

ORIGINAL ARTICLE

Social Factors Affecting on Irritable Bowel Syndrome in Women Referred to Arvand Hospital in Ahvaz, Iran, in 2014-2015

Bahman Sadeghi¹, Jalal Hashemi², Hashem Mirmoamen², Mojdeh Mirmoamen³, Sahar Sadeghi⁴

¹Department of Social Medicine, School of Medicine, Arak University of Medical Sciences, Arak, Iran.

²Department of Gastroenterology, School of Medicine, Ahvaz University of Medical Sciences, Ahvaz, Iran.

³School of Medicine, Arak University of Medical Sciences, Arak, Iran. ⁴School of Rehabilitation, Arak University of Medical Sciences, Arak, Iran.

Keywords: Irritable Bowel Syndrome, Risk Factors, Socioeconomic Condition

ABSTRACT

Introduction: Irritable bowel syndrome (IBS) is the most common functional gastrointestinal disorder of unknown etiology. There is a relation between this syndrome and social factors. The purpose of this research was investigation the various social factors in people with IBS compared with control group.

Methods: This cross-sectional study was performed on 130 patients with IBS fulfilling ROME III diagnostic criteria referred to Gastroenterology Clinic in Arvand Hospital in Ahvaz, Iran, and 110 people of their fellows who had no digestive problems. Both groups completed questionnaires of social factors made by researcher.

Results: Overall, 240 individuals of total 312 eligible people were entered into the study. There was a significant correlation based on multi-regression

model between the disease and use of analgesics (OR=2.12), 20 to 30 yr old age (OR=2.03), 31 to 40 yr old age (OR=3.14), age of marriage from 10 to 20 yr (OR=2.09), water consumption less than two glasses per day (OR=2.63), childhood socioeconomic status (OR=2.4) and life satisfaction (OR=3.42). However, there was no correlation between disease and sex, body mass index, smoking, use of mobile phones, television, and computer, contact with pets and kind of drinking water.

Conclusion: IBS is strongly associated with dysmenorrhea, working on night shift and in turns shifts, use of detergents and bleaches and other socioeconomic and medical conditions. However, role of symptoms caused by socioeconomic conditions need to be studied further. *JOURNAL OF IRANIAN CLINICAL RESEARCH* 2016;2(1): 143-152

INTRODUCTION

Irritable bowel syndrome (IBS) is a type of bowel dysfunction that can be identified with changes in digestive habits and abdominal pain in the absence of detectable structural abnormalities. Although this disease creates numerous problems for person, but does not cause change in bowel tissue and/or does not increase the risk of colorectal cancer [1]. It concerns patient and creates inability in physicians. The cost of treating the disease in the United States has annually estimated one billion dollars [2]. In addition, it would be a

waste of time and cause disability in patients [3].

About half of the patients who visit physicians due to gastrointestinal complaints are suffered from functional disorders, especially IBS [1]. Its prevalence in the United States has been reported 10-22%. 25-50% of outpatient referrals to gastroenterologists are consisted of these patients [4, 5]. 10%-20% of individuals in general population experience symptoms consistent with IBS [6, 7]. It is a disorder for young people and more cases of the disease appear in ages under 45 yr. IBS in women live in Western societies is diagnosed 2-3 times more than in men, and women consist 80% of population with sever IBS [8].

Correspondence: Sahar Sadeghi, School of Rehabilitation, Arak university of Medical Sciences. Arak, Iran, e-mail: sm.sadeghi163@gmail.com.

Patients with IBS refer to physicians with a wide range of digestive and non-digestive symptoms. Although, symptoms of abdominal chronic pains and changes in evacuate habits are the most common complaints in these patients [9].

Given that there is no definitive sign for diagnosis of IBS, diagnosis is based on rejection of other organic causes. Manning diagnostic criteria (with sensitivity of 58% and specificity of 85%) [8] or Rome III diagnostic criteria (with sensitivity of 65%, specificity of 100% and positive predictive value of 100%) [10] and/or use of both Manning and Rome system have been applied by researchers to facilitate diagnosis process. Despite high prevalence of IBS, there is a little cognition from its complex and multifunctional etiology and pathology. Research evidence suggests no detectable structural abnormality for the disease. However, some studies have noted the role of biological triggers such as gastro-intestinal bacterial infections [6] and changes in intestinal evacuate habits and movements such as visceral sensitivity [7], but in general, structural defects have not been known for it [8].

