Irritable Bowel Syndrome (IBS) Among Jordanian Adults: Uncovering the Underdiagnosed and The Triggering Factors

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A B S T R A C T

Background: There is no pervious investigation of the prevalence and triggering factors of undiagnosed IBS among Jordanian adults. This study aimed to determine the prevalence of Jordanians living with undiagnosed IBS and examine how sociodemographic variables and symptoms, influenced people with IBS on a daily basis.

Methods: Between July and September 2023, a cross-sectional survey was carried out in Jordan employing proportionate random sampling across the country's regions.

Results: The odds of having IBS were 1.471 and 1.475 times higher in adults with psychological distress and insomnia severity respectively compared with no IBS adults. However, the odds of having IBS were 0.548 and 0.601 times lower in caffeine drinkers and smokers respectively compared to non-IBS. In smokers having IBS, the odds of disordered eating attitudes were significantly greater by 17% compared with nonsmokers having IBS, whereas the BMI was significantly lower by 65.4% compared with nonsmokers having IBS. In comparison to non-caffeine drinking having IBS, the odds of disordered eating attitudes and insomnia severity were significantly greater by 33% and 19.5%, respectively.

Conclusion: The study emphasized the need for increasing IBS awareness among Jordanian citizens to encourage early diagnosis and reduce the proportion of undiagnosed IBS people.

Keywords: IBS, Rome IV, Factors, Jordan

INTRODUCTION

The intricate interplay between the brain and the stomach causes irritable bowel syndrome (IBS), formerly known as functional gastrointestinal (GI) disorders, which causes abdominal pain and changes in bowel habits in the absence of a distinct organic disease.[1] This pervasive disorder has serious consequences for both health and the economy.[2]

IBS is one of the most common functional gastrointestinal illnesses worldwide. A wide range of symptoms, notably changes in bowel habits and stomach discomfort, characterize its presentations. These manifestations manifest in the intestines without any obvious biochemical or anatomical abnormalities.[3] IBS has a complicated etiology, which is highlighted by both its variety of etiologies and the difficulties in diagnosing it. Despite being often seen, a sizable fraction of cases goes undetected, leading to increased patient suffering and healthcare costs.[4]

Although the precise cause of IBS is still unknown, several risk factors, such as anxiety and depressive disorders, have been identified.[5,6] IBS diagnosis is dependent on symptomatology and the exclusion of alternative disorders because there are no conclusive biomarkers or diagnostics for the syndrome.[7] Furthermore, an efficient treatment option is still elusive, with management techniques mostly focusing on symptom relief through dietary changes, lifestyle adjustments, and sporadic pharmaceutical treatments.[8,9]

No identifiable structural explanation can be found despite thorough laboratory investigations, imaging reviews, and tissue samplings. It is possible for triggers including emotions, nutrition, drugs, and hormones to cause or aggravate GI symptoms. IBS is now understood to be a complex interaction of physiological and psychosocial factors, as opposed to previous beliefs that primarily attributed the condition to psychological roots.[10]

Based on population surveys from different countries throughout the world, the prevalence of IBS ranges from 1.1% to 45%[11], with a combined prevalence of 11.2%.[11,12] IBS prevalence has increased, according to several research conducted throughout Asia.[13] In Jordan, 16% of respondents have IBS according to a cross-sectional study[14] on Hashemite University students.

These various prevalence figures might be the consequence of variations in age distribution, gender distribution, or survey methodology. IBS has a major detrimental impact on job productivity and health-related quality of life[15], as well as substantial financial and health care expenditures. However, little is known about the pathophysiology and related illnesses or factors that contribute to the onset and progression of IBS. A significant frequency of mental comorbidity has been linked to IBS. A study found that depressive and anxiety disorders made up the majority of the mental comorbidity in 44% of IBS patients.[15]

The symptoms of IBS typically start in adolescence and come and go at unpredictable times. Although less often, onset in late adulthood is also conceivable. IBS symptoms seldom ever wake up a patient who is asleep. Food or stress are common triggers for symptoms.[1] Additionally, a number of studies have found a link between IBS and sleep issues. Individuals with IBS frequently have sleep issues, such as poor sleep quality, increased daytime drowsiness, delayed sleep latency, and frequent sleep fragmentation (assessed using self-report questionnaires and polysomnography).[16] Additionally, IBS symptoms are influenced by sleep issues, such as insomnia and poor sleep quality.[17] Thus, sleep issues are closely related to IBS symptoms, whether they are subjective or objective.

