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IBS Associated Demographical and Economic Factors in Northern Saudi Arabia

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ABSTRACT

Objective: *The aim of the present study was to assess the association of Irritable bowel syndrome (IBS) with demographical and economic factors in Northern Saudi Arabia.* ***Methodology:*** *Data about IBS was obtained from 946 Saudi volunteers. IBS was ascertained using Rome IV criteria. Each questionnaire was filled by a medical student during an active interview.* ***Results:*** *The prevalence rates of IBS with continuous symptoms and intermittent symptoms were 12% and 34%, respectively. IBS was significantly predominant among females (RR (95% CI)=1.1775(1.0182 to 1.3618), p=0.0276). IBS was significantly among relatively younger adults (21-40 years) (RR (95% CI)=1.6203 (1.3425 to 1.9556), p<0.0001).* ***Conclusion:*** *IBS associated symptoms are prevalent in Northern Saudi Arabia. IBS was significantly associated with females' gender and younger age.*

Keywords: IBS, Irritable bowel syndrome, Rome IV, Saudi Arabia

INTRODUCTION

Irritable bowel syndrome (IBS) is a much frequent medical complain, which often alter life's quality for many people. The patients are usually present with diverse diagnostic and management challenges to the medical service provider [1]. IBS affects 7%-21% of the general population worldwide, influencing their quality of life and work productivity [2].

In recent years, IBS has substantially evolved on several scopes. The pathophysiology is recently pointed towards a consensual hypothesis known as "brain-gut axis", which pleats all the stimuli of peripheral factors, such as gut microbiota, transit modifications, visceral hypersensitivity, central pain perception and local serotonin secretion [3]. The diagnosis of IBS depends on the identification of certain symptoms and exclusion of others. Patients with IBS can be managed by a personalized, holistic approach, which embraces the dietary, lifestyle, medical and behavioral interventions [2].

The prevalence of IBS in Saudi Arabia was reported to be 14.4%, with major predictors including food hypersensitivity, family history and morbid anxiety [4].

However, the frequency of diagnosis of IBS is strongly linked to demographic and clinical features, particularly comorbid conditions related to IBS. The existence of related comorbid conditions should increase the confidence of clinicians to establish IBS diagnosis, thus limiting redundant testing and lowering health care costs [5]. Therefore, the aim of the present study was to assess the association of IBS with demographical and economic factors in Northern Saudi Arabia.

MATERIALS AND METHODS

In this community based cross-sectional survey, data about IBS were obtained from 946 Saudi volunteers living in the

city of Hail, Northern Saudi Arabia. Participants were randomly selected by simple random regardless of age, gender, and education or occupation.

A purposeful questionnaire was designed and used for obtaining the necessary data. Each questionnaire was filled by a medical student during an active interview. Individuals fulfillment Rome IV criteria were ascertained as those with continuous IBS symptoms and those partial fulfillment Rome IV criteria were ascertained as a group with intermittent IBS symptoms. The following information was obtained from each participant: age, gender, education level, occupation, residence, living status, marital status, monthly income, and income sufficiency.

Data Analysis

Statistical package for social sciences (version 16) was used for analysis and to perform a Pearson Chi-square test for statistical significance (p-value). The 95% confidence level and confidence intervals were used. A p-value of less than 0.05 was considered statistically significant.

Ethical Consent

Each participant was asked to sign a written ethical consent during the questionnaire's interview. The informed ethical consent form was designed and approved by the ethical committee of the College of Medicine, University of Hail, Saudi Arabia, Research Board.

RESULTS

This study investigated 946 Saudi (399 were males and 547 were females), their ages ranging from 17-83 years with a mean age of 33 years with females males ratio of 1.37:1.00. The great majority of study subjects were at age group 21-25 years, followed by age groups, 41-50 years, and 31-40 years, representing 279 (29.5%), 154 (16.3%) and 140 (14.8%), respectively as indicated in Table 1 and Figure 1. Most males were found at age group 14-50 years, representing 101 (25.6%), hence, females were predominantly in the age group 21-25 years, representing 224 (41%), as shown in Table 1 and Figure 2.

