

# Prevalence of Dyspepsia and its Associated Factors Among the Adult Population in Southeast of Iran in 2010

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**Background:** Dyspepsia is a common disorder that can present many clinical dilemmas in patient management. Although not usually life-threatening, its symptoms such as abdominal pain, heartburn, early satiety and postprandial fullness can have a significant negative impact on patients' quality of life.

**Objectives:** The aim of this study was to determine the prevalence of dyspepsia and its associated factors among the adult population in Kerman in 2010.

**Patients and Methods:** This cross-sectional study was performed on 2210 patients with the mean age of 43.4 years in Kerman, a city in southeast of Iran. Demographic factors, lifestyle data and gastrointestinal symptoms were collected for each patient.

**Results:** The prevalence of dyspepsia was 16.1% (95% confidence interval: 14.3-18.1). The prevalence in patients with abdominal obesity (7.3%) was lower in comparison with those with low physical activity (13.8%). Out of other psycho-behavioral risk factors, anxiety after controlling for other variables increased the risk of functional dyspepsia more than 65 percent ( $P = 0.004$ ) and depressive disorders also increased that risk about 2.13 percent ( $P < 0.0001$ ). Patients with dyspepsia symptoms were more likely to restrict their diet, take herbal medicine, use over-the-counter drugs and consult with physicians.

**Conclusions:** Results of this study reveal the moderate prevalence of dyspepsia among the adult population in Kerman like in other parts of the country and this prevalence is associated with several demographic factors, lifestyle and health-seeking behaviors.

**Keywords:** Prevalence; Dyspepsia; Abdominal Pain

## 1. Background

Dyspepsia is a common disorder that can present many clinical dilemmas in patient management. It refers to upper abdominal pain or discomfort, which is taught to arise from the upper gastrointestinal tract (1). Dyspepsia is a global concern, although most of the published data have arisen from western countries. It is assumed that dyspepsia in populations from developing countries is mostly organic in nature, whilst functional dyspepsia is more prevalent in western nations (2). The prevalence of this disorder varies between 3% and 40% in different studies (3, 4). This variation in the prevalence rates may be related to differences in the definition of dyspepsia in those studies. Although not life-threatening, the symptoms are long-lasting (5). Various risk factors have been found to have associated with these disorders such as helicobacter pylori infection (6, 7), psychiatric disorders (6, 8, 9) and behavioral characteristics (10). In addition, geographical distribution of functional dyspepsia is different in the world (11-14). Considering the negative effect of this disorder on patients' quality of life (15-17); understanding its prevalence

in the general population in different regions of Iran and other populations as well as the implementation of suitable interventions can lead to health promotion in the community. It also helps better understanding about the problem and remains a good resource for clinical researches (18-20). There is no comprehensive population-based investigation in Iran about functional dyspepsia. Many studies in this issue have emphasized mainly on dyspepsia and the functional type of this disorder often has been ignored. Comparing the condition of functional dyspepsia from different views such as the prevalence and risk factors among various populations is a main defect in research in the field of gastroenterology, particularly in Iran. Considering the high prevalence of the dyspepsia symptoms in Iran through daily clinical experiences and very low information about functional dyspepsia particularly in southeast of Iran, it seems that an understanding of the prevalence and potentially relevant risk factors can help the policy makers to establish a program for training and early diagnosis of the disease in the future.

## 2. Objectives

The aim of this study was to estimate the prevalence of functional dyspepsia and its associated factors in the adult population in Kerman (southeast of Iran).