The information gap regarding unrecognized instances of IBS in Jordan needs to be investigated and addressed. IBS patients that go undiagnosed in Jordan must be addressed in order to enhance healthcare outcomes, patient quality of life, and the efficient use of healthcare resources throughout the nation. This research is crucial for improving IBS early diagnosis, care, and management, which would eventually lessen the burden of this illness on individuals and the healthcare system. Moreover, it is important to raise public knowledge about IBS and its possible effects on daily life while also giving healthcare practitioners more insights into the diagnosis and treatment of the ailment.

IBS is widespread and negatively affects people's quality of life; however, many cases go undetected.[18] The aim of this study was to investigate the prevalence of Jordanians with undiagnosed IBS and analyze how sociodemographic factors and symptoms, such as anxiety, sadness, insomnia, physical distress, sleeping, sport and eating habits, affected those with IBS on a daily basis.

METHODOLOGY

Study design and sampling: Between July and September of 2023, a cross-sectional survey was carried out in Jordan employing a proportionate random sampling method across the country's different governorates (Table 1). Using Google Forms, a digital survey was created and distributed online via social media platforms frequently until reaching the required sample size in each area. All Jordanians over the age of 18 and previously undiagnosed with IBS were included. Previously diagnosed IBS people were excluded from the study.

For sample size (N) calculation, we used the following formula n= Z^2p(1-p)/d^2

Where, expected Prevalence (P): Based on preliminary studies and global averages, we set the expected prevalence of unidentified IBS in the Jordanian adult

population to be 10% (0.10).[19, 20] Desired Precision (d): This is the margin of error we were willing to accept. For this study, a precision of 2% (0.02) was deemed acceptable. Confidence Level (Z): Typically, studies use a 95% confidence level, which corresponds to a Z-value of 1.96.

By solving the equation, 868 participants were needed. The sample was further increased by 20% to account for contingencies such as non-response or recording error. Therefore, a sample size of 1,042 Jordanian adults was sought after. Jordan is divided into twelve governorates. The population till the end of 2022 are shown in Table 1.

Table 1: Population percentages for each governorate in Jordan (2022)[21]

Governorate	Population (%)
Amman	42
Balqa	5.2
Zarqa	14.3
Madaba	2
Irbid	18.5
Marfaq	5.8
Jarash	2.5
Ajlun	1.8
Karak	3.3
Tafiela	1
Ma'an	1.7
Aqaba	2

To guarantee the accuracy of undiagnosed IBS prevalence in Jordan, the size of sample of each governorate was calculated using the following formula:

$$N_{each\ governorate} = population\ \% \times N$$

The questionnaire was distributed until reaching the desired number of participants in each governorate.

Data collection: Self-administered questionnaire was used, which contained inquiries on sociodemographic details (gender, age, marital status, level of education, location of residence, weight and height, IBS status), lifestyle elements (occupation, food, exercise, stress, sleep, and smoking and caffeine status), and gastrointestinal symptoms.

Diagnosis of IBS: IBS was identified based on participant responses using the Rome IV diagnostic criteria.[22] Individuals were split into two groups (non-IBS and IBS). The participants should meet the following requirements over the last three months to receive a potential IBS diagnosis: (1) consistent abdominal discomfort that occurs at least once a week, (2) discomfort that is related to two or more of the following factors: (a) defecation at least 30% of the occurrences, (b) at least 30% of occurrences with a change in frequency of stool, (c) at least 30% of occurrences with a change in the appearance of the stool, and (3) having symptom onset at least 6 months prior to diagnosis.

Depression and Anxiety measurement: Twenty-

one questions were introduced according to the Arabic version of the Depression-Anxiety-Stress-Scale (DASS-21). Each question was scored from 0 (never applies to me) to 3 (frequently applies to me). The cumulative score ranged between 0 and 24 where high score indicated a mental distress risk.[23,24]

Insomnia severity and sleep measurement: Seven questions were introduced according to the Arabic version of the insomnia severity[25] and sleep disorders[16] using the Insomnia Severity Index. Each question was scored from 0 (never applies to me) to 4 (frequently applies to me). The cumulative score ranged between 0 and 28 where high score indicated an insomnia severity.

Eating attitude test: Twenty-six questions were introduced according to the Arabic version of the EAT-7 test. Each question was scored from 0 (never applies to me) to 3 (usually applies to me). The cumulative score ranged between 0 and 24 where high score indicated possible disordered food attitudes.[26]

Life quality measurement: The body mass index (BMI) was determined by dividing a person's weight (kg) by their height in (m2). Participants were also asked to answer questions about education, occupation, smoking and caffeine status, average daily sleep, physical activity, regular meals per day, eating fast food and household income.