Most of the study population were found with university education followed by secondary constituting 526 (55.6%) and 255 (27%), in this order. The majority of both males 199 (49.9%) and females 327 (59.8%) were found at the university level of education, as indicated in Table 1 and Figure 1.

Moreover, about 344 (36.4%) were found as governmental employed and 306 (32.4%) were self-employed. Most of the males were self-employed 202 (50.6%), hence, most females were governmental employed 284 (52%) as indicated in Table 1 and Figure 1.

Table 1 Study population by age, education, occupation, and sex

Category	Variable	Males	Females	Total
Age (Years)	≤ 20	17	120	137
	21-25	55	224	279
	26-30	50	58	108
	31-40	81	59	140
	41-50	102	52	154
	>50	94	34	128
	Total	399	547	946
Education	Illiterate	33	27	60
	Basic	27	41	68
	Secondary	129	126	255
	University	199	327	526
	Post-university	11	26	37
	Total	399	547	946

Occupation	Jobless	55	115	170
	Employer	49	34	83
	Self-employed	202	104	306
	Governmental job	60	284	344
	Student	30	7	37

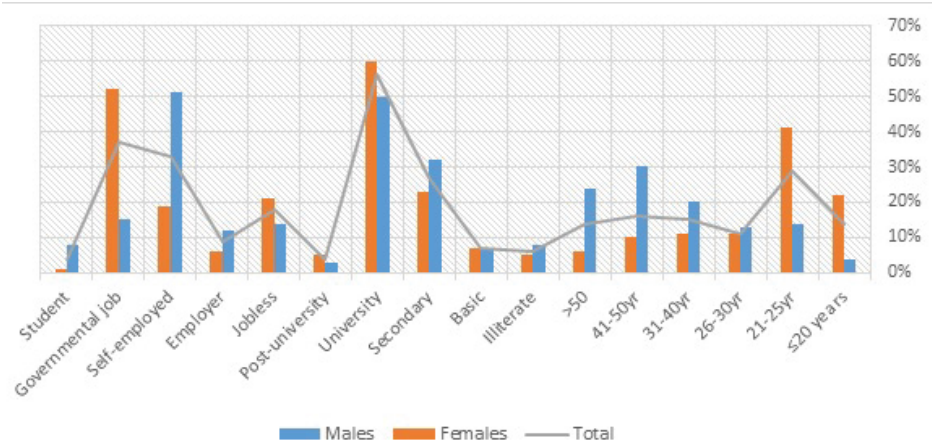

Figure 1 Proportions of the demographical characteristics

The highest proportions of the participants were found living in an urban area of 811 (89%) compared to only 101 (11%) in rural. Moreover, the majority of participants were with single marital status 478 (51%) followed by married 416 (44%). Most of the males were single 278 (70%), whereas, most females were married 316 (60%), as described in Table 2 and Figure 2.

Table 2 Study population by residence, marital status, and sex

Category	Variable	Males	Females	Total
Residence	Urban	348	463	811
	Rural	37	64	101
	Total	385	527	912
Marital status	Single	278	200	478
	Married	100	316	416
	Divorced	12	18	30
	Widow	6	13	19
	Total	396	527	943

