Prevalence and Risk Factors of Functional Dyspepsia: A Population-Based Study

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ABSTRACT

Background: *Functional dyspepsia is one of the most common functional gastrointestinal disorders and affects more than 20% of the population. This study aimed to determine the prevalence of functional dyspepsia according to Rome IV criteria and its relation with social determinants.*

Methods: *This cross-sectional study was conducted in the Department of Family Medicine, Kartal Dr Lutfi Kırdar City Hospital Tuzla Training and Research Primary Health Care Center, Istanbul, Turkey from May - December 2019. The participants (aged 18-78) were selected using randomized sampling by a family physician according to the records. All participants underwent a clinical interview based on a questionnaire based on Rome IV criteria. The factors that were significant in the binary comparison were taken into logistic regression analysis (Backward: LR) to determine the causal relationship. P-values <0.05 were considered statistically significant.*

Results: *A total of 350 participants were enrolled to the study (43.4 %; n=152 male and 56.6%; n=198 female). The prevalence of functional dyspepsia was 16.9% (n=59). 62.7% (n=37) of dyspeptic patients had epigastric pain syndrome and 67.8% (n=40) of them had postprandial distress syndrome. Daily tee consumption, body mass index, and family history were found as social factors related to funct*

ional dyspepsia.

Conclusion: *The prevalence of functional dyspepsia was 16.9% according to Rome IV criteria and most of the patients were female. Obesity was an important factor related to dyspepsia. Dyspeptic symptoms must investigate especially in obese female patients.*

Keywords: *Dyspepsia, functional dyspepsia, prevalence*

ABSTRAK

Latar belakang: *Dispepsia fungsional adalah salah satu gangguan pencernaan fungsional yang paling umum dan mempengaruhi lebih dari 20% populasi. Tujuan dari penelitian ini adalah untuk mengetahui prevalensi dispepsia fungsional menurut kriteria Roma IV dan hubungannya dengan faktor penentu sosial.*

Metode: *Penelitian cross-sectional ini dilakukan di Departemen Kedokteran Keluarga, Rumah Sakit Kota Kartal Dr Lutfi Kırdar Pusat Pelatihan dan Penelitian Kesehatan Primer Tuzla, Istanbul, Turki dari Mei - Desember 2019. Para peserta (berusia 18-78 tahun) dipilih secara acak oleh dokter keluarga berdasarkan catatan medis. Semua peserta menjalani wawancara klinis berdasarkan kuesioner berdasarkan kriteria Roma IV. Faktor-faktor yang signifikan dalam perbandingan biner dimasukkan ke dalam analisis regresi logistik (Backward: LR) untuk menentukan hubungan sebab akibat. Nilai p <0,05 dianggap signifikan secara statistik.*

Hasil: *Sebanyak 350 partisipan terdaftar dalam penelitian ini (43,4%; n=152 laki-laki dan 56,6%; n=198 perempuan). Prevalensi dispepsia fungsional adalah 16,9% (n=59). 62,7% (n=37) pasien dispepsia mengalami sindrom nyeri epigastrium dan 67,8% (n=40) di antaranya mengalami sindrom gangguan postprandial. Konsumsi teh setiap hari, indeks massa tubuh dan riwayat keluarga ditemukan sebagai faktor sosial yang berhubungan dengan dispepsia fungsional.*

Simpulan*: Prevalensi dispepsia fungsional adalah 16,9% berdasarkan kriteria Roma IV dan sebagian besar pasien adalah perempuan. Obesitas merupakan faktor penting yang berhubungan dengan dispepsia. Gejala dispepsia harus diselidiki terutama pada pasien wanita yang mengalami obesitas.*

Kata kunci: *Dispepsia, dispepsia fungsional, prevalensi*

INTRODUCTION

Dyspepsia is a complex of symptoms related to the gastrointestinal region, which accounts for approximately 5% of all visits to family physicians. Definition of dyspepsia have changed over years and Rome criteria were developed for standardization of the diagnosis .[1,2] The definition of dyspepsia evolutes from only "heart burn" to "functional dyspepsia" throughout the years.