## 3. Patients and Methods

In this cross-sectional study, a study population was selected using a cluster random sampling method based on the postal code divisions of Kerman, a city in southeast of Iran. This study was nested in a comprehensive study (KERCADR: The study of coronary artery disease risk factors in Kerman, 2008). Full details of sampling and methodology of KERCADR study were presented elsewhere (14). Assuming the prevalence of 25% for functional dyspepsia in the previous studies and a design effect equal to 1.5 and also considering 20% drop out, we calculated a sample size of 2200 to estimate the prevalence of functional dyspepsia by the accuracy rate of 0.025 in the significance level of 0.05. All required data were collected using two comprehensive questionnaires. Demographic, anthropometric, psychosocial, nutritional and behavioral information had been collected by the original questionnaire in KERCADR study with reliability and validity of 87% and 85%, respectively. Specific questions about the main objectives of the current study asked by a standardized questionnaire based on ROMEIII criteria (1). This questionnaire contains more than 20 questions about the dyspepsia symptoms and evidences of past medical history of recruits. An expert practitioner collected the data by direct face to face interview, asking specific questions and investigating relevant medical documents. The patient's privacy was respected in this study. Ethical approval, with a code of k/89/161, was obtained from the ethical committee. Patients who had signs and symptoms of weight loss, anemia, lesions and wounds in previous endoscopy and also those who had used drugs for the peptic ulcer were excluded from the study. Statistical analyses were undertaken by SPSS version 16 (SPSS Inc, Chicago, IL, USA). Chi-square and Fisher's exact tests were used to compare the categorical variables, and the logistic regression model was used to calculate the association between dyspepsia and risk factors. Statistical significance was considered  $P$  value  $< 0.05$ .

## 4. Results

From a total of 2320 individuals enrolled in the study, 110 cases were excluded and 2210 cases (1049 males and 1161 females) with the mean age of  $43.4 \pm 16.25$  years were studied. No statistically significant difference was observed between males and females regarding age ( $P = 0.7$ ). Among the participants, 333 patients were diagnosed with dyspepsia in this study. The standardized prevalence of functional dyspepsia in Kerman was 16.1% (95% confidence interval: 14.3-18.1). Table 1 shows the

prevalence of functional dyspepsia in relation to demographic, anthropometric, behavioral and psychosocial data. Results showed that although the dyspepsia was more common in females (17.1%; 95% CI: 15.8-18.5), young adults (18.9%; 95% CI: 18-19.8), subjects with academic education (16.8; 95% CI: 12.9-21.6), anxiety (16.9; 95% CI: 14.8-19.3) and depression (18.1%; 95% CI: 14.7-22), none of these associations was statistically significant. Results also revealed that the prevalence of this disorder was lower among high fruit and vegetable consumers [(15.8%; 95% CI: 13.6-18.3) and (16.1%; 95% CI: 10.3-24.3), respectively], the tea-coffee and fast-food consumers [(16.1%; 95% CI: 14.2-18.2) and ( 8.8%; 95% CI: 5.2-14.6), respectively] and patients with low physical activity (13.8%; 95% CI: 11.3-16.6) and abdominal obesity (7.3%; 95% CI: 3.6-14.5), while only the association between functional dyspepsia and abdominal obesity was statistically significant ( $P = 0.0002$ ).

Among patients with functional dyspepsia, 58.3 % (95% CI: 51.8-64.3) had epigastric pain or burning, 37.3% (95% CI: 31.5-43.6) had postprandial fullness and 18.6 % (95% CI: 13.9-24.3) complained of early satiety. Only about 3 percent (95% CI: 1.4-6.4) of the patients had all of the three above-mentioned symptoms. There was no statistically significant difference between males and females in the relevant symptoms (Table 2).

Table 3 showed that anxiety after controlling for other variables increased the risk of functional dyspepsia more than 65 percent ( $P = 0.004$ ) and also depression increased that risk about 2.13 percent ( $P < 0.0001$ ). Although high consumption of fruit decreased the risk of functional dyspepsia (crude OR = 0.66;  $P = 0.04$ ), controlling other variables demonstrated no statistically significant protective effect (adjusted OR = 0.92;  $P = 0.7$ ). Moreover, current smoking and drinking teacoffee and alcohol increased the risk of functional dyspepsia about 5%, , 30% and 35% , respectively; however, their effects were not statistically significant ( $P = 0.4, 0.4$  and  $0.8$ , respectively) (Table 3).

