



## Defense Mechanisms in Patients with Irritable Bowel Syndrome and Their Relationship with Symptom Severity and Quality of Life

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### ABSTRACT

#### BACKGROUND

Despite the fact that there is theoretical evidence about the association between unconscious defense mechanisms and irritable bowel syndrome (IBS), experimental evidence in this regard is limited. The aim of the present study was to compare the defense mechanisms used by the patients with IBS and a control group, and to investigate the relationship between these mechanisms with the severity of the disease and patients' quality of life.

#### METHODS

Forty-five patients with IBS (mean age of 37.1 years; 14 males) and 45 controls (mean age of 38.0 years; 13 males) were evaluated. IBS diagnosis was determined based on Rome III criteria and the predominant pattern of the disease was determined based on the patient's history (13 diarrhea-predominant, 16 constipation-predominant, and 16 alternating IBS). Defense Style Questionnaire-40, IBS Severity Scale, and IBS-Quality of Life questionnaire were used.

#### RESULTS

The mean scores of projection, acting-out, somatization, autistic fantasy, passive-aggression, and reaction formation in the IBS group were significantly higher than the control group and the mean scores of humor and anticipation mechanisms were higher in the control group. There was no significant correlation between the score of defense mechanisms and the severity of IBS and the patients' quality of life.

#### CONCLUSION

The severity of immature defenses in the IBS group was significantly higher, whereas the severity of mature defenses was higher in the control group. These defenses were not correlated with the severity of IBS. Considering the limited sample size, these relationships need to be more investigated.

#### KEYWORDS:

Irritable bowel syndrome, Defense mechanisms, Quality of life, Functional gastrointestinal disorder

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### INTRODUCTION

Irritable bowel syndrome (IBS) is one of the most common functional gastrointestinal disorders, which affects about 10-20% of the population in the Western countries and about 5-10% of the population in Asia.<sup>1-3</sup> Although the etiology of the disease is not fully known, several hypotheses have been proposed. For example, there are recognized associations between IBS development and



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psychosocial factors, especially anxiety and stress, or traumatic events such as psychological trauma or abuse, particularly before the age of 18.<sup>2,4-6</sup> In this syndrome, some changes in the central amplification of pain, emotional excitement, cognitive flexibility, and endogenous inhibition of pain have been reported, which are sometimes independent of the severity of anxiety or depression.<sup>5,7-9</sup>

Up to 80% of patients with IBS have psychiatric comorbidities, especially depression and anxiety disorders, somatization, and substance use disorders, which affect the treatment-seeking behaviors of the patients.<sup>10-11</sup> In addition, antidepressants and a variety of psychological interventions, such as mindfulness, and analytical and interpersonal psychotherapy play an important role in the treatment of the disease.<sup>11-13</sup>

Furthermore, there is a relationship between the desire to control or suppress anger with abdominal pain and exacerbated colon movements after eating.<sup>14</sup> Also, there is a significant relationship between anger and immature defense mechanisms in various types of functional gastrointestinal disorders, including IBS.<sup>15</sup> It should be noted that the defense mechanisms, as defined by the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), are factors that mediate the responses of individuals to emotional conflicts and external stressors.<sup>16</sup> These mechanisms are divided into three groups: Mature defenses are used by normal people to cope with various stressors and considered normal, unless excessive. Neurotic defenses are common in healthy population, however may be correlated with some psychiatric disorders, especially anxiety disorders. Immature defenses are not frequently used by healthy adults and may cause psychic disturbances and are correlated with personality disorders and other psychiatric conditions.<sup>17</sup>

Despite this theoretical knowledge, there have been only limited studies that have assessed defense mechanisms in patients with IBS. A limited study showed that in fighting against tensions, patients with IBS had more escape-avoidance and turning-against-self mechanisms than the control group.<sup>18</sup> However, in another study, there was no significant difference in the use of the defense mechanisms between the patients with IBS and the control group.<sup>19</sup> Yet, the relationship between these mechanisms and the types of clinical features or its severity has not been studied.

The purpose of the present study was to compare the defense mechanisms used by patients with IBS and the control group and also to investigate the relationship between these mechanisms and the severity of the disease and the patients' quality of life.

## MATERIALS AND METHODS

### Study Design and Participants:

This study was designed as a case-control study. The participants in this research were 45 patients with IBS and 45 controls who were selected by available sampling method. The sample size in each group was determined for an effect size of 0.6 or greater, considering  $\alpha = 0.5$  and  $\beta = 0.2$ . In the patients group, the diagnosis of the disease was confirmed by a board-certified gastroenterologist, based on the Rome III criteria.<sup>20</sup> The exclusion of other gastrointestinal disorders was based on the patient's history, physical examination, and endoscopic investigations. The predominant pattern of the disease was recorded based on the history of the patient. During the years of 2015 and 2016, these patients were referred to the gastroenterology clinic of Firouzgar Hospital.

The participants in the control group were selected from the people who accompanied the patients admitted to the gastroenterology clinic of this hospital. These participants had no major gastrointestinal diseases or acute internal illness and were sexually compatible with the patients group.