Environmental and psychosocial factors are important parts of IBS biophysical model and are involved in imbalance of gastrointestinal axis and lead to onset of IBS, stability of signs or abnormal behaviors in patients [11]. There is a high correlation between IBS and psychological factors. Depression, anxiety and somatic symptoms are high in patients with IBS [12]. Consumption of anti-analgesics, include acetaminophen, aspirin, and non-steroidal anti-inflammatory drugs, used for purposes other than the disease, are more in the patients with IBS, however, a relation has not been found between the disease and age, sex, body mass index, history of consumption of smoking and alcohol, education, contact with pets and the amount of water consumption. Increased prevalence of gastrointestinal symptoms in the disease has direct relation with reduction of social level [13]. Socioeconomic level and environmental factors have significantly associated with the risk of IBS and more cases of IBS occur at lower socioeconomic levels [14].

A history of stressful events in life including death of close relatives, divorce, sexual or physical abuse is seen in a significant number of patients [10]. The other numerous variables such as disconnection of very close relations, separation in marriage and leave of home by a family member [15], individual personality and neuroticism [16, 17], depression [18, 19], factors related to childhood [20], less education, lower income of parents, lack of job satisfaction, and hard physical works [21, 22], several social

factors such as stress, psychological disorders, personality problems, negative thoughts, low self-esteem, leisure time, travel, diet, occupation and sexual relations [23], cultural factors such as beliefs and way of thinking and decision making, economic and education level, gender relations, and urban and rural life [24] and other factors are known related to the disease. However, their influences in an appropriate statistical population are not still studied in Iran. The purpose of this research was investigation the various social factors in people with IBS compared with control group.

MATERIALS AND METHODS

In this cross-sectional study performed in 2014-2015 to determine effective social factors on IBS, a number of 714 women referred to Arvand Hospital, Ahvaz, Iran as a patient or patient attendant were evaluated based on Manning (with sensitivity of 58% and specificity of 85%) [8] and ROME III criteria (with sensitivity of 65%, specificity of 100% and positive predictive value of 100%) [10].

Ahvaz University of Medical Sciences Ethics Committee approved the study and written informed consent was taken from patients.

Women suspected of having IBS are those who refer with abdominal pain and bloating associated with altered evacuate habits as constipation, diarrhea and/or both symptoms. These patients should also have ROME III criteria that include recurrent abdominal pain or discomfort at least three times in a month, in last three month with two or more of following criteria:

- 1- Improvement of abdominal pain with defecation
- 2- Beginning of abdominal pain with a change in the number of defecation
- 3- Onset of abdominal pain with change in stool consistency

These criteria should be completed at least in last three month of referral time and complains should be started from at least six months before the time.

The samples were then referred to Gastroenterology Clinic for examination and, if necessary, some routine tests such as CBC, S/E, CRP, ESR and S/C as well as radiological control was performed to rule out other causes. Ultrasound of liver, pancreas, gallbladder and barium enema or endoscopy was considered in common path of disease diagnosis for people who were strongly suspected to other diseases, in order to study patients after rejection of other organic diseases and definitive diagnosis of IBS. Qualitative study in the type of focus group

discussion (FGD) was then conducted to determine social factors, in which group discussion tool with presence of diagnosed patients was used.

Four sessions of three-hour focus group discussion (FGD) with open semi-structured questions and open-depth individual interviews were performed in the presence of patients. In this section, whilst providing of a safe physical and psychological environment for participants, and by assumption of lack of complete awareness of researcher on social factors and to avoid any prejudice, researcher tried, by planning of open questions about affecting social factors on the syndrome and by inspiration from other performed studies and BRFSS 2013 Questionnaire (Behavioral Risk Factor Surveillance System Questionnaire) in group discussions with small groups of 8 to 10 people, to make participants to express social factors. In this section, among planning an open question researcher allowed participants to express freely their views and opinions. Researcher role was only as a director of group discussion and possibly as a meddlesome in unrelated cases to discussion.

Finally, results of group discussions were analyzed using content analysis method and based on the obtained results early questionnaire was prepared.

In the second part, in a cross-sectional study, the questionnaire was distributed and completed by 130 patients, who were in accordance with ROME III and Manning criteria and with clinical diagnosis of gastroenterologist, and ranging from 15 to 60 yr who were not suspected to lactase deficiency or other metabolic diseases such as diabetes and they were also not suffered from known psychotic or neurotic disorders and they were not taking medications for a long time, and 110 people without any diseases.

Finally, presence or absence of IBS was considered as dependent variable in a logistic regression model in Amos and SPSS16 software (Chicago, IL, USA). And odds ratio was calculated as multi-sided (matched) for age in order to predict effective risk factors on irritable bowel syndrome in multivariate logistic regression model. Moreover, certainty range of 95% and odds ratio (OR) were calculated in each variable between two states of presence and lack of it according to estimate coefficient in logistic regression model.