Statistical analysis: SPSS v.25 was used for the statistical evaluation. The statistical analysis of mean differences for continuous variables was evaluated using the independent t-test. The significance of differences for categorical variables was assessed using the chi-square test. The odds ratio (OR) of IBS was calculated using the logistic regression analysis. In the bivariate analysis, all variables with P values less than 0.25 were added to the model as independent variables. A larger threshold makes it possible to filter variables more liberally, boosting the likelihood of discovering potentially significant correlations. Few studies have examined the relationship between smoking[27] and caffeine[28] use and the risk of having IBS. Thus, a stratification analysis based on smoking and caffeine status was tested.

RESULTS

Among 1042 previously undiagnosed participants, the mean age was 35.9 ±12.63 where 56.1% were female. The majority of the participants were single (57.3%) and had secondary certificate or less (57.3%). The majority of participants worked in governmental (36.9%) or private (38.3%) sectors, where mean income was 662.62 ± 113.12 USD per month. According to ROME IV criteria, the results showed that 41.7% had IBS. The majority of participants (57%) suffered from chronic diseases. Both smoking (58%) and caffeine drinking (58.1%) statuses were highly detected in participants. According to exercise, 52.7% of participants played sports.

Table 2: Characteristics of participants (N=1042)

Variable	Participants (%)
Gender	
Male	457 (43.9)
Female	585 (56.1)
Marital Status	
Single	597 (57.3)
Married	445 (42.7)
Education	
Secondary or less	597 (57.3)
University	445 (42.7)
Occupation	
Housework	258 (24.8)
Governmental sector	385 (36.9)
Private Sector	399 (38.3)
Chronic diseases	
Yes	594 (57)
No	448 (43)
Diagnosed IBS	
Yes	435 (41.7)
No	607 (58.3)
Smoker	
Yes	604 (58)
No	438 (42)
Caffeine drinker	
Yes	605 (58.1)
No	437 (41.9)
Physical sport activity	
Yes	549 (52.7)
No	493 (47.3)
Average daily sleep	
<6 hrs.	263 (25.24)
7-8 hrs.	391 (37.52)
>9 hrs.	387 (37.14)
Regular meals per day	
<3	262 (25.14)
4-6	382 (36.67)
>6	398 (38.19)
Eating fast food	
Yes	598 (57.4)
No	444 (42.6)
Variable	**Mean ±SD**
Age	35.9 ±12.63
Body mass index	29.85 ±3.33
Household income (USD/month)	662.6 ±113.1
Eating attitude	1.83±3.15
Psychological distress	8.56 ±8.15
Insomnia severity	7.86±6.28

Only 25.24% of participants slept 6 hours or less; however, 37.52% and 37.14% slept between 7-8 hours and 9 or more hours, respectively. As for the food, the majority of the participants ate fast food, where 24.14% ate 3 or less meals per day, 36.67% ate from 4-6 meals per day, and 38.19% ate more than 6 meals per day; the mean body mass index was 29.85 ±3.33. The means of psychological distress and insomnia severity were 8.56 ±8.15 and 7.86±6.28, respectively. **Table 2** shows sociodemographic and other characteristics of participants.

Table 3 shows the bivariate analysis. Compared to men, a larger proportion of women (250 females, 57.5%) met the ROME IV criteria for probable IBS. Additionally, people with suspected IBS showed substantially lower mean of age and eating attitudes lev-els, but higher BMI, psychological distress and insomnia severity compared to non-IBS participants.

Table 4 shows the multivariable analysis results (R^2= 0.091). The logistic regression model using the presence vs absence of IBS according to ROME IV criteria revealed that high psychological distress (aOR=1.471), insomnia severity (aOR=1.475), average daily sleeping (aOR= 1.219) and BMI (aOR= 1.348) were significantly linked to higher odds of having possible IBS. In addition, a high caffeine drinker (aOR=0.548), smoker status (aOR=0.601) and eating attitudes (aOR= 0.84) were significantly linked to lower odds of having possible IBS.

Moderation analysis: Finding correlations between different IBS-related characteristics could help us better comprehend the underlying causes of the disease. Thus, the correlation of eating attitudes, BMI insomnia severity and psychological distress by smoking and caffeine drinker were studied.