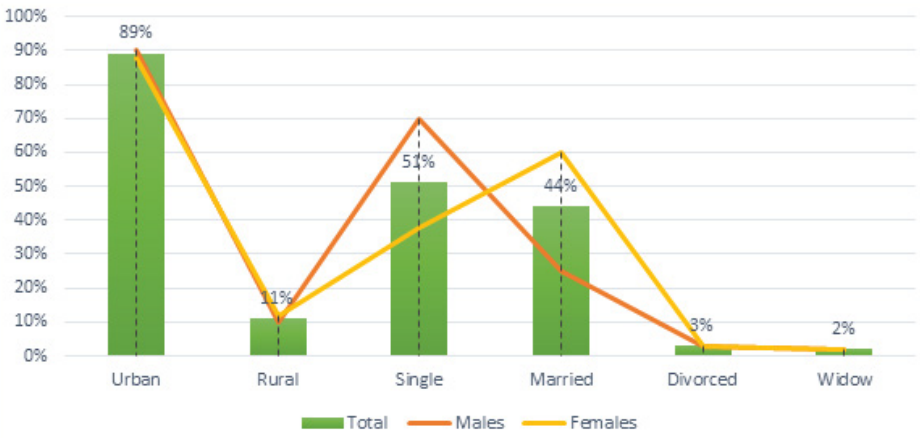

Figure 2 Study population by residence, marital status, and sex

As indicated in Table 3 and Figure 3, out of the 110 patients with continuous IBS symptoms, 44/110 (40%) were males and 66/110 (60%) were females. Within males group, these patients represent 44/395 (11%), hence, within females group patients represent 66/540 (12.2%). Out of 318 patients with intermitted IBS symptoms, 120/318 (38%) were males and 198/318 (62%) were females. Within males group, these patients represent 120/395 (30%), hence, within females group patients represent 198/540 (37%). The 95% Confidence Interval (95%CI) and Relative Risk (RR) associated with females as more frequent affected by IBS was RR (95% CI)=1.1775 (1.0182 to 1.3618), p=0.0276.

Table 3 Study population by age, education, occupation and IBS status

Category	Variable	Continuous IBS Symptoms	Intermitted IBS Symptoms	No IBS evidence	Total
Sex	Males	44	120	231	395
	Females	66	198	276	540
	Total	110	318	507	935
Age (Years)	≤ 20	16	51	69	136
	21-25	27	93	157	277
	26-30	13	43	48	104
	31-40	22	51	66	139
	41-50	17	44	93	154
	>50	15	36	74	125
	Total	110	318	507	935
Education	Illiterate	14	19	25	58
	Basic	10	24	33	67
	Secondary	39	92	122	253
	University	42	167	311	520
	Post-university	5	16	16	37
	Total	110	318	507	935
Occupation	Jobless	32	65	71	168
	Employer	15	30	36	81
	Self-employed	28	83	192	303
	Governmental job	28	122	190	340
	Student	5	16	15	36
	Total	108	316	504	928

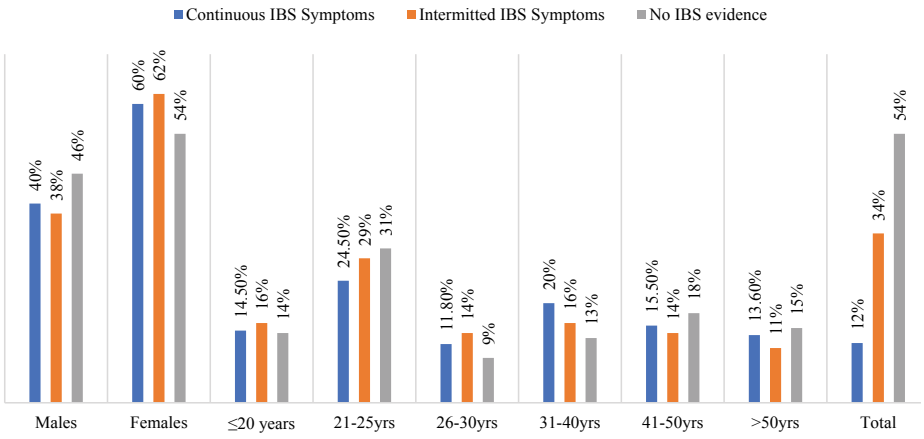

Figure 3 Description of the study population by sex, age and IBS status

With regard to age, the majority of patients were seen at age range 21-40 years representing 62/110 (56.4%) and 187/318 (58.8%) for both continuous and intermitted symptoms of IBS. The relative risk associated with age range 21-40 years, as more frequent affected by IBS was: RR (95% CI)=1.6203 (1.3425 to 1.9556), p<0.0001, as shown in Table 3 and Figure 3.

Continuous IBS symptoms, as well as intermitted were more frequently observed among those with university education followed by the secondary level of education representing 42/110 (38%) and 167/318 (52.5%) and 39/110 (35.5%) and 92/318 (29%), respectively, as indicated in Table 3 and Figure 4. However, the proportions of patients within each education level greatly vary, as shown in Figure 5.