RESULTS

The average age of samples was 28.45 ± 5.4 yr and that of marriage was 23.7 ± 3.3 yr. The most

age group among total samples was in the range of 21 to 30 yr with 33%, and 34% of the cases were in the weight range of 61 to 70 kg. Fifty eight percent of the samples were married and their education levels were generally in middle school.

All the samples (100%) had only been vaccinated in accordance to Expanded Programme on Immunisation and any specific-vaccination was not reported. A set of symptoms in the form of bloating, abdominal pain, diarrhea, gas excretion, was predominant symptoms in 56 (43%) patients.

Family history of the disease or a same condition was positive in 31% of the cases.

The disease began or aggravated in 12.1% of the patients on contaminated days with dust and in 41.3% of the patients on one or two day(s) after dust. The remaining samples did not have significant change in severity of illness by dust.

Among associated diseases with IBS can be mentioned to cystitis disease (dysuria, frequency of urine and change of odor and color of urine) in 38%, dysmenorrheal in 21.2%, asthma and allergies in 26.7%, dyspareunia in 6.5% of the cases and history of cholecystectomy surgery or appendectomy or hysterectomy in 7.6% of the case.

According to univariate and multivariate prediction of IBS and demographic risk factors significant association ($OR \geq 2$) was identified for age 31-40 year old, marriage age of 10-20 yr old, 10-20 yr old Age at first pregnancy and divorced women.

In nutritional risk factors, IBS was significantly associated ($OR \geq 2$) with less than 2 glasses water consumption per day and usual consumption of bean and vegetable per week. No association was detected between IBS and consumption of hot and spicy, animal protein, vegetable protein, smoking or use of drugs, methods of food cooking, tea and coffee, type of drinking water and type of consumption rice.

Results of sanitary, economical and chemical risk factors are listed in Table 1 to 4.

Multivariate relationship of IBS and its psychological risk factors showed that dissatisfaction with life, lack of contact to family, change of career, stress caused by death of relatives, war immigration, physical and sexual abuse in childhood, and family disputes and conflicts are related with odds ratio greater than 2 despite IBS. However, it was not related to travel, stress caused by accident, and chronic diseases in childhood.

Univariate and multivariate relationship of IBS and physical risk factors showed that the amount of physical activity, temperature and humidity of air, contact to radiation in medical

and diagnosis cases, and use of mobile phone and television, did not raise the odds ratio of IBS (Table 4).

Table 1: Multivariate odds ratios of IBS and risk factors

Variable	Variable level	Number	Multivariate OR (95% CI)	P-value
Use deodorant and (m=18)		222		
	Do not use	123	1.0	0.076
	1-2 times in a week	49	0.98 (0.50, 1.62)	
	2-4 times in a week	37	0.69 (0.33, 1.129)	
	Almost every day	14	0.85 (0.77, 1.59)	
Menstrual cycle (m=16)		224		
	Regular	152	1.0	0.321
	Less than 21 days	38	0.98 (0.60, 1.67)	
	More than 25 days	34	0.69 (0.63, 1.99)	
Breastfeeding (m=9)		231		
	Not experienced	132	1.0	0.083
	Some children with incomplete course	34	0.82 (0.60, 1.67)	
	Some children but complete course	28	0.87 (0.40, 1.80)	
	All children with complete course	37	0.94 (0.93, 1.99)	
Pregnancy (m=7)		233		
	Not experience	135	1.0	0.421
	1-2 times	29	0.88 (0.40, 1.67)	
	3-5 times	50	0.60 (0.60, 1.77)	
	More than 5 times	19	0.64 (0.43, 1.10)	
Abortion (m=88)		152		
	Not have	113	1.0	0.348
	Have	39	0.88 (0.40, 1.67)	
History of surgery (m=2)		238		
	Not experience	120	1.0	0.031
	Head and neck	14	0.78 (0.50, 1.77)	
	Chest	23	0.69 (0.33, 1.39)	
	Abdomen and pelvis	38	2.88 (2.14, 3.67)	
	Organ	43	0.84 (0.33, 1.69)	
Dysmenorrhea (m=16)		224		
	Not have	166	1.0	0.001
	Have	58	2.88 (1.40, 3.67)*	

M= missing, odds ratios (OR) and 95% confidence intervals (CI).