To study the correlation of eating attitudes, BMI, average daily sleeping, insomnia severity and psychological distress by smoking, according to ROME IV criteria, a stratification analysis based on smoking status was conducted. **Table 5** shows the stratification analysis results. In smokers, high eating attitude was significantly linked to high odds of having possible IBS indicating 1.173 times more likely to have possible IBS in comparison with non-smokers. However, high BMI (aOR= 0.645) and psychological distress (aOR= 0.537) were significantly linked with lower odds of having possible IBS. For non-smokers, high BMI (aOR= 1.629) and insomnia severity (aOR= 1.475) were significantly linked to high odds of having possible IBS indicating 1.629 and 1.475 times more likely to have IBS, respectively. However, high psychological distress (aOR= 0.546) and average daily sleeping (aOR= 0.763) were significantly linked to lower odds of having possible IBS in non-smokers.

To study the correlation of eating attitudes, BMI, average daily sleeping, insomnia severity and psychological distress by caffeine, according to ROME IV criteria, a stratification analysis based on caffeine drinking status was conducted. **Table 6** shows the stratification analysis results. In caffeine drinking, the odds of eating attitudes (aOR= 1.330) and insomnia severity (aOR= 1.195) were 1.33 and 1.195 likely to be significantly higher compared to non-caffeine having IBS However, high average daily sleeping (aOR= 0.506) and psychological distress (aOR= 0.603) were significantly linked to lower odds of having possible IBS indicating decrease in possibility of having IBS. For non-caffeine drinking, high BMI (aOR= 1.340), eating attitudes (aOR= 1.069) and high psychological distress (aOR= 0.569) were significantly linked to high odds of having possible IBS. This indicated that possibility of IBS increased with high BMI, eating attitudes and psychological distress. However, the high average daily sleeping was significantly linked to low odds of having IBS in non-smokers.

Table 3: Bivariate analysis of factors associated with the presence and absence of IBS

Variable	Presence of IBS (%) (N=435; 41.7%)	Absence of IBS (%) (N= 607; 58.3%)	P-value
Gender			
Male	185 (42.5)	272 (44.9%)	0.450
Female	250 (57.5)	334 (55.1%)	
Marital Status			
Single	264 (60.7)	333 (55%)	**0.065**
Married	171 (39.3)	273 (45%)	
Education			
Secondary or less	289 (66.4)	308 (50.8%)	**< 0.001**
University	146 (33.6)	298 (49.2%)	
Occupation			
Housework	91 (20.9)	167 (27.6%)	**0.044**
Governmental sector	169 (38.9)	167 (35.5%)	
Private Sector	175 (40.2)	224 (37%)	
Chronic diseases			
Yes	264 (60.7)	330 (54.5%)	**0.045**
No	171 (39.3)	276 (45.5%)	
Smoker			
Yes	278 (63.9)	326 (53.8%)	**0.001**
No	157 (36.1)	280 (46.2%)	
Caffeine drinker			
Yes	236 (54.3)	368 (60.7%)	**0.037**
No	199 (45.7)	238 (39.3%)	
Physical sport activity			
Yes	234 (53.8)	314 (51.8%)	0.529
No	201 (46.2)	292 (48.2%)	
Average daily sleep			
<6 hrs.	120 (27.59)	119(19.64%)	**0.010**
7-8 hrs.	159 (36.55)	243 (40.09%)	
>9 hrs.	156 (35.86)	244 (40.26%)	
Regular meals per day			
<3	119 (27. 53)	143 (23.6%)	0.509
4-6	150 (34.48)	232 (38.28%)	
>6	167 (38.39)	231 (38.11%)	
Eating fast food			
Yes	238 (54.71)	360 (59.41%)	**0.131**
No	197 (45.29)	246 (40.59%)	
Quantitative Variable (Mean ±SD)			
Age	33±15.2	37.97±10.79	**0.079**
Body mass index	30.48 ±4.5	29.4±2.49	**0.007**
Household income (Jordanian Dinar/month)	364 ±36	512.64 ±112	**0.136**
Eating attitude	1.59±2.57	2.01±3.57	
Psychological distress	11.48 ±10.51	6.48 ±6.47	**<0.001**
Insomnia severity	8.12 ±7.94	7.69 ±5.1	**<0.001**

Bold numbers indicate significant p-values

Table 4 Multivariable analysis: Logistic regression taking the presence of IBS as the dependent variable

