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Original Article

Sexual Abuse Is Associated With an Abnormal Psychological Profile and Sleep Difficulty in Patients With Irritable Bowel Syndrome in Taiwan

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Background/Aims
Both sexual and physical abuse history have been reported to be associated with irritable bowel syndrome (IBS) in Western countries. The impact of abuse history in IBS patients in Asia remains unclear. We aim to determine the prevalence of abuse history, its associated psychological profiles, and sleep problems among IBS patients in Taiwan.

Methods
In total, 194 Rome III-defined IBS patients were invited to participate. Age- and sex- matched healthy carriers of chronic hepatitis B or hepatitis C without chronic abdominal symptoms were identified as disease-controls. We administered a validated questionnaire to evaluate bowel symptoms, physical/sexual abuse history, anxiety/depression (Hospital Anxiety and Depression Scale [HADS]), and sleep quality.

Results
IBS patients had a significantly higher prevalence of sexual abuse history than the disease-control group both before (16.5% vs 6.7%, $P < 0.05$) and after (16.0% vs 6.6%, $P < 0.05$) adolescence. These significant differences were mainly observed in women (13.4% vs 3.4%, $P < 0.05$). No difference was noted in history of physical abuse between the 2 groups. IBS patients with a history of sexual abuse had significantly higher HADS scores and higher frequencies of sleep difficulty than those without.

Conclusions
In Taiwan, sexual abuse history was more prevalent in female IBS patients than controls. Sexual abuse history may contribute to higher anxiety/depression levels and sleep difficulties, which are commonly experienced in IBS patients. In Asia, abuse history should be obtained when approaching IBS patients to facilitate better management.
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Key Words
Depression; Irritable bowel syndrome; Physical abuse; Sexual abuse

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Introduction

Irritable bowel syndrome (IBS) is characterized by chronic or recurrent abdominal pain/discomfort with altered bowel habits in the absence of structural or biochemical abnormalities.[1] The actual pathophysiology of IBS remains unclear, although some studies have shown that it is associated with motility disorders, visceral hypersensitivity, previous gastrointestinal infection, psychological disorders, and gut dysbiosis, among others.[2-5] The impact of IBS on society is very large in terms of the direct medical expenses and indirect social costs.[6,7]

In Western countries, childhood or adulthood abuse is associated with IBS and other functional gastrointestinal disorders (FGIDs).[8] For example, Drossman et al[9] found that FGID patients experienced more severe forms of abuse in childhood and/or adulthood, including rape. In a population-based study, Talley et al[10] found that the rate of childhood abuse was significantly higher in IBS patients than in controls (15.4% vs 9.5%). Furthermore, experiences of abuse among IBS patients may lead to greater abdominal pain, poorer daily function, and more extra-intestinal symptoms.[11,12] Despite the positive association between history of abuse and IBS, a study in Europe showed no significant differences between IBS patients and controls in terms of abuse history.[13] Furthermore, IBS patients who reported previous abuse demonstrated significantly higher levels of current psychological distress.[13]

IBS has been reported to be associated with higher levels of anxiety and/or depression.[14-16] Sleep difficulty is also common in IBS patients.[17] Brain-gut dysfunction could be the underlying pathophysiology responsible for the extra-intestinal symptoms in IBS patients described above.[18] A history of childhood sexual abuse is a well-known major risk factor for psychological problems in adulthood.[19] Whether this abuse history contributes to anxiety, depression or even sleep difficulty among IBS patients remains unclear. Eastern and Western societies differ in many ways in terms of their cultures as well as the medical, social, economic, and political environments. To the best of our knowledge, the role of sexual and physical abuse in IBS patients has not been examined in Asia. Thus, we aim to determine whether a history of sexual and physical abuse was higher in IBS patients than in control patients in Taiwan. We also evaluated the associations between psychological profiles (anxiety and depression) and sleep difficulty and abuse history in IBS patients.

Materials and Methods

Subjects

Male and female IBS patients who were over 18 years of age were consecutively recruited from outpatient clinics in Taipei Veterans General Hospital, a tertiary medical center in Northern Taiwan from January 2011 to December 2011. The diagnosis of IBS was based on the Rome III criteria. After a detailed explanation about the way to fill the questionnaires (see below) from a research assistant, these patients were asked to complete the questionnaires at a quiet and private room beside the clinic. A separate age- and sex-matched diseased-control group was invited to participate in the study at the same clinic. The disease-controls consisted of healthy carriers of chronic hepatitis B or C without symptoms of FGIDs. The patients in the disease-control group were clinically asymptomatic and were enrolled during their regular surveillance visits for chronic hepatitis B or C. The patients in both groups had not taken any anti-depressive or anxiolytic medications and had not visited the psychiatric clinics in the past 3 months prior to the enrollment. The study was approved by the Institutional Review Board of Taipei Veterans General Hospital (IRB No. 201012020IC), and all subjects signed a written informed consent form before the start of the study.