## 5. Discussion

Our study showed that the prevalence of functional dyspepsia was about 16% and it was significantly associated with anxiety and depressive disorder; although it was slightly greater among females, and peaked in the age group 25- 34 years old. Moreover, the prevalence of functional dyspepsia was greater to some extent in cigarette smokers, those who drank alcohol and those who consumed tea and coffee regularly compared with other subjects. The prevalence of functional dyspepsia in our study was less than other studies such as, UK (21%) (15), US (26%) (13) and Jordan (60%) (16). The rates in our study were very close to the rates of the studies conducted in western Iran (18%) (17), China (18.4%) (18) and another study (15.7%) (11). These discrepancies could be due to various definitions in different studies (19) and also the exclusion criteria

**Table 1.** Prevalence of Functional Dyspepsia in Relation to Different Characteristics of Study Subjects<sup>a</sup>

	Dyspepsia		P Value <sup>b</sup>
	Yes	No	
<b>Gender</b>			
Male (1049)	158 (15.2)	891 (84.8)	0.3
Female (1161)	175 (17.1)	986 (82.9)	
<b>Age group</b>			
15-24 (328)	55 (16.7)	273 (83.3)	0.1
25-34 (433)	82 (18.9)	351 (81.1)	
35-44 (406)	59 (14.7)	347 (85.3)	
45-54 (436)	58 (13.6)	378 (86.4)	
55-64 (354)	53 (14.7)	301 (85.3)	
65-74 (188)	18 (9.6)	170 (90.4)	
<b>Educational level</b>			
Illiterate (301)	48 (11.6)	253 (88.4)	0.9
High school & diploma (1478)	220 (15.8)	1258 (84.2)	
Academic level (431)	65 (16.8)	366 (83.2)	
<b>Anxiety (BAI &gt; 7)</b>			
No (501)	64 (13)	437 (87)	0.1
Yes (1704)	267 (16.9)	1437 (83.1)	
<b>Depression (BDI &gt; 15)</b>			
No (1405)	191 (15)	1214 (85)	0.1
Yes (803)	141 (18.1)	662 (81.9)	
<b>Fruit consumption</b>			
Less than 5 per month (233)	44 (17.8)	189 (82.2)	0.9
2-4 per week (599)	87 (16)	512 (84)	
At least 1 per day (1356)	199 (15.8)	1157 (84.2)	
<b>Raw vegetable consumption</b>			
Less than 5 per month (905)	144 (17)	761 (83)	0.7
2-4 per week (1043)	159 (15.9)	884 (84.1)	
At least 1 per day (259)	30 (16.1)	229 (83.9)	
<b>Consumption of Cooked vegetables</b>			
Less than 5 per month (1252)	190 (16)	1062 (84)	0.6
2-4 per week (874)	133 (17)	741 (83)	
At least 1 per day (68)	9 (9.8)	59 (90.2)	
<b>Fast-food consumption</b>			
Less than 5 per month (2052)	304 (15.9)	1748 (84.1)	0.4
2-4 per week (133)	26 (19.1)	107 (80.9)	
At least 1 per day (17)	3 (8.8)	14 (91.2)	
<b>Tea- coffee consumption</b>			
No (111)	16 (17.9)	95 (82.1)	0.8
Yes (2099)	317 (16.1)	1782 (83.9)	
<b>Alcohol consumption</b>			
No (2145)	322 (16.1)	1823 (83.9)	0.9
Yes (65)	11 (8.3)	54 (91.7)	
<b>Current smoking</b>			
No (1956)	292 (16.2)	1664 (83.8)	0.6
Yes (253)	41 (12.1)	212 (87.9)	
<b>Low physical activity</b>			
No (1222)	192 (17.9)	1030 (82.1)	0.09
Yes (988)	141 (13.8)	847 (86.2)	
<b>Abdominal obesity</b>			
No (1772)	292 (17.1)	1480 (82.9)	0.0002
Yes (435)	41 (7.3)	394 (92.7)	

<sup>a</sup> Data are presented as No. (%).<sup>b</sup> Chi-square test.