Functional Dyspepsia (FD), a symptoms complex, is a chronic gastrointestinal disease that is not accompanied by a structural disease shown by (including upper GIS endoscopy) routine studies.[3] Two FD subgroups have been proposed by the Rome IV criteria: Postprandial Distress Syndrome (PDS) with postprandial fullness or early satiety and Epigastric Pain Syndrome (EPS), characterized by epigastric pain or epigastric burning. Moreover for diagnosis; symptoms should affect the usual activities, start at least 6 months before, and should be continuous for 3 months after onset with the frequency of 1 (EPS) or 3 (PDS) days per week.[4]

The global prevalence of dyspepsia was 20.8%.[5] National prevalence Turkey of dyspepsia varied between 18% and 42%.[6-8] Recent studies using Rome IV criteria revealed the prevalence of FD near %10 (61% PDS, 18% EPS, and 21% overlap).[9] The differences in prevalence of FD may reflect not only genetic variation of population but also work life events, nutritional habits, and tobacco and alcohol consumptions. These factors should also be taking into count in exploring FD. Several studies suggested that age, gender, body mass index, use of drugs and educational level as risk factor for FD.[10,11] Nearly half of the patients with dyspeptic complaints apply to primary care physician and 15% of them referred to a gastroenterologist, but on the other hand some FD patients do not visit a clinic because pain severity, fear of disease and consulting behaviors.[12,13] The aim of this study is to evaluate the prevalence and social risk factors of FD.

METHODS

A total of 350 participants were enrolled to the study registered in a primary health care center. All of the participants (aged 18-78) were selected using randomized sampling by family physician according to the records. Participants with organic diseases such as reflux esophagitis, barrett esophagus, peptic ulcer, dysplasia, esophageal cancer, or gastric cancer and participants with history of gastrointestinal surgery, abnormal findings of ultrasonography, or systemic disease requiring chronic medication except hypertension and diabetes mellitus were excluded. All participants underwent a clinical interview based on a questionnaire. For determining the presence of functional dyspepsia a questionnaire based on Rome IV criteria was applied to all participants. Participants were divided in two groups: the FD group and the healthy group. The questionnaire include participants personal and clinical data included questions regarding demographic data including presence of upper gastrointestinal symptoms during the previous year, history of H. pylori eradication therapy, smoking and alcohol habit, levels of education and income, drug history including non-steroidal anti-inflammatory drugs and antibiotics. Upper gastrointestinal symptoms of epigastric pain or soreness and postprandial discomfort for >1 month within a year were considered indicative of FD symptoms. Body mass index was calculated as mass (kg) divided by height (m^2).

All statistical analyses were performed using the Statistical Package for the Social Sciences software version 18.0 (SPSS, Chicago, IL). Continuous variables were analyzed using the student t-test, and categorical variables were analyzed using a

chi-square test. The factors that were significant in the binary comparison were taken into logistic regression analysis (Backward: LR) to determine the causal relationship. P-values <0.05 were considered statistically significant. This study was approved by the Ethical Committee (2019/514/154/5-Date:29.05.2019). Informed consent was obtained from all participants before the study began.

RESULTS

A total of 350 participants were enrolled to the study. The prevalence of functional dyspepsia was 16.9% (n=59). The demographic features and personal health habits are presented in of two groups was shown in **table 1**. It was found that 10.5% (n=37) have epigastric pain syndrome and 11.4% (n=40) have postprandial distress syndrome of all participants. The relationship between sociodemographical parameters with epigastric pain syndrome and postprandial distress syndrome was shown in **table 2**.