Variable	P-value	aOR	95% CI
Age/ year	.760	1.002	.991; 1.012
Gender (female*)	.976	.996	.763; 1.300
Education (secondary or less*)	**<.001**	1.279	1.126; 1.51
Occupation	**.026**	.827	.700; 0.978
Body mass index	**.028**	1.348	1.033; 1.758
Smoker (yes*)	**<.001**	.601	.458; 0.789
Caffeine drinker (yes*)	**.006**	.548	.418; .718
Average daily sleep	**.022**	1.219	1.029; 1.445
Eating fast food	.591	1.298	.919; 1.287
Household income (Jordanian Dinar/month)	.331	0.67	0.512; 0.756
Eating attitude	**0.014**	0.84	0.75; 0.95
Psychological distress	**<0.001**	1.471	1.121; 1.930
Insomnia severity	**<0.001**	1.475	1.119; 1.944

aOR, adjusted odds ratio; CI, confidence interval; Bold numbers indicate significant p-values; * Indicates the reference group

Table 5: Stratification analysis according to the smoking status

Variable	Non-smokers (R²=0.091)			Smokers (R²=0.094)		
	P value	aOR	95% CI	P value	aOR	95% CI
Body mass index (BMI)	**.024**	1.629	1.065; 4.491	**.016**	.645	.452; .922
Average daily sleep	**.042**	.763	.588; 0.990	.188	.859	.684; 1.077
Eating attitudes	0.37	1.209	0.842; 1.749	**.036**	1.173	1.232; 1.653
Psychological distress	**.006**	.546	.355; 0.841	**<0.001**	.537	.379; .761
Insomnia severity	**<0.001**	1.475	1.119; 1.944	.012	.725	.511; 0.830

aOR, adjusted odds ratio; CI, confidence interval; Bold numbers indicate significant p-values; * Indicates the reference group

Table 6: Stratification analysis according to the caffeine status

Variable	Non-Caffeine drinker (R²= 0.082)			Caffeine drinker (R²= 0.112)		
	P	aOR	95% CI	P	aOR	95% CI
Body mass index	**.016**	1.340	1.196;2.004	.394	.905	.720; 1.138
Average daily sleep	**.009**	.708	.545;.919	**<.001**	.506	.723; .726
Eating attitudes	**0.054**	1.069	1.0864; 1.504	**.0122**	1.330	1.326; 1.908
Psychological distress	**.006**	1.569	1.380; 1.852	**.008**	.603	.415; .875
Insomnia severity	.625	.903	.600;1.359	**0.047**	1.159	1.005;1.574

aOR, adjusted odds ratio; CI, confidence interval; Bold numbers indicate significant p-values; * Indicates the reference group

DISCUSSION

This was the first study in Jordan to investigate the prevalence and contributing variables of IBS in a group of Jordanian citizens. The objectives of this study were to determine underdiagnosed IBS prevalence in Jordanian adults and investigate any potential contributing factors, including sociodemographic variables, anxiety, sleeplessness, physical sport, inappropriate eating attitudes and smoking and caffeine status. The prevalence of IBS among participants in this study was 41.7%. Previous studies conducted in Jordan among university students and medical students based on the Rome III criteria showed lower rates, 15.95%[14] and 30.9%[29], respectively. In Lebanon, the prevalence rate was 46.8% based on the Rome IV criteria among Lebanese adults.[3] A study used self-assessment questionnaire based on Rome III and IV criteria in Canada, United States and United Kingdom showed very low rates ranging between 4.4% and 4.8% [30]. IBS is becoming more common among Jordanian adults, and this may be due to psychiatric conditions such as anxiety, depression, sleep difficulties and eating attitudes. Community-based research and meta-analyses of Western populations have demonstrated this finding.[31,32]

In our study, women had a greater chance of developing IBS than men. This outcome was in line with research from a previous study employing the ROME III criteria to determine the incidence of IBS among Jordanian students.[29] In other countries, such as Pakistan, Saudi Arabia, Iraq, and Nigeria, similar results were obtained.[33, 34, 35, 36] However, a study[17] showed that there was no correlation between gender and IBS prevalence. Similarly, researches conducted in South Asia, South America, and Africa found that women were not considerably more likely than males to have IBS.[37] In contrast, research done in Saudi Arabia[38] revealed that male had a higher incidence of IBS, which was associated with high expectations from family and society causing heightened stress.

Surprisingly in our study, the occurrence of IBS was high in single participants reporting a much greater incidence of the condition contradictory to a study[17] which showed that married participants had high IBS prevalence. The absolute numbers were small, nevertheless, and further research should look into this result.