**Table 2.** Prevalence of Main Symptoms of Functional Dyspepsia in the Study Population <sup>a</sup>

Symptoms	Male	Female	Total	P Value <sup>b</sup>
Epigastric pain or burning	54.7 (49.7-59.7)	61.8 (57.9-65.5)	58.3 (51.8-64.3)	0.311
Post prandial fullness	38.5 (33.8-43.4)	36.1 (32.4-39.9)	37.3 (31.5-43.6)	0.703
Early satiety	21.8 (17.8-26.3)	15.3(12.5-18.5)	18.6 (13.9-24.3)	0.215
All symptoms	3.9 (2.3-6.6)	2 (1.2-3.5)	3 (1.4-6.4)	0.523

<sup>a</sup> Data are presented as percent (95% CI).<sup>b</sup> Chi-square test.**Table 3.** Odds Ratio Between Functional Dyspepsia and Psycho-Behavioral Risk Factors

Variables	Odds Ratio			
	Crude	P Value <sup>a</sup>	Adjusted	P Value <sup>a</sup>
Anxiety (BAI > 7)	2.15	< 0.0001	1.65	0.004
Depression (BDI > 15)	2.51	< 0.0001	2.13	< 0.0001
Low physical activity+	1.02	0.8	0.91	0.5
Current smoking	1.06	0.8	1.05	0.8
Tea or coffee consumption	1.34	0.3	1.30	0.4
<b>Fruit consumption</b>				
Less than 5 per month	1		1	
2-4 per week	0.69	0.1	0.84	0.5
At least 1 per day	0.66	0.04	0.92	0.7
<b>Raw vegetable consumption</b>				
Less than 5 per month	1		1	
2-4 per week	0.93	0.6	0.97	0.8
At least 1 per day	0.67	0.08	0.69	0.1
<b>Alcohol consumption</b>	1.15	0.7	1.35	0.4
<b>Obesity (BMI &gt; 30)</b>	0.96	0.8	0.89	0.6

<sup>a</sup> Logistic Regression

applied especially in the current research. Although functional dyspepsia was more common in females, that association was not statistically significant. This was similar to the findings of another study in which the prevalence of dyspepsia was equally distributed between the genders (20); however, was in contrast to the most previous studies, which showed that dyspepsia was more prevalent among females (8, 18, 21). Although our study showed no significant association between age and functional dyspepsia, the prevalence of the disease was more common in 25-34-year age group. Similarly, in studies conducted in Shiraz (6) and US (22), there was no relationship between age and dyspepsia. On the other hand, one of the studies indicated that the prevalence of dyspepsia was higher in 35-50-year age group (20), while other studies found the positive and reverse associations between age and functional dyspepsia, respectively (21, 23).

Psychological disorders, particularly depression and anxiety have been shown to be the major risk factors for

functional dyspepsia in one study (8), as indicated in the current study. In addition, another study found that anxiety seemed to be related to abnormal antral retention of food in functional dyspeptic patients. Since psychological stresses have been shown to affect gastrointestinal motility, it seems that the emotional factors, such as depression and anxiety, have also a negative effect on gastric motility. However, there is some evidence which suggests that there is an association between psychological abnormalities and impaired gastric motor function in patients with functional dyspepsia (24). Moreover, in the study (11) anxiety but not depression found to be a significant risk factor for the functional dyspepsia. Some studies have shown that anxiety was negatively associated with pain threshold and discomfort, gastric rendition, and abdominal ardor and discomfort. Another study reported that experimentally induced anxiety alters the gastric sensorimotor function. Moreover, the fluctuating cortisol levels, which is one of the most studied physiological