Questionnaire

All questionnaires were conducted in a comfortable and confidential place to ensure anonymity. The participants were asked to self-complete the questionnaire based on the explanations provided by research assistants.

Bowel symptom questionnaire

We used a standardized questionnaire modified from a previously validated one to assess the presence of IBS and other FGIDs based on Rome II questions.[17] Briefly, the presence of a Rome III diagnosis of IBS was based on the presence of recurrent abdominal pain or discomfort for at least 3 days/month for the past 3 months that involved 2 of three features: improvement in symptoms with defecation and onset associated with a change in the frequency of stools or in the form (appearance) of stools.

Sleep questionnaire

Sleep quality was evaluated by a questionnaire that was validated in a prior study.[17] Sleep difficulty was defined as abnormal

sleep in the last 6 months with difficulty falling asleep, waking up repeatedly during the night, waking up in the morning yet feeling tired and not rested, or the inability to sleep without a sleeping pill or other sleeping aid.[17]

Hospital Anxiety and Depression Scale

We measured the degree of psychological distress in IBS patients using the Hospital Anxiety and Depression Scale (HADS). The individual subscales reflecting anxiety and depression comprise 7 questions rated on a score of 0-3, for a total potential score of 0-21. The 2 subscales can be summed to provide anxiety and depression scores (range: 0-42). High HADS scores indicate poor mental health. A score of 11 was chosen as the cut-off, which has previously been validated.[20]

Sexual and physical abuse questionnaire

The modified Chinese version of an abuse history questionnaire was translated from the English version; the Chinese version has been previously validated.[21] This questionnaire has been extensively adopted to study history of abuse in FGIDs[21] and has 2 major components: sexual and physical abuse. The sexual abuse component is divided into 2 age groups with a cut-off of 14 years to differentiate between before and after adolescence. Items include "Has anyone ever exposed the sex organs of their body to you when you did not want it? Has anyone ever threatened to have sex with you when you did not want to? Has anyone ever touched the sex organs of your body when you did not want this? Has anyone ever made you touch the sex organs of their body when you did not want this? Has anyone ever forced you to have sex when you did not want this?" The physical abuse component is also divided with the same age cut-off as sexual abuse. Items to evaluate physical abuse include "Has an older person ever done the following: hit, kick or beat you or seriously threaten your life?"

Statistical Methods

Student's *t* test and chi-square test were used to evaluate history of abuse between the IBS patients and controls. The statistical

Table 1. Demographic Data of Irritable Bowel Syndrome Patients and Diseased-controls

Variables	IBS patients	Controls	*t* score	χ^2 score
Age (mean ± SD, yr)	46.3 ± 13.1	45.0 ± 13.0	0.95[a]	
Sex (% female)	104 (53.6%)	104 (53.6%)		0.0[a]
Bowel habit type (n)				
IBS-D	91	NA		
IBS-C	60	NA		
IBS-M	37	NA		
IBS-U	6	NA		
Education (n)				4.6[a]
Elementary school	10	6		
Junior high school	14	13		
Senior high school	37	52		
University or college	109	96		
Post-graduate	24	27		

[a]Not significant.
IBS, irritable bowel syndrome; χ^2, Pearson's chi-square test; IBS-D, diarrhea-predominant IBS; IBS-C, constipation-predominant IBS; IBS-M, mixed IBS; IBS-U, unsubtyped IBS; NA, not applicable.

Table 2. Sexual and Physical Abuse History in Irritable Bowel Syndrome Patients and Controls

Variables	Before adolescence			After adolescence		
	IBS patients (n = 194)	Controls (n = 194)	χ^2 score	IBS patients (n = 194)	Controls (n = 194)	χ^2 score
Sexual abuse (n [%])						
Any sexual abuse	32 (16.5)	13 (6.7)	9.1[a]	31 (16.0)	15 (7.7)	6.3[a]
Sexual exposure	20 (10.3)	10 (5.2)		17 (8.8)	12 (6.2)	
Threat of sex	3 (1.5)	1 (0.5)		6 (3.1)	1 (0.5)	
Touched patient	8 (4.1)	1 (0.5)		6 (3.1)	2 (1.0)	
Patient touched other	14 (7.2)	1 (0.5)		10 (5.2)	4 (2.1)	
Rape or incest	9 (4.6)	5 (2.6)		11 (5.7)	2 (1)	
Physical abuse (often) (n [%])	43 (22.2)	36 (18.6)	0.8[b]	21 (10.8)	13 (6.7)	2.1[b]
Either sexual or physical abuse (n [%])	53 (27.3)	39 (20.1)	2.8[b]	38 (19.6)	26 (13.7)	3.1[b]
Both sexual and physical abuse (n [%])	11 (5.7)	5 (2.6)	3.0[b]	7 (3.6)	1 (0.5)	3.6[b]

