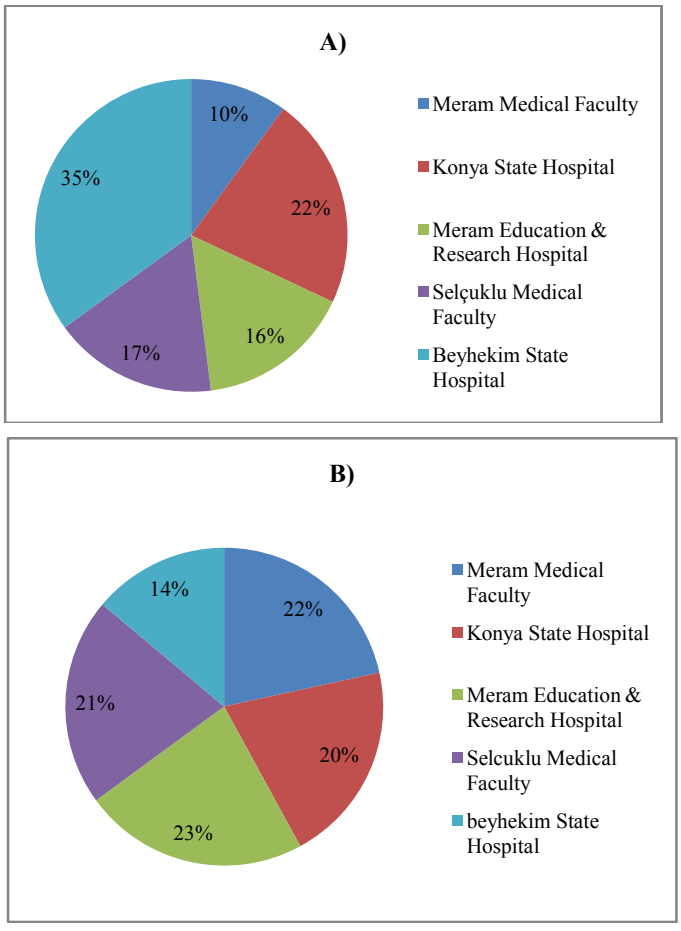

Figure 2 (٢) Distribution of participants by hospital (A) and reflux prevalence (B)

When the responses to questions concerning complications (questions 6, 7, 17 and 22) were evaluated, 45.7% of the staff with reflux also had complications, including oesophagitis, odynophagia, dysphagia and strictures. The reflux patients provided positive responses to all the questions related to oesophageal symptoms.

When questionnaire responses were analysed according to demographic characteristics, no relationship was found between reflux and age, marital status, education level, profession, smoking, alcohol consumption or income. However, there was a significant relationship between reflux symptoms and sex, BMI, presence of a chronic disease and taking medication (Table 3). Female gender was associated with a 2.9-fold increased likelihood of having reflux symptoms. Taking medication that could produce reflux symptoms increased the likelihood of having reflux symptoms 1.6-fold. The relationship between answering 'Yes' to a question and having reflux was low for questions 6–8, 10, 11, 13, 14, 15, 19, 21 and 22; moderate for questions 12, 20 and 23; and high for questions 1–5, 9 and 24. When questions answered "No" were evaluated in the context of reflux prevalence, the odds ratio was 1.7 for question 1; 1.0 for question 2; 6.4 for question 3; 5.8 for question 4; 1.6 for question 5; 1.0 for question 9 and 1.2 for question 24. There was a 1.7-fold increased likelihood of having reflux for participants with epigastric burn (question 1), a 6.4-fold increased likelihood for those with retrosternal heartburn (question 3), a 5.8-fold increased likelihood for those showing regurgitation of stomach contents (question 4), a 1.6-fold increased likelihood for those reporting a bitter taste in the mouth (question 5), and a 1.2-fold increased likelihood for participants who reported feeling bloated (question 24). In contrast, having retrosternal pain (question 2) or experiencing nausea-vomiting (question 9) apparently did not increase the risk of reflux.

Table 3 (٣) Relationships between reflux and demographic features

	Age	Sex	Marital status	Education level	Profession	Height
Reflux	–0.016 0.693 598	0.137(**) 0.001 598	–0.052 0.205 598	–0.001 0.978 598	–0.021 0.614 598	–0.108(**) 0.008 598
	Weight	**Smoking**	**BMI**	**Monthly income**	**Chronic disease**	**Medication**
Reflux	0.007 0.859 598	–0.053 0.197 598	0.085(**) 0.37 598	–0.025 0.536 598	0.210(**) 0.000 598	0.152(**) 0.000 598

Table 4 (٤) Reflux ratios for sex, marital status, education level, BMI and profession