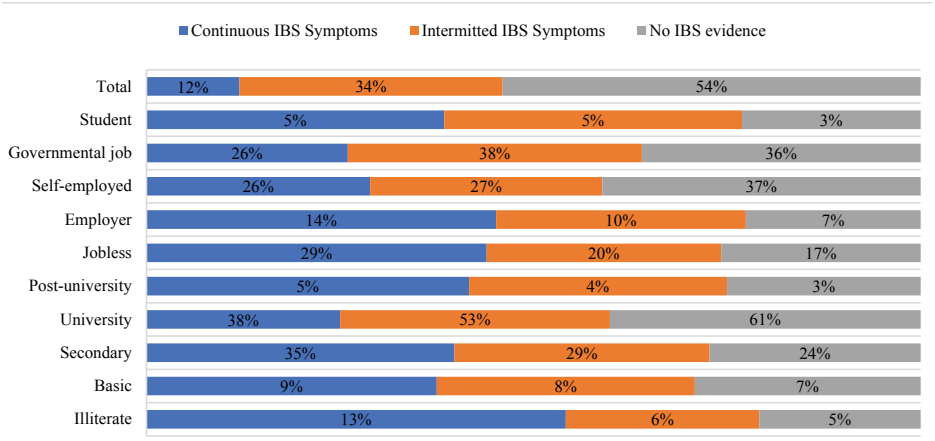

Figure 4 Description of the study population by education, occupation and IBS status

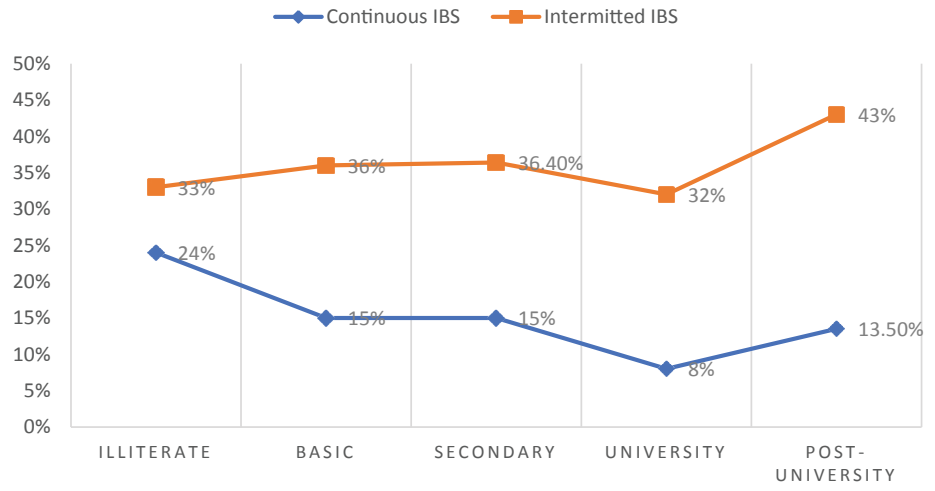

Figure 5 IBS proportions within each education level

Governmental job and self-employed were associated with higher rates of IBS, constituting 28 and 122 and 28 and 83 for both continuous and intermitted IBS, in this order, as described in Table 3 and Figure 4. Within each occupation group, the highest percentage of IBS related symptoms were noticed among jobless and followed by the employer, representing 58% and 56%, correspondingly, as shown in Figure 6.

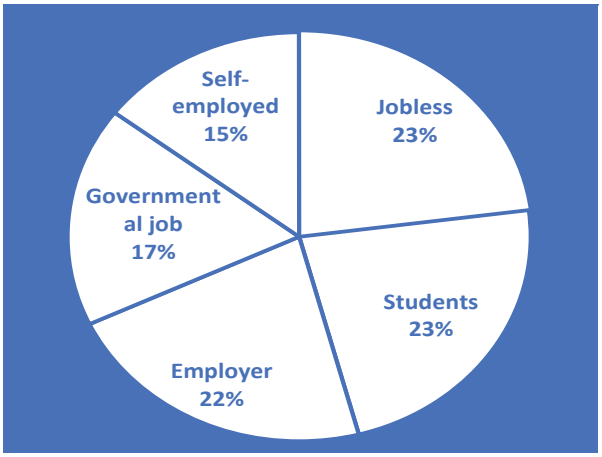

Figure 6 IBS proportions within each education level

Participants living in urban areas represent the majority of cases with IBS, as described in Table 4. Both IBS symptoms were more common among those stated as single marital status followed by married encountering 219/428 (51%) and 180/428 (42%), respectively. In the comparison of IBS status within each marital status, the highest percentage were found among divorced (69%) followed by a single (46%), as shown in Figure 7. About 380/828 (46%) of those with IBS symptoms were found living with their families, whereas, 46/101 (45.5%) were found living alone, as shown in Figure 7.