Table 2: Multivariate odds ratios of IBS and economical risk factors

Variable	Variable level	Number	Multivariate OR (95% CI)	P Value
Career (m=10)		230		
	Housewife	97	1.0	0.043
	Free trade worker	41	1.36 (0.83, 1.90)	
	Employed worker	32	1.35 (0.70, 1.56)	
	Employee	27	1.06 (0.33, 1.97)	
	Farmer	23	1.51 (0.98, 1.96)	
	Other businesses	10	0.82 (0.29, 1.17)	
Insurance (m=13)		227		
	Not	133	1.0	0.026
	Have	94	1.55 (0.53, 1.80)	

Employment type (m=1)		239		
	Workless	123	1.0	0.321
	Temporary employment	63	1.36 (0.83, 1.90)	
	Contractual employment	31	1.30 (0.79, 1.96)	
	Formal employment	22	1.12 (0.50, 1.07)	
Work times (m=0)		240		
	Not	178	1.0	0.002
	Constant daily shift	23	1.30 (0.33, 1.90)	
	Fixed night shift	13	2.71 (1.58, 3.46)*	
	Variable shift	26	2.88 (2.20, 3.67)*	
Current status and social position (m=22)		218		
	Suitable and normal	112	1.0	0.001
	Inappropriate	71	2.36 (1.83, 2.90)*	
	Good	22	1.31 (0.48, 1.96)	
	Excellent	13	0.82 (0.50, 1.07)	
Status and social position of childhood (m=25)		215		
	Suitable and normal	69	1.0	0.031
	Inappropriate	101	2.36 (1.83, 2.90)*	
	Good	37	1.31 (0.78, 1.46)	
	Excellent	8	2.82 (2.50, 3.07)*	
Current social status and its comparison with childhood (m=11)		229		
	Unchanged	59	1.0	0.048
	Worse	89	3.36 (2.83, 4.90)*	
	Better	81	1.31 (0.78, 1.46)	
Job satisfaction (m=15)		225		
	Not working	126	1.0	0.003
	Dissatisfied	43	3.36 (2.83, 3.90)*	
	Normal satisfaction	35	1.31 (0.78, 1.46)	
	Good satisfaction	21	0.82 (0.90, 1.07)	

M= missing, odds ratios (OR) and 95% confidence intervals (CI).

Table 3: multivariate odds ratios of IBS and chemical risk factors

Variable	Variable	Number	Multivariate OR (95% CI)	P value
Use of household insecticides and pesticides (m=4)		236		
	Did not use at all	43	1.0	0.059
	Less than 1 time in a week	120	1.66 (0.83, 1.90)	
	1-2 times in a month	73	1.30 (0.78, 1.46)	
Use of household detergents and bleaching (m=2)		238		
	Did not use at all	19	1.0	0.001
	1-2 times in a week	23	1.06 (0.33, 1.90)	
	3-4 times in a week	77	3.31 (1.78, 3.46)*	
	Almost every day	119	3.82 (2.50, 4.07)*	
Taking non-steroidal anti-inflammatory medicines (m=8)		232		
	Not have	102	1.0	0.001
	1-2 times in a week	43	1.38 (0.63, 1.90)	
	4-5 times in a month	55	1.31 (0.70, 1.46)	
	Most days of a week	32	2.82 (2.50, 3.07)*	

Taking non-narcotic pain relievers and antispasmodics (m=6)	234		
Not have	61	1.0	0.003
1-2 times in a week	55	1.26 (0.83, 1.80)	
4-5 times in a month	71	1.31 (0.78, 1.46)	
Most days of a week	47	2.82 (2.50, 3.07)*	
Taking gastrointestinal medicines (m=5)	235		
Not have	88	1.0	0.087
1-2 times in a week	50	1.36 (0.83, 1.70)	
4-5 times in a month	39	1.41 (0.78, 1.46)	
Most days of a week	58	0.92 (0.50, 1.77)	
Taking of cardiovascular medicines (m=2)	238		
Not have	176	1.0	0.091
Regular daily taking	23	1.36 (0.83, 1.90)	
Irregular daily taking	39	1.61 (0.48, 1.86)	

M= missing, odds ratios (OR) and 95% confidence intervals (CI)..