[a]$P < 0.01$.
[b]Not significant.
χ^2, Pearson's chi-square test; IBS, irritable bowel syndrome.

analysis was performed using SPSS 17.0 software (IBM Corp, Armonk, NY, USA).

Results

Sexual and Physical Abuse History

In total, 194 Rome-III defined IBS patients (female, 104; mean age 46.3 ± 13.1 years) were invited to complete the questionnaires on FGID and abuse history. In the diseased-control group, the mean age was 45.0 ± 13.0 years, with a similar gender distribution as in the IBS group. The characteristics of both groups are provided in Table 1. Of the IBS patients, 91 (46.9%) were classified as diarrhea-predominant, 60 (30.9%) as constipation-predominant, 37 (19.1%) as mixed, and 6 (3.1%) as unclassified. IBS patients had a higher prevalence of sexual abuse history than the control group, both before (16.5% vs 6.7%, $P < 0.01$) and after (16.0% vs 7.7%, $P < 0.05$) adolescence (Table 2). On the other hand, no difference was noted in the history of physical abuse between IBS patients and controls, either before (22.2% vs 18.6%, $P = 0.377$) or after (10.8% vs 6.7%, $P = 0.151$) adolescence.

Gender Differences in Sexual and Physical Abuse

A gender difference was noted in the prevalence of sexual and physical abuse in the IBS group. Female IBS patients had a significantly higher rate of sexual abuse history both before (13.4% vs 4.1%, $P = 0.001$) and after (14.4% vs 7.2%, $P = 0.010$) adolescence than controls (Table 3). Furthermore, female IBS patients also had a higher rate of physical abuse after adolescence than controls (7.7% vs 3.1%, $P = 0.030$). However, similar rates of sexual and physical abuse history between male IBS patients and controls were noted both before and after adolescence.

Table 3. Gender Difference in Sexual and Physical Abuse History in Irritable Bowel Syndrome Patients and Controls

	Gender	Before adolescence			After adolescence		
		IBS patients (n = 194)	Controls (n = 194)	χ^2 score	IBS patients (n = 194)	Controls (n = 194)	χ^2 score
Sexual abuse (n [%])	F	26 (13.4)	8 (4.1)	9.1[a]	28 (14.4)	14 (7.2)	6.3[a]
	M	6 (3.1)	5 (2.6)		3 (1.5)	1 (0.5)	
Physical abuse (n [%])	F	27 (13.9)	19 (9.8)	0.8[b]	15 (7.7)	6 (3.1)	2.1[b]
	M	16 (8.2)	17 (8.8)		6 (3.1)	7 (3.6)	

[a]$P < 0.01$.
[b]Not significant.
χ^2, Pearson's chi-square test; IBS, irritable bowel syndrome; F, female; M, male.

Table 4. Hospital Anxiety and Depression Scale and Sleep Disorders in Irritable Bowel Syndrome Patients With and Without a History of Abuse

	Sexual abuse				Physical abuse			
	Abuse	Non-abuse	t score	χ^2 score	Abuse	Non-abuse	t score	χ^2 score
Before adolescence (Mean ± SD)								
HADS	22.0 ± 6.2	13.1 ± 6.1	-9.4[a]		15.6 ± 7.4	14.4 ± 6.9	-0.9[c]	
HADS-A	11.1 ± 3.3	6.8 ± 3.3	-7.5[a]		8.1 ± 4.1	7.4 ± 3.6	-0.3[c]	
HADS-D	10.7 ± 3.7	6.6 ± 3.9	-8.4[a]		7.5 ± 3.6	7.2 ± 4.2	-0.9[c]	
Sleep disorders	22/31 (71.0%)	65/163 (39.9%)		6.7[b]	11/21 (52.4%)	76/173 (43.9%)		0.4[c]
After adolescence (Mean ± SD)								
HADS	22.0 ± 6.2	13.1 ± 6.1	-7.4[a]		15.6 ± 7.4	14.4 ± 6.9	-0.7[c]	
HADS-A	11.1 ± 3.3	6.8 ± 3.3	-6.8[a]		8.1 ± 4.1	7.4 ± 3.6	-0.8[c]	
HADS-D	10.7 ± 3.7	6.6 ± 3.9	-5.4[a]		7.5 ± 3.6	7.2 ± 4.2	-0.3[c]	
Sleep disorders	22/31 (71.0%)	65/163 (39.9%)		10.1[b]	11/21 (52.4%)	76/173 (43.9%)		0.5[c]

[a]$P < 0.001$.
[b]$P < 0.01$.
[c]Not significant.
χ^2, Pearson's chi-square test; HADS, Hospital Anxiety and Depression Scale; HADS-A, HADS including anxiety subscale; HADS-D, HADS including depression subscale.