Table 4 Study population by residence, marital status, and IBS status

Category	Variable	Continuous IBS Symptoms	Intermittent IBS Symptoms	No IBS evidence	Total
Residence	Urban	84	263	456	803
	Rural	20	43	36	99
	Total	104	306	492	902
Marital status	Single	58	161	254	473
	Married	42	138	232	412
	Divorced	8	12	9	29
	Widow	2	5	12	19
	Total	110	316	507	933
Living condition	With family	95	282	451	828
	Alone	12	34	55	101
	Total	107	316	507	929

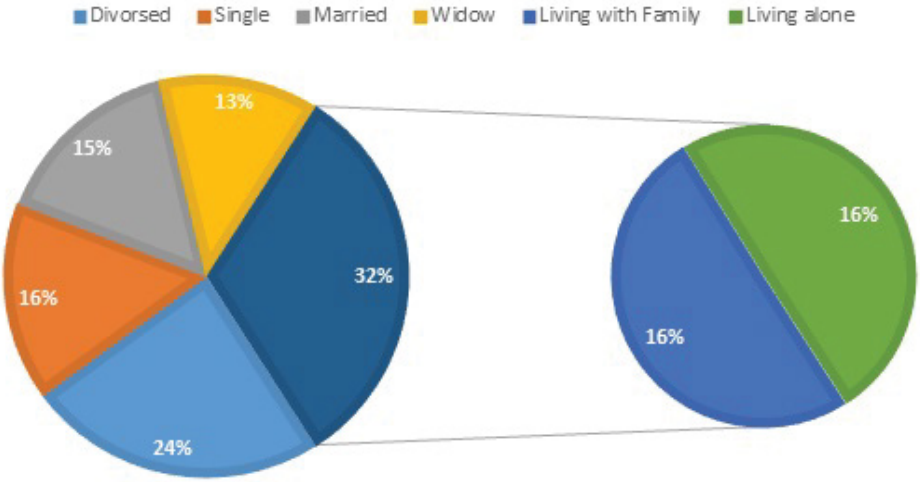

Figure 7 IBS proportions within each living condition and marital status

Higher IBS symptoms were observed among those with the monthly income of 1000-3000 SAR followed by <1000 SAR, representing 79/164 (48%) and 51/164 (31%), respectively. It was observed that the risk of IBS increases with the decrease of monthly income, RR (95% CI)=1.2185 (1.0022 to 1.4816), p=0.0475, as described in Table 5. Moreover, the sufficiency of income was not found to be encountered factor in the determination of IBS status among the studied group, as described in Table 5.

Table 5 Study population by monthly income, income sufficiency, and IBS status

Category	Variable	Continuous IBS Symptoms	Intermitted IBS Symptoms	No IBS evidence	Total
Monthly income	<1000 SAR	16	35	89	140
	1000-3000	22	57	54	133
	3000-6000	11	33	30	74
	6000-10.000	12	30	115	157
	>10.000	9	39	62	110
	Total	70	194	350	614
Income sufficiency	Enough and excess	22	36	67	125
	Just enough	31	132	259	422
	Insufficient	29	70	119	218
	Total	82	238	445	765

DISCUSSION

IBS is a common medical disorder that affects many people across diverse sections of different communities worldwide. Though there is a lack of literature referring to IBS from Saudi Arabia, medical practitioners talk about increased cases of IBS among Saudi population. Consequently, in the present study, we aimed at highlighting the existence of IBS among Northern Saudi population.

