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Migraine and Irritable Bowel Syndrome: an Epidemiological Study

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ABSTRACT

Background: Migraine and irritable bowel syndrome (IBS) are chronic conditions that seem to share common pathophysiological aspects.
Objectives: Our study aimed to estimate the prevalence of IBS in an Iranian migraine population, investigate its association with headache's characteristics and depression.
Materials and Methods: This cross-sectional study was done in a tertiary hospital clinic in Iran. Of patients referring for headache, migraineurs were diagnosed using international classification of headache disorder second edition (ICHD-II) by an experienced neurologist. Then, they were asked to answer to IBS section of SEPAHAN (The study on the epidemiology of psychological, alimentary health and nutrition) questionnaire, Persian version of Rome III questionnaire, to identify IBS and its subtypes in patients. Depression was evaluated by using Persian version of Beck-Depression Inventory second edition (BDI-II). The data were analyzed in SPSS software version 20 using the Chi-square test, the independent t-test and the Mann-Whitney U test.
Results: Of 215 participants, 84% were female. Their mean age was 34±10.5 years. The frequency of IBS was 13.5% among migraineurs. The most common type of IBS was undifferentiated (58.6%). IBS was more common among patients with migraine with aura (p=0.03). A significant association was observed between constipation dominant IBS and migraine (p=0.04). IBS patients were significantly depressed than non-IBS ones (p=0.01).
Conclusion: IBS prevalence is high in migraine patients. Therefore, its diagnosis and treatment should be regarded in their management to improve their quality of life.

Keywords: Irritable Bowel Syndrome; Migraine Disorders

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Introduction

As one of the most common types of headache across the world, migraine is a neuro-vascular disorder of the brain that is debilitating, progressive and chronic in nature and exerts serious effects on the patient's daily life (1). Migraine has been recognized by the World Health Organization as the nineteenth most debilitating disease with a worldwide prevalence of 11% (2).

Irritable bowel syndrome (IBS), one of the most common gastrointestinal functional disorders, affects 10% to 20% of the world's

population. This disorder imposes substantial costs on the patients and the healthcare system and has significant effects on the patient's quality of life (3). Just as migraine, IBS is a chronic disorder with female affection preponderance. One hypothesis is that both migraine and IBS are parts of Central Sensitivity Syndrome, which is a disease that predisposes the individual to other chronic diseases (4).

Very few studies and none in Iran have investigated the prevalence of IBS in patients with migraine (5). The present study is the first attempt in Iran to investigate the prevalence of IBS in patients with migraine and to examine its relationship with the features of migraine headache as well as depression.

Materials and Methods

The present cross-sectional study was approved by the ethics committee of Isfahan University of Medical Sciences. Participants submitted their written consent forms after they were completely explained on the study methods and objectives.

All the patients presenting with headache to the neurology clinic of Al-Zahra hospital affiliated to Isfahan University of Medical Sciences, Iran, were first examined by a neurologist and those with a migraine diagnosis based on the International Classification of Headache Disorders 2 (ICHD-2) were selected for participation in the study. The above criterion has been used in similar studies and its validity has already been confirmed (6). Participants who had other types of headaches and those unwilling to participate were excluded from the study. Study sample was selected through non-probability convenience sampling. During the examination, the neurologist completed a checklist of the features of migraine headache, including migraine type (regarding existence of aura), duration of migraine affection and the duration and frequency of migraine attacks. Participants then completed a questionnaire assessing their demographic features (age and gender) as well as their gastrointestinal and depression symptoms. IBS was diagnosed using the SEPAHAN (Study on the Epidemiology of Psychological, Alimentary Health and Nutrition) questionnaire, which is the modified translated Persian version of the Rome III (7). The following diagnostic criteria were used in SEPAHAN questionnaire:

Recurrent abdominal pain or discomfort over the last three months that accompanied by one or both of the following criteria:

1. Pain or discomfort is relieved with defecation.
2. Pain or discomfort begins with a change in the frequency of defecation or in the appearance and form of the stool.

In women, the abdominal pain or discomfort experienced should not be exacerbated during menstruation.

Based on the dominant defecation pattern, IBS was divided into four subgroups, including: a constipation-dominant group, a diarrhea-dominant group, a group of patients with a combination of constipation and diarrhea and a group of patients with neither. The diagnostic criteria used for each group were as follow:

1. Constipation-dominant IBS: Hard turd-like stool (with at least a moderate intensity) and loose watery stool (with a low intensity) over the last three months.

2. Diarrhea-dominant IBS: Loose watery stool (with a moderate intensity) and hard turd-like stool (with a low intensity).
3. Mixed IBS: Hard turd-like stool (with a moderate intensity) and loose watery stool (with a moderate intensity).
4. Undifferentiated IBS: The stool texture not matching any of the discussed patterns (8).

All participants completed a questionnaire based on the Persian version of Beck's Depression Inventory second edition (BDI-II), which contained 21 four-option items and assessed the presence and severity of depression. Higher scores indicated a more severe depression. Previous studies have already confirmed the validity of the Persian version of the questionnaire for assessing depression (9-10).

The data collected from the questionnaires were ultimately analyzed in SPSS software version 20 using the Chi-square test, the independent *t*-test and the Mann-Whitney U test.

Results

General Features

Of 215 patients participated in the study, 181 (84%) were women. Migraine with aura was reported by 60 (28%) patients. The prevalence of migraine with aura was significantly higher among the women. In other words, there was a significant relationship between gender and the type of migraine (p=0.02). Their mean age was 34±10.5 years. No significant relationship was observed between the type of migraine (with or without aura) and age (p=0.336). The mean duration of migraine affection was 8.7 ± 8 years.