Table 5. Relationship Between Subtype of Irritable Bowel Syndrome and Abuse History

	IBS-D (n = 91)	IBS-C (n = 60)	IBS-M (n = 37)	IBS-U (n = 6)	χ^2 score
Sexual abuse (n [%])					
Before adolescence					2.2[a]
Abuse	18 (19.8)	9 (15.0)	5 (13.5)	0 (0.0)	
No abuse	73 (80.2)	51 (85.0)	32 (86.5)	6 (100.0)	
After adolescence					2.0[a]
Abuse	18 (19.8)	7 (11.7)	5 (13.5)	1 (16.7)	
No abuse	73 (80.2)	53 (88.3)	32 (86.5)	5 (83.3)	
Physical abuse (n [%])					
Before adolescence					1.1[a]
Abuse	22 (24.2)	14 (23.3)	6 (16.2)	1 (16.7)	
No abuse	69 (75.8)	46 (76.7)	31 (83.8)	5 (83.3)	
After adolescence					3.1[a]
Abuse	12 (13.2)	3 (5.0)	5 (13.5)	1 (16.7)	
No abuse	79 (86.8)	57 (95.0)	32 (86.5)	5 (83.3)	

[a]Not significant.
IBS, irritable bowel syndrome; IBS-D, diarrhea-predominant IBS; IBS-C, constipation-predominant IBS, IBS-M, mixed IBS; IBS-U, unsubtyped IBS; χ^2, Pearson's chi-square test.

Hospital Anxiety and Depression Scale, Sleep Difficulty, and Abuse History

IBS patients with a history of sexual abuse, either before or after adolescence, had higher HADS (including both anxiety and depression subscales) scores (before adolescence: 23.3 ± 5.2 vs 12.8 ± 5.8, $P < 0.001$; after adolescence: 22.0 ± 6.2 vs 13.1 ± 6.1, $P < 0.001$), and higher frequencies of sleep difficulties than IBS patients without this history (71.0% vs 39.9%, $P < 0.05$). However, similar HADS scores and sleep quality were observed in IBS patients with and without a history of physical abuse (Table 4).

Irritable Bowel Syndrome Subtype and Abuse History

There were no significant differences between abuse prevalence (both sexual and physical) and IBS subtype (Table 5).

Discussion

In the current study, we first demonstrated that a higher rate of sexual abuse history can be identified in female IBS patients in Asia. We further indicated that IBS patients with a sexual abuse history in Taiwan had higher HADS scores and higher prevalence of sleep difficulty than patients without sexual abuse history.[9,10] In Eastern societies, sexual abuse is often under-reported due to cultural attitudes regarding sexual restraint.[22] Under-reporting of sexual abuse has even been reported in Asian populations emigrating overseas.[23] Furthermore, not only are patients with a history of abuse reluctant to share this information with their family, but physicians in Eastern countries seldom or never have the chance to approach this issue due to very busy clinic schedules and insufficient knowledge about the relationship between sexual abuse and IBS symptoms.[21] In the current study, we carefully obtained information on abuse history in a private condition in a setting free of interruptions. Though the possibility of under-reporting still exists, we nevertheless found that the prevalence of sexual abuse in IBS patients in Taiwan was approximately 16.0%, which is comparable to those in Western countries.[9,10,24,25] Most Western studies evaluate pre-adolescent sexual abuse history in IBS or other FGIDS, and the prevalence of sexual abuse has ranged between 11.0% and 57.0%, depending on the methods of assessment and definitions of abuse used.[9,10,24,25]

We found that the prevalence of physical abuse was similar between IBS patients and controls. This rate of physical abuse was higher than that in Western societies (4.0% in Drossman's study).[9] Corporal punishment is commonly viewed by many Taiwanese parents as a legitimate and effective form of discipline. In a previous study from Taiwan, 22.2% of adolescents living in rural Taiwan reported having experienced physical abuse.[26] However, their definition of physical abuse was strict, including abrasions, bruises, or pain caused by physical injury that had to last to the second day. This strict definition might have led to an underestimation of the occurrence of physical abuse. Moreover, we have reported an approximately 22.0% prevalence of IBS diagnosed by Rome II criteria in healthy check-up examinations, which is one of the highest

prevalences of IBS in Asian countries.[17] Whether this high rate of history of physical abuse in Taiwan contributes to IBS symptoms warrants further investigation.