Table 4: Multivariate odds ratios of IBS and physical risk factors

Variable	Variable level	Numbers	Multivariate OR (95% CI)	P Value
Physical activity (m=3)		237		
	Common house chores	114	1.0	0.831
	Regular activities less than 3 hours a day	39	0.36 (0.83, 1.00)	
	Regular activities more than 3 hours a day	65	0.31 (0.78, 1.06)	
	Physically sever work	19	0.80 (0.50, 1.37)	
Satisfied air temperature (m=7)		233		
	Less than 20 °C	89	1.0	0.420
	Between 20-30 °C	124	1.30 (0.83, 1.90)	
	More than 30 °C	20	1.51 (0.98, 1.49)	
Satisfied humidity (m=11)		229		
	Typical days	119	1.0	0.289
	Hot and humid days	64	1.46 (0.73, 1.80)	
	Dry and warm days	46	1.21 (0.68, 1.40)	
Exposure to radiation in medical cases (m=18)		222		
	Un-experienced	89	1.0	0.654
	1-2 contacts in a year	119	1.36 (0.83, 1.90)	
	More than 3-4 contacts in a year	14	1.41 (0.88, 1.96)	
Using a mobile phone (m=0)				
	Not use	23	1.0	0.147
	Less use than other family members	50	1.51 (0.98, 1.49)	
	Routine use	89	1.39 (0.93, 1.80)	
	More use than other family members	78	1.57 (0.98, 1.99)	
Use of computer (m=10)		230		
	Not use	79	1.0	0.089
	Less use than other friends	28	1.51 (0.98, 1.49)	
	Routine use	88	1.30 (0.83, 1.90)	
	More use than other friends	35	1.41 (0.90, 1.89)	
Use of Television (m=14)		226		
	Not use	12	1.0	0.270
	Less use than other family members	41	1.61 (0.98, 1.79)	
	Routine use	99	1.40 (0.80, 1.80)	
	More use than other family members	74	1.48 (0.80, 1.79)	

M= missing, odds ratios (OR) and 95% confidence intervals (CI).

DISCUSSION

The results showed that the majority of patients had clinical pictures, bloating in most days, and suddenly stomachache with diarrhea and gas excretion, and severity of the disease was reduced after a few days.

In the field of sanitary and individual risk factors, use of deodorants and air fresheners, monthly cycle, breastfeeding, pregnancy, and reproductive health and history of abortion did not increase the risk. However, history of abdominal or pelvic surgery, and presence of dysmenorrhea increased odds ratio of risk.

In the field of physical factors, none of temperature and moisture, activity, contact with medical radiations, mobile phone, computer and television was associated with higher risk.

In economic terms, type of career, insurance, and type of employment had no impact. However, working on night shift and in turns shifts, inappropriate current social status, inappropriate childhood or vice versa excellent childhood social status, change in current social status compared with childhood and lack of career satisfaction were all associated with an higher odds ratio.

In the field of chemical risk factors, exposure to household insecticides, use of digestive and cardiovascular medications did not increase the risk. However, use of more than 3 to 4 times in a week from detergents and bleaches, use of non-steroidal anti-inflammatory medicines and non-narcotic pain relievers, and use of digestive antispasmodic, had higher risk factors.

In the field of psychological perspective and unclassified factors, annual travel, contact with pets, chronic diseases in childhood, and traumatic stress were associated with higher risk. However, dissatisfaction with life, limited family visiting, stress of dismissal from work and change of career, death of one of relatives especially in childhood, war migration for 2 to 4 yr, physical and sexual abuse during childhood and family dispute had higher odds ratio of risk.

A comprehensive study was not found to discuss various social factors influence on the disease. However, some studies have mentioned certain social factors.

In a study [25] significant difference was observed in age distribution and young people had the most frequent. Married people were also had the most frequent in the terms of marriage. Most patients had diploma and higher-level degrees, and the most frequency was related to bachelor's degree and higher level. In terms of career, the most frequency was related to housewives and employees. Most of patients

lived in urban area. The results were agreed with the results of this study.

In another study [26] most of young people were involved in the disease. In terms of sex, most women were involved, but most of the patients had low educational level. In terms of education, the most frequency was belonging to married group and most of patients lived in urban area. According to the results of this study, smoking was not associated with the disease.

Although the causes of IBS are not clearly known, but diet, intestinal infections and mental disorders were risk factors for this disorder [27, 28]. The prevalence of depression, anxiety and other mental disorder were high in people with IBS [18]. IBS and medically unexplained syndromes were associated with depression and anxiety.

Fifty to 90 percent of patients with IBS reported a history of mental disorder during their lifetime [29]. These disorders were included major depressive disorder, generalized anxiety disorder, panic disorder, social phobia, post-traumatic stress disorder, and somatoform disorder [29].

In the present study, the average age of patients was 28.45 yr that showed prevalence of the disease in lower ages. The results are similar to researches of Drossman et al. [27] and Solati et al. [30] in people with IBS. Since, in the above studies the prevalence of the disease in lower age and young people has been more reported. One of the reasons of the problem can be related to facing of young people with more various socio-economic problems and issues.

Given to the higher prevalence of abdominal and pelvic surgery (cholecystectomy, appendectomy, and inguinal hernia), more precision is required in this category of patients when making clinical decisions [31].

Prevalence of abdominal and pelvic surgery except cholecystectomy in patients with IBS was 78% higher and prevalence of cholecystectomy was three times normal population [32].