Table 1. Demographical features of functional dyspepsia and healthy groups

		Healthy[1]	Functional Dyspepsia[1,2]
		% (n=291)	% (n=59)
Gender	Female	55.7 (162)	61.0 (36)
	Male	44.3 (129)	39.0 (23)
Age (year±SD)		42,0±14,8	41.9±12.1
Education Level	≤8 years	35.1 (102)	49.2 (29)
	≥ 9 years	64.9 (189)	50.8 (30)
Working Status	Yes	44.7 (130)	47.5 (28)
	No	55.3 (161)	52.5 (31)
Marital status	Married	69.4 (202)	76.3 (45)
	Single	22.7 (66)	18.6 (11)
	Divorced	7.9 (23)	5.1 (3)
Income (TL/month)	0-2200	33.3 (97)	33.9 (20)
	2201-4400	38.1 (111)	40.7 (24)
	≥4401	28.5 (83)	25.5 (15)
Family type	Nucleus	92.1 (268)	94.9 (56)
	Extended	7.9 (23)	5.1 (3)
Body mass Index (kg/m^2)		26.1±4.2	27.3±5.7
	<25	44.0 (128)	37.3 (22)
	25-29.9	37.1 (108)	27.1 (16)
	>30	18.9 (55)	35.6 (21)
Family History	Yes	29.9 (87)	45.8 (27)
	No	70.1 (204)	54.2 (32)
Smoking	Yes	27.8 (81)	28.8 (17)
	No	72.2 (210)	71.2 (42)
Alcohol	Yes	14.8 (43)	16.9 (10)
	No	85.2 (248)	83.1 (49)
Chronic disease	Yes	44.0 (128)	44.1 (26)
	No	56.0 (163)	55.9 (33)
Tee consumption[3]	Yes	82.8 (241)	94,9 (56)
	No	17.2 (50)	5.1 (3)
Coffee consumption[3]	Yes	40.2 (117)	52.5 (31)
	No	59.8 (174)	47.5 (28)
ASA	Yes	7.9 (23)	6.8 (4)
	No	92.1 (268)	93.2 (55)
NSAID	Yes	8.6 (25)	10.2 (6)
	No	91.4 (266)	89.8 (53)

1: Column percentece. 2: While epigastric pain syndrome was present in 62.7% (n=37) of the participants (n=59) with functional dyspepsia, postprandial distress syndrome was found in 67.8% (n=40) of them. The co-occurrence rate of epigastric pain syndrome and postprandial distress syndrome was 30.5%. 3: at least one cups/per day

ASA: Asetilsalicilic acid, NSAID: Nonsteroidal antiinflammatory drug, SD: Satndard deviation, TL: Turkish Lira

Table 2. The relationship between sociodemographical parameters with epigastric pain syndrome and postprandial distress syndrome

		EPS[1] % (n=37)	p	PDS[1] % (n=40)	p
Age (year±SD)		42,3±12,2	0,545[c]	40,9±12,4	0,867[3]
Body mass Index (kg/m^2)		28.1±5,5	0.033[c]	26.6±5.8	0.667[3]
	<25	29.7 (11)	0.012[2]	42,5 (17)	0.149[2]
	25-29.9	29.7 (11)		25.0 (10)	
	≥30	40.5 (15)		32.5 (13)	
Gender	Female	54,1 (20)	0,861[2]	65,0 (26)	0,310[2]
	Male	45,9 (17)		35,0 (14)	
Education Level	≤8 years	48,6 (18)	0,152[2]	52,5 (21)	0,036[2]
	≥ 9 years	51,4 (19)		47,5 (19)	
Working Status	Yes	40,5 (15)	0,603[2]	50,0 (20)	0,613[b]
	No	59,5 (22)		50,0 (20)	
Marital status	Married	81,1 (30)	0,284[2]	72,5 (29)	0,824[2]
	Single	16,2 (6)		22,5 (9)	
	Divorced	2,7 (1)		5,0 (2)	
Income (TL/month)	0-2200	37,8 (14)	0,818[2]	40,0 (16)	0,451[2]
	2201-4400	37,8 (14)		37,5 (15)	
	≥4401	24,3 (9)		22,5 (9)	
Family type	Nucleus	100,0 (37)	0,092[2]	92,5 (37)	0,985[2]
	Extended	0,0 (0)		7,5 (3)	
Family History	Yes	45.9 (17)	0.094[2]	47.5 (19)	0.047[2]
	No	54.1 (20)		52.5 (21)	
Smoking	Yes	27.0 (10)	1.000[2]	30.0 (12)	0.852[2]
	No	73.0 (27)		70.0 (28)	
Alcohol	Yes	24.3 (9)	0.141[2]	15.0 (6)	1.000[2]
	No	75.7 (28)		85.0 (34)	
Chronic disease	Yes	40.5 (15)	0.728[2]	42,5 (17)	0.867[2]
	No	59.5 (22)		57,5 (23)	
Tee consumption[d]	Yes	91.9 (34)	0.329[2]	97,5 (39)	0.017[2]
	No	8.1 (3)		2,5 (1)	
Coffee consumption[d]	Yes	56.8 (21)	0.078[2]	52.5 (21)	0.177[2]
	No	43.2 (16)		47.5 (19)	
ASA	Yes	8.1 (3)	1.000[2]	5.0 (2)	0.753[2]
	No	91.9 (34)		95.0 (38)	
NSAID	Yes	5.4 (2)	0.758[2]	12.5 (5)	0.377[2]
	No	94.6 (35)		87.5 (35)	