In Western courtiers, early life events, including abuse history, has been proven to relate with IBS symptoms.[27] Similarly, abuse history during adulthood is also associated with IBS.[9] Whether the abuse history before or after adolescence can contribute to IBS symptoms remains unknown in Asia. In this study, we also demonstrated that high prevalence of sexual abuse history, no matter before or after adolescence, commonly exists among IBS patients in Asia. Our results suggested that history of sexual abuse after adolescence can still be associated with IBS symptoms. We even identified that female patients having physical abuse after, but not before adolescence, is linked with IBS symptoms. Whether this shorter duration of the abuse history will have any impact on the abdominal symptoms and psychological profiles may need further evaluation.

IBS is usually female-predominant, although this trend seems to be non-significant in Asian countries.[28] Nevertheless, in the current study, we found that female, but not male, IBS patients had a significantly higher prevalence of sexual abuse history both before and after adolescence, and of physical abuse history after adolescence than controls. In other words, female gender contributed to the group differences regarding the increased history of abuse in IBS patients. This finding was consistent with those from Western settings.[9,10,27] However, this lack of difference in males may be caused by the relatively smaller sample size of male IBS patients compared with that of their female counterparts. Future larger studies enrolling more men are needed to clarify this issue.

In this study, a high HADS score and a high prevalence of sleep difficulties were identified among female IBS patients with a sexual abuse history in Taiwan. Sexual abuse can lead to a high anxiety status and sleep disorders, as has been widely documented.[29-36] In Taiwan, we have also previously demonstrated a higher prevalence of sleep difficulty in IBS patients than in controls.[17] The above findings suggest that sexual abuse may lead to stress and subsequent peripheral sensitization and abnormal pain processing in the brain, which may contribute to the development of IBS symptoms as well as to its associated psychological and sleep difficulty. Neurobiological mechanisms underlying the association between abuse-related stress and IBS have been identified both in animal models and in human beings. In animal studies, stress before adolescence would result in alterations in the hypothalamic-pituitary-adrenal axis regulation, enhanced visceral hypersensitivity and increased defecation in adult rats.[37,38] In adult subjects or IBS patients, acute stress would also increase small intestinal permeability and altered central processing of visceral stimuli.[39,40] For this group of IBS patients, treatment directed towards psychiatric conditions is essential to contribute to a reduction in symptom severity.[41]

To the best of our knowledge, no sexual abuse data in association with IBS are available in Asia. Our current data suggest that inquiring about abuse history is important in managing IBS patients, especially in the era of Rome IV. A Multidimensional Clinical Profile (MDCP) is suggested by the Rome IV committee as the standard approach in FGID (including IBS) patients.[42] MDCPs aim to assess the individual aspects of a given patient's physiological, psychological or social situation or history that could affect IBS symptoms. A recent systematic review and meta-analysis also suggested combining bowel symptoms with biomarkers and/or markers of psychological affect to obtain a more accurate diagnosis of IBS.[43] This approach may be more intuitive than using symptom-based criteria alone, as it takes into account the likely composite nature of IBS.

This study is subject to limitations due to its cross-sectional design. Therefore, the causal relationships between abuse history and IBS symptom, sleep difficulty, and psychological profiles are still uncertain. Furthermore, the reported abuse history that happened decades ago will be accompanied by concerns about the recall or self-report biases. In addition, this study was conducted in a tertiary medical center in Taiwan and it is unknown whether our findings can be extended to the general population.

In conclusion, a high prevalence of sexual abuse history with higher HADS scores and sleep difficulty were common in female IBS patients in Taiwan. We strongly suggest obtaining abuse history when using the MDCP approach for IBS patients in Asia, as this measurement will help improve strategies to manage this patient population.

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Conflicts of interest: None.

Author contributions: Study concept and design: Hsing-Feng Lee and Ching-Liang Lu; acquisition of data: Hsing-Feng Lee, Pei-Yi Liu, and Ching-Liang Lu; statistical analysis: Hsing-Feng Lee; technical support: Chia-Fen Tsai, Yen-Po Wang, and Pei-Yi Liu; wrote the manuscript: Hsing-Feng Lee and Ching-Liang Lu; study supervision: Yen-Po Wang, Chia-Fen Tsai, Full-Young Chang, and Ching-Liang Lu; and guarantor of the article: Ching-Liang Lu.

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