Irritable Bowel Syndrome and Migraine

The relative frequency of IBS among migraineurs was 13.5%. The most common type of IBS was the undifferentiated type (58.6%). patients with IBS comorbidity had a mean age of 32±10 years. No significant differences was observed between the patients with and without IBS comorbidity in terms of age (p=0.39) and gender (p=0.5). The Chi-square test showed a significant relationship between the type of migraine and IBS (p=0.03), as IBS was more prevalent among patients with migraine with aura. The constipation-dominant type of IBS had significant relationship with the type of migraine (p=0.048). However, no significant relationship has been observed between the other types of IBS and the type of migraine. Table 1 shows the frequency distribution of irritable bowel syndrome by migraine type.

Table 1. The frequency distribution of the different type of irritable bowel syndrome by migraine type

IBS subtypes	Migraine with aura (n=60)	Migraine without aura (n=155)	*p*-value
	N (%)	N (%)	
Constipation-predominant	3(5%)	1(0.6%)	0.048
Diarrhea-predominant	2 (3.3%)	3(1.8%)	0.429
Mixed type	2 (3.3%)	1(0.6%)	0.189
Undifferentiated	6(10%)	11(7%)	0.325
Total	13(21.7%)	16 (10.3%)	0.03

The Frequency and Duration of Migraine Attacks

Of the twenty nine patients diagnosed with IBS, 13 patients (45%) suffered from migraine headaches more than 15 days a month while 16 (55%) suffered between 1 and 15 days. The duration of migraine attacks was 24-48 hours in 6 (21%) patients, 12-24 hours in 16 (55%) and 3-12 hours in 7 (24%).

The Mann-Whitney U test showed a significant relationship between IBS and the frequency of the attacks, as the frequency of the attacks was higher among the patients

with IBS (p=0.048). However, no significant relationships was observed between IBS and the duration of the attacks (p=0.78).

Depression and Irritable Bowel Syndrome

The mean score of depression for participants suffering from IBS was 134.07 which were significantly higher when compared with those without IBS (101.6). (p=0.01). The level of depression among patients suffering from IBS and others without IBS is summarized in table 2. Among patients without IBS the majority of patients had no depression or if there was, had the grade of mild, while who were involved by IBS, at least had the moderate level of depression.

Table 2: The level of depression among patients suffering from IBS and others without IBS

Level of depression (total score)	IBS N (%)	No IBS N (%)
Normal (1-10)	4 (14%)	54 (29%)
Mild (11-16)	3(10%)	46(24.5%)
Borderline (17-20)	6(21%)	25(13.5%)
Moderate (21-30)	9(31%)	32(17%)
Severe (31-40)	5(17%)	22(12%)
Extreme (over 40)	2(7%)	7(4%)

Discussion

The present study calculated the frequency of IBS 13.5% in migraine patients which is within its prevalence range in the general population of Iran (1.1% to 21.7%) (11-12). However, in a similar study conducted on 1413 migraine patients 24% had IBS comorbidity. The apparent discordance of IBS prevalence across two studies may be attributed to the large number of participants of the last study as well as the different diagnostic criteria used. The latter evaluated the prevalence of IBS in migraine patients using two different criteria. The prevalence was 24% if the diagnosis was made based on self-reported physician diagnosis, but 17% if it was made using the ROME II criteria, which is more consistent with the frequency calculated in the present study (5). It should be noted that the ROME III criteria has a higher sensitivity and a lower specificity than the Rome I-II in the diagnosis of IBS (13-14). Other studies have reported a higher prevalence of migraine in patients with IBS compared to those without IBS (5).

Very few studies have investigated the prevalence of IBS in patients with migraine, and none have examined the prevalence of its subtypes or the effect of IBS comorbidity on the features of migraine headache. The present study showed a higher prevalence of IBS in migraine patients reporting aura. Furthermore, migraineurs with IBS comorbidity were found to experience more frequent attacks per month. Another study concluded that the incidence of headaches and the frequency of attacks increased with increase in gastrointestinal symptoms (15).

Although migraine and IBS involve two different organs, they are both chronic diseases, more prevalent among women and are accompanied by other types of chronic pain. Based on these similarities, central sensitization syndrome was referred to migraine, IBS and fibromyalgia comorbidity (13-16).

Common biological factors are involved in the pathogenesis of both diseases including: cannabinoids and 5 Hydroxy Tryptophan (5-HT). 5-HT is a neuro-peptide abundantly present in the intestine involved in the regulation of bowel movement, bowel secretion and intestinal blood circulation and IBS pathogenesis. 5-HT agonists have long been used in the treatment of migraine. It means that 5-HT malfunction comprises a pathogenic mechanism for both diseases (17). One study showed that clinical

endocannabinoids are reduced in patients with migraine and IBS. Given this finding, both diseases have similar clinical, biochemical and patho-physiological patterns, and can thus be effectively improved with cannabinoid (18-22).

The strengths of the present study include its use of valid diagnostic tools. Given that participants were selected from a tertiary clinic, they may not represent the general population and further studies with larger sample sizes are recommended to be designed and implemented to confirm these findings.

Conclusion

Although IBS prevalence in this study was not higher than that of general population, its diagnosis and treatment would not be useless in improving migraineurs quality of life.

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Conflict of Interest

The authors have no conflict of interest.

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