In the study of Richard Lock et al. that investigate role of nutritional and allergic factors on IBS, relatively similar results were obtained with the present study. Age, body mass index, smoking, coffee, alcohol, marital status, education, contact with pets, and type of drinking water had no effect on odds ratio for IBS [33]. However, stress, job satisfaction, food allergies, taking acetaminophen and steroidal anti-inflammatory medicines, and physical and sexual abuse increased chance of catching the disease.

IBS is a common disease with uncertain pathogenesis that role of central nervous system

disorder, gastrointestinal motility disorder, changes of hormonal system and digestive enzymatic and visceral hypersensitivity have been raised in pathophysiology of the disease in various psychological and sociocultural factors [34].

In most of patients with IBS familial aggregation of similar symptoms has been reported in first and second degree relatives [35-37]. However, role of environmental factors is shown highlighted than genetic factors in a study on twins [40-42]. Recent genetic studies also showed polymorphism of serotonin transporter gene and polymorphism of alpha-2-adrenergic [41-45].

Perhaps the reasons for relation between the disease and consumption of non-narcotic pain relievers and non-steroidal anti-inflammatory drugs can be mentioned to higher and simultaneous prevalence of the other somatic pains such as headache, back pain, joint stiffness and pain in the patients and/or due to the higher tendency of the patients to pain relievers to reduce abdominal pains. Higher prevalence of abdominal and pelvic surgery in patients with IBS is probably due to different quality of abdominal pain in these patients and can be mentioned to mild and tolerable pain to abdominal sudden, severe and cramping pain [46-50].

In association of exacerbation of IBS with consumption of food and association of allergic diseases with IBS may be argued that some symptoms of IBS are actually a part of allergic reactions. In general, role of allergens and IBS is unknown and has been a field of a lot of research [51].

Conclusion

Irritable bowel syndrome is strongly associated with dysmenorrhea, working on night shift and in turns shifts, use of detergents and bleaches, dissatisfaction with life, limited family visiting, stress of dismissal from work and change of career, death of one of relatives especially in childhood, war migration for 2 to 4 years, physical and sexual abuse during childhood and family and other socioeconomic and medical conditions.

Basic characteristic of the change has been type of disease, increase of the role of social and cultural factors and importance of structures and social behaviors on emergence of distribution and treatment of mentioned diseases. Therefore it is required that understanding of pathology and treatment of irritable bowel syndrome turns from a declining and simplistic bio-medical view to a comprehensive vision for complex psychological-socio-biological syndrome.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the financial assistance of Arak University of Medical Sciences And Arvand Hospital staffs of Ahvaz, especially Gastroenterology Clinic, in performing this investigation. The authors declare that there is no conflict of interests.

REFERENCES

1. Cohen LM, McChargue DE, Collins FL. The health psychology handbook: Practical issues for the behavioral medicine specialist. Sage; 2003 Jun 18.
2. Surdea-Blaga T, Baban A, Dumitrascu DL. Psychosocial determinants of irritable bowel syndrome. *WJG* 2012;18(7):616-26.
3. Solati dehkordi sk, Rahimian ga, Abedi a, Bagheri n. The relationship between mental disorders and irritable bowel syndrome. *Yafteh* 2007;8(2):31-8.
4. Drossman DA, Camilleri M, Mayer EA, Whitehead WE. AGA technical review on irritable bowel syndrome. *Gastroenterology* 2002;123(6):2108-31.
5. Whitehead WE, Palsson O, Jones KR. Systematic review of the comorbidity of irritable bowel syndrome with other disorders: what are the causes and implications? *Gastroenterology* 2002;122(4):1140-56.
6. Lee OY, Mayer EA, Schmulson M, Chang L, Naliboff B. Gender-related differences in IBS symptoms. *Gastroenterology* 2001;96(7):2184-93.
7. Drossman DA. The functional gastrointestinal disorders and the Rome III process. *Gastroenterology* 2006;130(5):1377-90.
8. Saito YA, Locke GR, Talley NJ, Zinsmeister AR, Fett SL, Melton LJ. A comparison of the Rome and Manning criteria for case identification in epidemiological investigations of irritable bowel syndrome. *Am J Gastroenterol* 2000 ;95(10):2816-24.
9. Drossman DA, Camilleri M, Mayer EA, Whitehead WE. AGA technical review on irritable bowel syndrome. *Gastroenterology* 2002;123(6):2108-31.
10. Tibble JA, Sigthorsson G, Foster R, Forgacs I, Bjarnason I. Use of surrogate markers of inflammation and Rome criteria to distinguish organic from nonorganic intestinal disease. *Gastroenterology* 2002;123(2):450-60.
11. Whitehead WE, Palsson O, Jones KR. Systematic review of the comorbidity of irritable bowel syndrome with other disorders: what are the causes and implications? *Gastroenterology* 2002;122(4):1140-56.
12. Henningsen P, Zimmermann T, Sattel H. Medically unexplained symptoms, anxiety, and depression: a meta-analytic review. *Psychosom Med* 2003; 65: 528-33.
13. Kalantar JS, Locke 3rd GR, Zinsmeister AR, Beighley CM, Talley NJ. Familial aggregation