responses to acute stress, seems to be related to different symptoms of functional dyspepsia (24, 25). Although abdominal obesity in dyspeptic patients was more than that of other participants in our study, applying exclusion criteria for subjects showed no association between obesity and functional dyspepsia similar to the findings of the study conducted in Shiraz (6). There are different results in the previous studies which show both negative (12) and positive associations (11) between obesity and functional dyspepsia. In addition to our findings, the behavioral risk factors such as smoking and the alcohol and coffee consumption had no relationship with functional dyspepsia (6, 7). That was in contrast to the finding which indicated a harmful effect of smoking (12). Adjusting for potential confounders such as demographic and behavioral risk factors, fruits and vegetables seemed to have no association with functional dyspepsia (although the crude association was found), which was in parallel to the results of a study in southern Iran (6). Abdominal pain or burning was the most common symptoms in the present study, which was similar to the results of another study conducted in Iran (5). We considered a sufficient sample size and good participation rate in this study; however, the participants with evidences of other diseases were excluded from the study and thus the association among dyspepsia and risk factors was estimated based on half of our sample size. This study conducted only on urban population and also information about food consumption was based on only frequency of usage without detection of units and calories of dietary regimens. In conclusion, we estimated a prevalence of 16.1% of functional dyspepsia in Kerman, southeast of Iran, which was lower than that in most other studies and associated only with psychiatric disorders. More precise studies collecting detailed information about food consumption and area of residence could lead to better estimation of the effect of such risk factors.

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## Authors' Contributions

Ali Akbar Haghdoost, Mehdi Afshari and Azam Dehghani helped us to design the protocol, analyze the data and prepare the samples. All authors had equally contributed to preparing the manuscript.

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## References

- Hershcovici T, Zimmerman J. Functional heartburn vs. non-erosive reflux disease: similarities and differences. *Aliment Pharmacol Ther.* 2008;**27**(11):1103-9.
- Talley NJ, Silverstein MD, Agrues L, Nyren O, Sonnenberg A, Holtmann G. AGA technical review: evaluation of dyspepsia. American Gastroenterological Association. *Gastroenterology.* 1998;**114**(3):582-95.
- El-Serag HB, Talley NJ. Systemic review: the prevalence and clinical course of functional dyspepsia. *Aliment Pharmacol Ther.* 2004;**19**(6):643-54.
- Moayyedi P, Soo S, Deeks J, Forman D, Harris A, Innes M, et al. Systematic review: Antacids, H2-receptor antagonists, prokinetics, bismuth and sucralfate therapy for non-ulcer dyspepsia. *Aliment Pharmacol Ther.* 2003;**17**(10):1215-27.
- Aghazadeh R, Mohammad Alizadeh AH, Ansari S. Epidemiology of dyspepsia in Nahavand, Iran: a population-based study. *pejouhesh.* 2005;**29**(1):33-6.
- Khademolhosseini F, Mehrabani D, Zare N, Salehi M, Heydari S, Beheshti M, et al. Prevalence of dyspepsia and its correlation with demographic factors and lifestyle in Shiraz, southern Iran. *Middle East J Dig Dis.* 2010;**2**(1):24-30.
- Shaib Y, El-Serag HB. The prevalence and risk factors of functional dyspepsia in a multiethnic population in the United States. *Am J Gastroenterol.* 2004;**99**(11):2210-6.
- Mahadeva S, Goh KL. Epidemiology of functional dyspepsia: a global perspective. *World J Gastroenterol.* 2006;**12**(17):2661-6.
- Ganji A, Malekzadeh F, Safavi M, Nassri-Moghaddam S, Nourie M, Merat S, et al. Digestive and liver disease statistics in Iran. *Middle East J Dig Dis.* 2009;**1**(2):56-62.
- Okumura T, Tanno S, Ohhira M, Tanno S. Prevalence of functional dyspepsia in an outpatient clinic with primary care physicians in Japan. *J Gastroenterol.* 2010;**45**(2):187-94.
- Aro P, Talley NJ, Ronkainen J, Storskrubb T, Vieth M, Johansson SE, et al. Anxiety is associated with uninvestigated and functional dyspepsia (Rome III criteria) in a Swedish population-based study. *Gastroenterology.* 2009;**137**(1):94-100.
- Watanabe Y, Fujiwara Y, Shiba M, Watanabe T, Tominaga K, Oshitani N, et al. Cigarette smoking and alcohol consumption associated with gastro-oesophageal reflux disease in Japanese men. *Scand J Gastroenterol.* 2003;**38**(8):807-11.
- Crean GP, Card WI, Beattie AD. Geographical differences in the prevalence of dyspepsia. *Scand J Gastroenterol.* 1991;**83**(23):1734-9.
- Najafipour H, Mirzazadeh A, Haghdoost A, Shadkam M, Afshari M, Moazenazadeh M, et al. Coronary Artery Disease Risk Factors in an Urban and Peri-urban Setting, Kerman, Southeastern Iran (KERCADR Study): Methodology and Preliminary Report. *Iran J Public Health.* 2012;**41**(9):86-92.
- Jones RH, Lydeard SE, Hobbs FD, Kenkre JE, Williams EI, Jones SJ, et al. Dyspepsia in England and Scotland. *Gut.* 1990;**31**(4):401-5.
- Farsakh NA, Saadeh A, Rawshdeh M, Farsakh HA. Dyspepsia in the general population in Jordan. *Indian J Gastroenterol.* 2000;**19**(2):68-70.
- Majlesi A, Mani Kashani KH, Karimi MM. Prevalence of dyspepsia in rural districts of Hamadan City in 2002. *Sci J Hamadn Univ Med Sci.* 2004;**11**(1):47-50.
- Hu WH, Wong WM, Lam CL, Lam KF, Hui WM, Lai KC, et al. Anxiety but not depression determines health care-seeking behaviour in Chinese patients with dyspepsia and irritable bowel