		Reflux-positive	Reflux-negative
Sex	Female	68 (19.5%)	279 (80.5%)
	Male	24 (9.5%)	227 (90.5%)
Marital status	Married	58 (17%)	283 (83%)
	Not married	26 (10.1%)	221 (89.9%)
Education	Primary school	8 (16.6%)	40 (83.4%)
	High school	16 (14.4%)	95 (85.6%)
	University	68 (15.4%)	371 (84.6)
BMI (body mass index) kg/m^2	< 18	6 (33.3%)	12 (66.7%)
	18.5–23	22 (10.2%)	193 (89.8%)
	23–29.9	56 (17.5%)	263 (82.5%)
	> 30	8 (17.5%)	38 (82.7%)
Profession	Doctor/Pharmacist	14 (14%)	86 (86%)
	Nurse	42 (17.4%)	199 (82.6%)
	Security personnel	10 (13.8%)	62 (86.2%)
	Secretarial staff	12 (14.1%)	73 (85.9%)
	Student	14 (14%)	86 (86%)

While 19.5% of our female participants had reflux, the condition affected only 9.5% of males. In total, 17% of the married participants had reflux, whereas only 10.1% of those who were single or widowed were affected. The results

regarding level of education showed that 16.6%, 14.4% and 15.4% of participants who graduated from primary school, high school and university had reflux, respectively. The BMI classification data demonstrated that 10.2% of participants with a normal BMI, 17.5% of overweight individuals and 17.3% of those who were obese had reflux. By profession, approximately 14% of doctors/pharmacists and medical/nursing students had reflux (Table 4).

DISCUSSION

GORD is a common disorder and some individuals may be more susceptible to the disease, or experience more frequent symptoms, due to their genetic predisposition or demographic characteristics, or to high stress levels associated with their profession. Understanding the patient's history, together with more advanced diagnostic technological tools, can assist in diagnosing the disease. We used a questionnaire-based survey to evaluate reflux symptoms in hospital staff working in the city of Konya, Turkey and determined that the prevalence of GORD was 15%.

Many previous studies, performed in different countries, have had differing objectives and used different methods to collect and classify the data. Lifestyle factors, including obesity, higher socioeconomic status and a longer life may increase the probability of developing reflux symptoms. Previous studies showed large variation in their results, and few studies on reflux included information on their patients' professions. In the US, a study was performed on healthcare workers following the 11 September attacks; a large proportion of them (57.6%) had reflux symptoms (6). In total, 42 healthy workers were surveyed using a questionnaire on GORD history. This information was verified using objective diagnosis tools, including 24-hour pH monitoring and oesophagogastroduodenoscopy. Approximately half of the participants individuals had been at scene within 48 hours and the prevalence of weekly reflux symptoms was high (42%). Half of the symptoms were due to GORD and half to non-erosive reflux. In the present study, 598 hospital staff completed our questionnaire. The weekly reflux symptom prevalence among these hospital workers was only 7%, whereas the average reflux symptom prevalence in those with a GORD diagnosis was 15.4%. Although objective diagnosis tools were not used, such that the probability of false-positive results was increased, clinical findings and patient histories were sufficient for a diagnosis in 95% of cases. Because of the rotating shift work engaged in at the different hospitals, we were unable to obtain the reflux ratios for all clinics even when there was a record of attendance for all workers.

Sharma *et al*. performed a 2-year follow-up study on the staff of a regional hospital in India and found a reflux prevalence of 16.2% (5). They used a simple variation analysis to demonstrate that age, higher BMI, smoking, medication use and the presence of a chronic disease were significantly associated with GORD symptoms (5). Our study included five of the largest hospitals in the city of Konya. In total, 605 of 9,000 staff were interviewed, and 598 of them completed study questionnaires. We evaluated the data by categorising it according to the professions of the workers. In agreement with previous studies, we found that reflux predominantly affected females. Additionally, BMI, sex, chronic diseases and taking medication were all associated with reflux symptoms. The reflux prevalence was 14% in doctors and 17.4% in nurses. Although both of these figures are lower than those recorded in western countries, there have been no previous studies performed solely on reflux symptoms among hospital staff. Additionally, our study cannot be compared directly to the one performed in India referred to previously.

In a study performed in Germany, 7124 participants between the ages of 18 and 79 years were assessed on the basis of their nutrition, health and demographic characteristics. In total, 25% had mild, 14% had moderate, and 4% had severe reflux symptoms (7). A US study that obtained data from 2298 individuals by e-mail reported a reflux prevalence of 15% in males and 14% in females (8). In Japan, a study on a group of control patients demonstrated a reflux prevalence of 6.6%, with weekly and monthly symptom prevalence rates in patients of 4.6% and 12.8%, respectively (9). This Japanese study included individuals who worked for companies, among whom the reflux prevalence was higher than the average for Japan. This suggests that the risk of reflux may be increased by stress. One possible explanation for the differences in reflux prevalence between European and American studies could be the type of questionnaires used. Our questionnaire was based on four previous questionnaires, and our results cannot be directly compared to those of other studies due to differences in the methods of data collection and evaluation. However, the prevalence of GORD symptoms in our study was higher than the national average, and this could be related to the stress of working in a healthcare environment. In our study, 45.7% of the questions concerning complications (3, 9, 10, 11) were responded to positively by reflux patients; these data could be analysed further.

Finally, our study was performed between June and October; clearly this does not cover the entire year, and our reflux prevalence data were collected during the summer.

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