- of irritable bowel syndrome: a prospective study. *Gut* 2003;52:1703-7.
14. Locke 3rd GR, Zinsmeister AR, Talley NJ, Fett SL, Melton 3rd LJ. Familial association in adults with functional gastrointestinal disorders. *Mayo Clin Proc* 2000;75:907-12.
 15. Richard Locke G, Zinsmeister AR, Talley NJ, Fett BS SL, Melton LJ. Risk Factors for Irritable Bowel Syndrome: Role of Analgesics and Food Sensitivities. *Am J Gastroenterol* 2000;95:157-165.
 16. Bytzer P, Howell S, Leemon M, Young LJ, Jones MP, Talley NJ. Low socioeconomic class is a risk factor for upper and lower gastrointestinal symptoms: a population based study in 15 000 Australian adults. *Gut* 2001;49:66-72.
 17. Howell S, Talley NJ, Quine S, Poulton R. The Irritable Bowel Syndrome has Origins in the Childhood Socioeconomic Environment. *Am J Gastroenterol* 2004;99:1572-1578.
 18. DiMarino AJ. Sleisenger and Fordtran's Gastrointestinal and Liver Disease Review and Assessment. Elsevier Health Sciences; 2010.
 19. Drossman DA. The functional gastrointestinal disorders and the Rome III process. *Gastroenterology* 2006;130(5):1377-90.
 20. Farrokhyar F, Marshall JK, Easterbrook B, Irvine EJ. Functional gastrointestinal disorders and mood disorders in patients with inactive inflammatory bowel disease: prevalence and impact on health. *IBD* 2006 ;12(1):38-46.
 21. Farnam A, Somi MH, Sarami F, Farhang S. Five personality dimensions in patients with irritable bowel syndrome. *Neuropsychiatr Dis Treat* 2008;4(5):959-62.
 22. Tougas G, Chen Y, Hwang P, et al. Prevalence and impact of upper gastrointestinal symptoms in the Canadian population: findings from the DIGEST study. *Am J Gastroenterol* 1999;94:2845-54.
 23. Khajedaluae M , Vosooghinia H , Bahari A, Khosravi A, Esmailzadeh A et al. Demographic, social and clinical characteristics in patients with irritable bowel syndrome in Mashhad . *Med J MUMS* 2014;57(3):579-586.
 24. Jamali R, Jamali A, Poorrahnama M, Omid A, Jamali B, Moslemi N, et al. Evaluation of health related quality of life in irritable bowel syndrome patients. *Health Qual Life Outcomes* 2012;10:12.
 25. Kanazawa M, Endo Y, Whitehead WE, Kano M, Hongo M, Fukudo S. Patients and nonconsulters with irritable bowel syndrome reporting a parental history of bowel problems have more impaired psychological distress. *Dig Dis Sci* 2004;49:1046-53.
 26. Levy RL, Jones KR, Whitehead WE, Feld SI, Talley NJ, Corey LA. Irritable bowel syndrome in twins: heredity and social learning both contribute to etiology. *Gastroenterology* 2001;121:799-804.
 27. Mohammed I, Cherkas LF, Riley SA, Spector TD, Trudgill NJ. Genetic influences in irritable bowel syndrome: a twin study. *Am J Gastroenterol* 2005; 100:1340-4.
 28. Cho JH. The genetics and immunopathogenesis of inflammatory bowel disease. *Nature Rev Immunol.* 2008;8(6):458-66.
 29. Kim HJ, Camilleri M, Carlson PJ, Cremonini F, Ferber I, Stephens D, et al. Association of distinct alpha(2) adrenoceptor and serotonin transporter polymorphisms with constipation and somatic symptoms in functional gastrointestinal disorders. *Gut* 2004;53:829-37.
 30. Pata C, Erdal ME, Derici E, Yazar A, Kanik A, Ulu O. Serotonin transporter gene polymorphism in irritable bowel syndrome. *Am J Gastroenterol* 2002; 97:1780-4.
 31. Yeo A, Boyd P, Lumsden S, Saunders T, Handley A, Stubbins M, et al. Association between a functional polymorphism in the serotonin transporter gene and diarrhoea predominant irritable bowel syndrome in women. *Gut* 2004; 53:1452-8.
 32. Saito YA, Schoenfeld P, Locke III GR. The epidemiology of irritable bowel syndrome in North America: a systematic review. *Am J Gastroenterol* 2002 ;97(8):1910-5.
 33. Farrokhyar F, Marshall JK, Easterbrook B, Irvine EJ. Functional gastrointestinal disorders and mood disorders in patients with inactive inflammatory bowel disease: prevalence and impact on health. *Inflam Bowel Dis* 2006;12(1):38-46.
 34. Ronkainen J, Aro P, Storskrubb T, Johansson SE, Lind T, Bolling-Sternevald E, Graffner H, Vieth M, Stolte M, Engstrand L, Talley NJ. High prevalence of gastroesophageal reflux symptoms and esophagitis with or without symptoms in the general adult Swedish population: a Kalixanda study report. *Scandinavian J Gastroenterol* 2005;40(3):275-85.
 35. Atkinson W, Sheldon TA, Shaath N, Whorwell PJ. Food elimination based on IgG antibodies in irritable bowel syndrome: a randomised controlled trial. *Gut.* 2004;53(10):1459-64.
 36. Okura Y, Urban LH, Mahoney DW, Jacobsen SJ, Rodeheffer RJ. Agreement between self-report questionnaires and medical record data was substantial for diabetes, hypertension, myocardial infarction and stroke but not for heart failure. *J Clin Epidemiol* 2004;57(10):1096-103.
 37. Rocca WA, Yawn BP, Sauver JL, Grossardt BR, Melton LJ. History of the Rochester Epidemiology Project: half a century of medical records linkage in a US population. *In Mayo Clinic Proceedings* 2012;87(12):1202-1213.
 38. Saito YA, Schoenfeld P, Locke III GR. The epidemiology of irritable bowel syndrome in North America: a systematic review. *Am J Gastroenterol* 2002 ;97(8):1910-5.
 39. Zar S, Kumar D. Role of food hypersensitivity in irritable bowel syndrome. *Minerva Medica* 2002 ;93(5):403-12.
 40. Duerr RH, Taylor KD, Brant SR, Rioux JD, Silverberg MS, Daly MJ, Steinhart AH, Abraham C, Regueiro M, Griffiths A, Dassopoulos T. A genome-wide association