The present study evaluated a randomly selected population section with diverse demographic and economic characteristics. In the present study, the incidence rate of individuals with continuous IBS was 12%, whereas, the individuals with the intermittent IBS symptoms was found to be 34%. Greatly varying findings were reported from Saudi Arabia. A study from Northern Saudi had reported a prevalence of 9.2% for based in Rome II criteria [6]. Another study from western Saudi Arabia had reported IBS prevalence of 31.8% [7]. In a study to determine the prevalence and implication of coeliac disease (CD) among adult Saudis and compared to those with diagnosed IBS, the percentage of CD in control individuals and patients diagnosed with IBS were found to be 1.9% and 9.6% respectively [8]. A study from western Saudi Arabia has determined IBS prevalence of 14.4% among nurses [9].

In a study aimed at determining the global prevalence rates of IBS, the mean prevalence among individual countries ranged from 1.1% in France and Iran to 35.5% in Mexico. There was significant variance in pooled regional prevalence rates ranging from 17.5% (95% CI 16.9% to 18.2%) in Latin America, 9.6% (9.5% to 9.8%) in Asia, 7.1% (8.0% to 8.3%) in North America/Europe/Australia/New Zealand, to 5.8% (5.6% to 6.0%) in the Middle East and Africa [10,11].

In the present study, the prevalence rate of IBS was significantly higher among females compared to males subjects. Such findings were previously reported from Saudi Arabia, indicated a multiple logistic regression analysis, which revealed that the first predictor of IBS was female gender (aOR=2.89; 95.0% CI: 1.65-5.05) [7]. Although several worldwide studies have reported the significant IBS among female subjects compared to males, an opposing report found no sex difference [12-16].

In the current study, IBS was significantly demonstrated among age range 21-40 years. Such findings were also reported in Saudi Arabia [7,8]. It was found that IBS is less prevalent among older persons and they suffer a poorer quality of life compared to younger IBS patients [17]. It was suggested that the prevalence of IBS was more common in the young declining with growing in age [18].

Although, IBS was increasingly noticed among patients with university education followed by the secondary level of education, the proportions of patients within each education level greatly differ. The highest prevalence rates of continuous IBS were found among illiterates (24%) followed by basic and secondary levels of education (15%). The highest prevalence rates of intermittent IBS were found among post-university (43%) followed by secondary (36.4%) and basic (36%) levels of education.

Governmental job and self-employed were associated with overall higher prevalence rates of IBS, but when calculating the prevalence rates within each occupation group, jobless and student were associated with the highest IBS prevalence rates. Such findings were previously reported [19,20].

Even though IBS was more common among those stated as single marital status followed by married, but within the entire marital status situation, the highest IBS prevalence rates were witnessed among divorced (69%) tracked by single (46%). It was reported that being single was more commonly associated with IBS in female patients [21].

Nevertheless, in the present study, the prevalence rates of IBS were found to increase with the decrease of individual's monthly income. It was reported that being single and having a lower educational level, income, lower BMI and being unemployed were the most important factors associated with IBS, particularly in females [19].

CONCLUSION

IBS associated symptoms are prevalent in northern Saudi Arabia. IBS was significantly associated with female's gender and younger age. Those with higher levels of education are more likely to have IBS, as well as, jobless, students. Individuals with divorced and single marital status, in addition to those with lower monthly income, are more expected to get IBS.

DECLARATIONS

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Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

[1] Defrees, Dean Nathanial, and Justin Bailey. "Irritable bowel syndrome: Epidemiology, pathophysiology, diagnosis, and treatment." *Primary Care,* Vol. 44, No. 4, 2017, pp. 655-71.

[2] Chey, William D., Jacob Kurlander, and Shanti Eswaran. "Irritable bowel syndrome: A clinical review." *JAMA,* Vol. 313, No. 9, 2015, pp. 949-58.

[3] Duboc, H., M. Dior, and B. Coffin. "Irritable bowel syndrome: New pathophysiological hypotheses and practical issues." *La Revue de Medecine Interne,* Vol. 37, No. 8, 2016, pp. 536-43.

[4] Ibrahim, Nahla Khamis, et al. "Irritable bowel syndrome among nurses working in King Abdulaziz University Hospital, Jeddah, Saudi Arabia." *Libyan Journal of Medicine,* Vol. 11, No. 1, 2016, p. 30866.