1: Column percentece. 2: chi-square test. 3: Student t test. d: at least one cups/per day

EPS: Epigastric Pain Syndrome, PDS: Postprandial Distress Syndrome, ASA: Asetilsalicilic acid, NSAID: Nonsteroidal antienflamatory drug, SD: Satndard deviation, TL: Turkish Lira

Independent variables that were statistically significant in the binary analysis were included in the logistic regression (Backward: LR) analysis. According to this, functional dyspepsia was 0.418 times less in participant with body mass index below 25 kg/m^2 (CI: 0.207-0.842) and 0.347 times less in participants with body mass index 25 kg/m^2-29.99 kg/m^2 (CI: 0.105-0.731) compared with participants with body mass index ≥30 kg/m^2. More over functional dyspepsia was 1.989 (CI: 1.099-3.600) times more in participants with family history and 4.186 (CI: 1.239-14.144) times more in daily tee consumers. Only body mass index show significant relationship with epigastric pain syndrome. Epigastric pain syndrome was 0.322 times less in participant with body mass index below 25 kg/m^2 (CI: 0.400-0.741) and 0.396 times less in participants with body mass index 25 kg/m^2-29.99 kg/m^2 (CI: 0.171-0.915) compared with participants with body mass index ≥30 kg/m^2. In the case of postprandial distress syndrome only two parameters were significant: educational level and family history. Postprandial distress syndrome was 0.458 (CI: 0.233-0.898) time less in 8 years and above educated participants, and it was 2.228 times more (CI: 1.132-4.387) in participants with positive family history was shown in **table 3**.

Table 3. The results of logistic regression analysis related to functional dyspepsia, epigastric pain syndrome and postprandial distress syndrome

		β	p	OR	%95 CI
Dependent variable: Functional Dyspepsia					
Body Mass Index	<25	-0.873	0.010	0.418	0.207-0.842
	25-29.99	-1.059	0.005	0.347	0.165-0.731
	≥30			(Reference)	
Family History	Yes	0.688	0.021	1.989	1.099-3.600
	No			(Reference)	
Tee consumption	Yes	1.432	0.023	4.186	1.239-14.144
	No			(Reference)	
Dependent variable : Epigastric pain syndrome					
Body Mass Index	<25	-1.134	0.005	0.322	0.400-0.741
	25-29.99	-0.927	0.025	0.396	0.171-0.915
	≥30			(Reference)	
Dependent variable: Postprandial Distress Syndrome					
Education level	≥8 years	-0.782	0.004	0.458	0.233-0.898
	<8 years			(Reference)	
Family History	Yes	0.801	0.038	2.228	1.132-4.387
	No			(Reference)	
Tee consumption	Yes	1,927	0.035	6.870	1,158-51.566
	No			(Reference)	

CI: Confidence Interval, OR: Odd's Ratio

DISCUSSION

As a result considering all participants the prevalence of functional dyspepsia was found as 16.9% (n=59). When all female participants are considered 18.2% (n=36) of all women have functional dyspepsia, it is 15.1% (n=23) in men. Only body mass index, daily tee consumption and family history were significantly related with functional dyspepsia. The prevalence of epigastric pain syndrome in total participants was found as 10.5% (n=37) and the prevalence of postprandial distress syndrome was 11.4% (n=40) of all participants. Only body mass index was significantly related with epigastric pain syndrome. Educational level and family history show significant relationship with postprandial distress syndrome. The co-occurrence rate of epigastric pain syndrome and postprandial distress syndrome was 30.5%