- syndrome: a population-based study. *Aliment Pharmacol Ther.* 2002;**16**(12):2081-8.
19. Barazandeh F. Dyspepsia: a common riddle in practice, both for patients and doctors! *Middle East J Dig Dis.* 2010;**2**(1):3-4.
  20. Maconi G, Tosetti C, Stanghellini V, Bianchi Porro G, Corinaldesi R. Dyspeptic symptoms in primary care. An observational study in general practice. *Eur J Gastroenterol Hepatol.* 2002;**14**(9):985-90.
  21. Talley NJ, Zinsmeister AR, Schleck CD, Melton L3. Smoking, alcohol, and analgesics in dyspepsia and among dyspepsia subgroups: lack of an association in a community. *Gut.* 1994;**35**(5):619-24.
  22. Stene-Larsen G, Weberg R, Froyshov Larsen I, Bjortuft O, Hoel B, Berstad A. Relationship of overweight to hiatus hernia and reflux oesophagitis. *Scand J Gastroenterol.* 1988;**23**(4):427-32.
  23. Jones R, Lydeard S. Prevalence of symptoms of dyspepsia in the community. *BMJ.* 1989;**298**(6665):30-2.
  24. Lorena SL, Tinois E, Brunetto SQ, Camargo EE, Mesquita MA. Gastric emptying and intragastric distribution of a solid meal in functional dyspepsia: influence of gender and anxiety. *J Clin Gastroenterol.* 2004;**38**(3):230-6.
  25. De la Roca-Chiapas JM, Solis-Ortiz S, Fajardo-Araujo M, Sosa M, Cordova-Fraga T, Rosa-Zarate A. Stress profile, coping style, anxiety, depression, and gastric emptying as predictors of functional dyspepsia: a case-control study. *J Psychosom Res.* 2010;**68**(1):73-81.

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