[5] Lacy, Brian, et al. "Factors associated with more frequent diagnostic tests and procedures in patients with irritable bowel syndrome." *Therapeutic Advances in Gastroenterology,* Vol. 12, 2019.

[6] Alhaznn, A. H. "Irritable bowel syndrome in secondary school male students in AlJouf Province, north of Saudi Arabia." *Journal of the Pakistan Medical Association,* Vol. 61, No. 11, 2011, p. 1111.

[7] Ibrahim, Nahla Khamis Ragab, Wijdan Fahad Battarjee, and Samia Ahmed Almehmadi. "Prevalence and predictors of irritable bowel syndrome among medical students and interns in King Abdulaziz University, Jeddah." *Libyan Journal of Medicine,* Vol. 8, No. 1, 2013, p. 21287.

[8] Al-Ajlan, Abdulrahman S. "Screening of coeliac disease in undetected adults and patients diagnosed with irritable bowel syndrome in Riyadh, Saudi Arabia." *Saudi Journal of Biological Sciences,* Vol. 23, No. 4, 2016, pp. 462-66.

[9] Ibrahim, Nahla Khamis, et al. "Irritable bowel syndrome among nurses working in King Abdulaziz University Hospital, Jeddah, Saudi Arabia." *Libyan Journal of Medicine,* Vol. 11, No. 1, 2016, p. 30866.

[10] Sperber, Ami D., et al. "The global prevalence of IBS in adults remains elusive due to the heterogeneity of studies: a Rome Foundation working team literature review." *Gut,* Vol. 66, No. 6, 2017, pp. 1075-82.

[11] Klem, Fabiane, et al. "Prevalence, risk factors, and outcomes of irritable bowel syndrome after infectious enteritis: a systematic review and meta-analysis." *Gastroenterology,* Vol. 152, No. 5, 2017, pp. 1042-54.

[12] Bardisi, Bandar Mohammed, et al. "Efficiency of diet change in irritable bowel syndrome." *Journal of Family Medicine and Primary Care,* Vol. 7, No. 5, 2018, p. 946.

[13] Meleine, Mathieu, and Julien Matricon. "Gender-related differences in irritable bowel syndrome: potential mechanisms of sex hormones." *World Journal of Gastroenterology,* Vol. 20, No. 22, 2014, p. 6725.

[14] Lee, JY, and Park, KS. "Gender difference in functional gastrointestinal disorders." Korean Journal of Gastroenterology, Vol. 72, No. 4, 2018, pp. 163-69.

[15] Kim, Young Sun, and Nayoung Kim. "Sex-gender differences in irritable bowel syndrome." *Journal of Neurogastroenterology and Motility,* Vol. 24, No. 4, 2018, p. 544.

[16] Ju, Tiffany, et al. "Risk and protective factors related to early adverse life events in irritable bowel syndrome." *Journal of Clinical Gastroenterology*, 2019.

[17] Minocha, Anil, et al. "Prevalence, sociodemography, and qualitlife of older versus younger patients with irritable bowel syndrome: A population-based study." *Digestive Diseases and Sciences,* Vol. 51, No. 3, 2006, pp. 446-53.

[18] Khademolhosseini, Farnaz, et al. "Irritable bowel syndrome in adults over 35 years in Shiraz, southern Iran: prevalence and associated factors." *Journal of Research in Medical Sciences: The Official Journal of Isfahan University of Medical Sciences,* Vol. 16, No. 2, 2011, p. 200.

[19] Farzaneh, N., et al. "Effects of demographic factors, body mass index, alcohol drinking and smoking habits on irritable bowel syndrome: A case-control study." *Annals of Medical and Health Sciences Research,* Vol. 3, No. 3, 2013, pp. 391-96.

[20] Costanian, Christy, Hala Tamim, and Shafika Assaad. "Prevalence and factors associated with irritable bowel syndrome among university students in Lebanon: Findings from a cross-sectional study." *World Journal of Gastroenterology,* Vol. 21, No. 12, 2015, p. 3628.

[21] Khoshkrood-Mansoori, Babak, et al. "Irritable bowel syndrome: a population-based study." *Journal of Gastrointestinal and Liver Diseases,* Vol. 18, No. 4, 2009.