The prevalence of dyspepsia in national studies Turkey was range between 18%- 44%.[6,8,14,] In a study total of 328 people were interviewed face to face and the prevalence of dyspepsia was found to be 18.6% according to Rome III diagnostic criteria. In this study, similar to our study, the prevalence of dyspepsia in women was not found to be statistically significant.[14] In a study based on Rome IV criteria, the prevalence of functional dyspepsia was found as 11%; the prevalence of epigastric pain syndrome was 8.8% and the prevalence of postprandial distress syndrome was 6.3%. The prevalence of functional dyspepsia was shown to be significantly higher in women (12.5% in men vs 17.8% in women).[15] In another study the prevalence of functional dyspepsia was found as 15.7% and the prevalence of epigastric pain syndrome and postprandial distress syndrome was found as 5.2% and 12.2 respectively.[16] In studies conducted in the Far East, the prevalence of functional dyspepsia was reported between 7.0% -20.4%, the prevalence of epigastric pain syndrome was reported between 2.3%-9.5%, and the prevalence of postprandial distress syndrome was reported between 6.2%-13.9%. Studies have found dyspepsia more common in female participants.[11,17] We found out the prevalence of dyspepsia as 16.9%. Although the social characteristics of the study areas are different in each study and this may affect the prevalence; it was thought that the main reason for this difference is the different in the methods used to diagnose dyspepsia. While the prevalence is found to be high in studies where only one or a few complaints are present, the prevalence is lower in studies based on Rome II and III, where stricter diagnostic criteria are used. In our study, we used the Rome IV criteria, which is a more objective diagnostic criterion.

We found out that body mass index show significant relationship with functional dyspepsia and epigastric pain syndrome but not postprandial distress syndrome. If we take participants with body mass index ≥30 kg/m^2 as reference, functional dyspepsia was 0.418 times less in participant with body mass index below 25 kg/m^2 (CI: 0.207-0.842) and 0.347 times less in participants with body mass index 25 kg/m^2-29.99 kg/m^2 (CI: 0.105-0.731). Moreover epigastric pain syndrome was 0.322 times less in participant with body mass index below 25 kg/m^2 (CI: 0.400-0.741) and 0.396 times less in participants with body mass index

25 kg/m^2-29.99 kg/m^2 (CI: 0.171-0.915). Although some studies showed no correlation between BMI and functional dyspepsia and epigastric pain syndrome a study conducted with 35447 people in France, the relationships between BMI and FD differ according to gender.[10,12] In females, higher rates of class I, II and III obesity were observed for the underweight and underweight obesity subgroups compared with normal BMI, respectively.[18]

The role of caffeine intake in dyspepsia is controversial. Most of the studies form United States and Europe have reported that excessive tea intake has not been shown with relationship with dyspepsia.[19] In another study form China it was found that tea consumption may play a protective role on functional dyspepsia.[20] In our study it was found that functional dyspepsia was 4.186 (CI: 1.239-14.144) times more in daily tee consumers. But tea consumption showed no significant relationship with epigastric pain syndrome and functional dyspepsia. Non standardization of dietary terminology and habits may play a role on these controversial results. Consumption of other food type consumption responsible for dyspeptic symptoms with tea may be an explanation of this situation.

Most of the population based study has examined associations of social factors and dyspepsia and majority have not show any significance. We found in our study that functional dyspepsia was 1.989 (CI: 1.099-3.600) times more in participants with family history and postprandial distress syndrome was 2.228 times more (CI: 1.132-4.387) in participants with positive family history. Moreover postprandial distress syndrome was 0.458 (CI: 0.233-0.898) time less in 8 years and above educated participants. In some studies it was shown that functional dyspepsia was significantly high in lower income and larger household and low income groups, in other words low socioeconomic status.[20-22] The socioeconomic status affect dietary habits, moreover family members share the same dietary culture.

CONCLUSION

In conclusion the prevalence of functional dyspepsia was 16.9% according to Rome IV criteria and most of the patients were female. Obesity was an important factor related with dyspepsia. Dyspeptic symptoms must investigated especially obese female patients.

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