- study identifies IL23R as an inflammatory bowel disease gene. *Science* 2006;314(5804):1461-3.
41. Kim HJ, Camilleri M, Carlson PJ, Cremonini F, Ferber I, Stephens D, et al. Association of distinct alpha(2) adrenoceptor and serotonin transporter polymorphisms with constipation and somatic symptoms in functional gastrointestinal disorders. *Gut* 2004;53:829–37.
 42. Pata C, Erdal ME, Deric E, Yazar A, Kanik A, Ulu O. Serotonin transporter gene polymorphism in irritable bowel syndrome. *Am J Gastroenterol* 2002; 97:1780–4.
 43. Yeo A, Boyd P, Lumsden S, Saunders T, Handley A, Stubbins M, et al. Association between a functional polymorphism in the serotonin transporter gene and diarrhoea predominant irritable bowel syndrome in women. *Gut* 2004; 53:1452–8.
 44. Cremonini F, Talley NJ. Irritable bowel syndrome: epidemiology, natural history, health care seeking and emerging risk factors. *Gastroenterology Clinics of North America* 2005;34(2):189-204.
 45. Koloski NA, Talley NJ, Boyce PM. The impact of functional gastrointestinal disorders on quality of life. *Am J Gastroenterol* 2000;95(1):67-71.
 46. Ronkainen J, Aro P, Storskrubb T, Johansson SE, Lind T, Bolling–Sternevald E, Vieth M, Stolte M, Talley NJ, Agréus L. Prevalence of Barrett's esophagus in the general population: an endoscopic study. *Gastroenterology* 2005;129(6):1825-31.
 47. Monsbakken KW, Vandvik PO, Farup PG. Perceived food intolerance in subjects with irritable bowel syndrome—etiology, prevalence and consequences. *European J Clin Nutr* 2006;60(5):667-72.
 48. Sauver JL, Grossardt BR, Yawn BP, Melton LJ, Rocca WA. Use of a medical records linkage system to enumerate a dynamic population over time: the Rochester epidemiology project. *Am J Epidemiol* 2011;173(9):1059-68.
 49. Barbara G, Stanghellini V, De Giorgio R, Cremon C, Cottrell GS, Santini D, Pasquinelli G, Morselli-Labate AM, Grady EF, Bunnett NW, Collins SM. Activated mast cells in proximity to colonic nerves correlate with abdominal pain in irritable bowel syndrome. *Gastroenterology* 2004;126(3):693-702.
 50. Park M, Camilleri M. Is there a role of food allergy in irritable bowel syndrome and functional dyspepsia? A systematic review. *Neurogastroenterology & Motility* 2006;18(8):595-607