In line with other studies done in Jordan[17], Korea[39] and Saudi Arabia[40], our study showed that physical sport activity did not appear to be a defense against IBS. Studies on this topic have shown inconsistent results, nevertheless, some have discovered a protective impact of exercise on IBS symptoms.[41,42]

Insomnia severity and average daily sleep were significantly linked to a greater risk of developing IBS. There was a significant correlation between sleep disturbance and functional gastrointestinal diseases, notably IBS. This finding was supported by other previous studies.[29,34,43,44,45] Similarly, a study [46] stated that IBS symptoms including stomach discomfort and trouble sleeping were related.

Our study showed high psychological distress among Jordanian adults, which was significantly associated with high odds of having possible IBS. There was a significant link between IBS and mental disorders including sadness and anxiety, according to previously published studies.[29,47,48,49] Negative feelings, such as worry and despair may be impacted by IBS.[50] Anxiety and depression can increase the likelihood of developing IBS in the future, according to a meta-analysis of case-control and prospective cohort studies.[51]

Furthermore, according to our study, smoking had a statistically significant moderating influence on IBS. Similar results are collaborated by another study.[3] It has been demonstrated that the odds of insomnia

were 1.475 significantly higher IBS compared to nonsmokers having IBS. Numerous previous research that found a significant correlation between IBS and insomnia corroborated our findings.[43,47] High eating attitudes were found to increase significantly the risk of IBS in smokers. A number of food-related symptoms were shown to be more prevalent in IBS patients than in controls[52], which may have a substantial impact on the development of eating disorders in this group. Teenagers and young adults, who had IBS were more likely to develop eating-related symptoms, which were often curable by reducing the offending food, according to another study.[53] Furthermore, a meta-analysis[54] found a high correlation between smoking and eating disorders. Smoking may decrease hunger and aid in weight control, which may explain why women who smoke exclusively to lose weight have considerably higher rates of eating disorders than nonsmokers.[55] However, having a high BMI was strongly linked to a lower likelihood of developing IBS. This outcome matched that of a prior study's [3] findings. The overwhelming majority of studies found a link between IBS and obesity. Symptoms of IBS can be lessened by losing weight, according to a Norwegian prospective cohort study.[56] Inflammatory processes have also been connected to IBS. The gastrointestinal reflexes may be impacted by these processes[57], and obese individuals with IBS were shown to have higher levels of inflammatory biomarkers than controls.[58] Previous results proved that smoking inhibits the development of IBS by decreasing gut mucosal inflammation and delaying gastrointestinal tract motility[59]; this could be linked to the fact that in our investigation, smokers with greater BMI had considerably reduced risks of developing IBS. According to a study[3], severe sleeplessness in non-smokers was substantially associated with a greater likelihood of developing IBS. In our study, the likelihood of developing IBS was substantially correlated with considerable psychological distress. The results of earlier studies corroborated the exact reverse.[3]

Moreover, our study demonstrated a significant moderating effect of caffeine on IBS. In caffeine drinkers, higher eating attitudes and insomnia severity were significantly linked to increased possibility of having IBS. This was also proved by a study[60], which stated that among participants who were overweight or obese, there was a strong link between coffee use and the severity of IBS symptoms. Those who were overweight or obese have a slower metabolism for caffeine than people with normal weight.[60] This might help explain, at least in part, the correlation between caffeine uses and the high risk of developing IBS in this cohort. Higher average daily sleeping was significantly linked to decreased possibility of having IBS. However, a study[61] showed high correlation between sleep and caffeine drinking with IBS. However, another study[62] stated that function of caffeine in IBS was unclear. Further investigation to understand this correlation is needed.

LIMITATIONS

In our study, self-administered questionnaires were the only diagnostic tools used. No additional diagnostic tools, such as colonoscopy tests to look for intestinal damage, fecal occult blood tests to look for blood in stools, blood tests to look for possible anemia, or physician evaluations of other symptoms or signs, were used. Therefore, there was a chance that our results were both overestimated and underestimated.

CONCLUSION

Our study indicated that a notable number of adults in Jordan suffered from IBS. IBS has been associated with a number of risk factors, both controllable and not. A better comprehension of the risk factors linked to this disorder's diverse pathophysiology is necessary for a comprehensive therapy strategy. The results of this study, in our opinion, would have significant ramifications for national initiatives targeted at enhancing academic performance and stress management among IBS students. However, to assess if this alleged relationship is causal, long-term controlled trial is required.

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