### Other inclusion criteria were:

providing an informed consent for participating in the study, being literate to the extent that the individual was able to answer the questionnaires by themselves, having the physical ability to complete the questionnaires and to participate in the diagnostic interviews, and the ages of 18-64 years. Moreover, based on the semistructured clinical diagnostic interview based on DSM-IV criteria by a well-educated resident of psychiatry,<sup>21</sup> major psychiatric disorders including schizophrenia, schizophreniform disorder, schizoaffective disorder, bipolar disorder type I, and acute mania or major depressive episodes, or substance intoxication were excluded and other psychiatric diagnoses were established. In addition, the participants who did not complete their questionnaires were excluded.

After explaining the purpose of the study and obtaining

the written informed consents, a semi-structured clinical interview for DSM-IV was done. If necessary, supplementary questions were tailored to meet the new criteria of DSM-5. The questionnaires were then given to the participants. They were supposed to complete the questionnaires in the same place. If some questions were not answered, the participants were asked to complete the questionnaire. The study protocol was approved by the Ethics Committee of Iran University of Medical Sciences.

#### Tools:

**Defense Style Questionnaire-40 (DSQ-40):** This questionnaire was developed by Andrews and colleagues in 1993. It consists of 40 items with a 9-degree Likert scale and defines the defense mechanism based on the mature, immature, and neurotic defensive styles.<sup>22</sup> Cronbach's alpha coefficients are satisfactory for all types of the defensive styles.<sup>23</sup> The Cronbach's alpha coefficient of the questions of each mature, immature, and neurotic style of the Persian version in a student sample were 0.75, 0.73, and 0.74, respectively, and its retest reliability coefficient was 0.82 with a 4-week interval.<sup>24</sup>

**IBS Severity Scale (IBS-SS):** This scale includes five questions about the number of the days with abdominal pain, pain intensity, abdominal distension, overall satisfaction with gastrointestinal function and the effect of the symptoms on everyday life. The scoring is based on a 100-mm visual analogue scale (VAS) and its psychometric properties, including content validity, repeatability, and sensitivity to change have been desirable in numerous studies.<sup>25,26</sup>

**IBS Quality of Life Questionnaire (IBS-QOL):** This questionnaire includes 34 questions with a 5-degree Likert scale and eight subscales, which measures the quality of life and was developed by Patrick and colleagues in 1998.<sup>27</sup> The Cronbach's alpha coefficient in the original version of the questionnaire was 0.95 and in the Persian version was 0.91-0.95. Its validity was shown by correlating the scores with a variety of disease severity and quality of life scales.<sup>28,29</sup>

#### Statistical Analysis:

The data were analyzed using SPSS software version 22. To compare the outcome variables between the two

groups, we used Chi-square test (or Fisher's exact test, as indicated) for the qualitative variables and the independent t test for the quantitative ones. The comparison of the three subgroups of IBS was done using the analysis of variance (ANOVA). The ANOVA was repeated with regard to the occurrence of the somatoform disorders and the obsessive-compulsive disorder as the probable confounders. The correlation between the variables was also calculated using Pearson's correlation coefficient. Statistical significance was assumed at the level of  $p < 0.05$ .

#### RESULTS

The mean ages (years,  $\pm$  SD) in the IBS and the control groups were  $37.1 \pm 11.9$  and  $38.0 \pm 10.8$  years, respectively ( $t = 0.372$ ,  $p = 0.711$ ). There were 14 males (31.1%) in the IBS group and 13 males (28.9%) in the control group ( $X^2 = 0.53$ ,  $p = 0.818$ ). The frequency of the people with a degree lower than diploma, diploma, and a university academic background in the IBS group was 4 (8/9 %), 8 (18.7%), and 33 (73.3%), respectively. In the control group, however, the order was 1 (2.2%), 9 (20.0 %), and 35 (77.8%) ( $X^2 = 1.918$ ,  $p = 0.382$ ). Moreover, in the IBS group, there were 2 unemployed (4.4%), 11 housewives (24.4 %), and 32 employed (71.1%) participants. This frequencies for the control group were in the order of the followings: 1 (2.2 %), 5 (11.1 %), and 38 (84.4%) ( $X^2 = 3.087$ ,  $p = 0.214$ ).

In the IBS group, 13 (28.9%) participants had diarrhea-predominant, 16 (35.6%) had constipation-predominant, and 16 (35.6%) had an alternating IBS. Among the different types of psychiatric comorbidities, the frequency of obsessive-compulsive disorder in the IBS group was significantly higher than the control group (table 1).

#### Severity of IBS Symptoms

39 patients with IBS (86.7%) suffered from abdominal pain when completing the questionnaires and 42 (93.3%) had abdominal bloating. The average number of the days that the person had a pain in the month ( $\pm$  SD) was  $4.7 \pm 2.7$ . The mean pain intensity in these subjects was  $49.2 \pm 22.0$  mm, the mean abdominal distension was  $62.3 \pm 19.7$  mm, the mean discomfort of bowel habits was  $60.5 \pm 24.4$  mm, and the mean amount of IBS interference with daily life was  $52 \pm 0.29$  mm. In this way, the mean severity of the IBS (sum of the four mentioned

**Table 1:** Frequency of psychiatric comorbidities among participants in the study

Variables		IBS group		Control group		Chi square test	
		Frequency	Percentage	Frequency	Percentage	X <sup>2</sup>	p
<b>Somatoform disorders</b>	Illness Anxiety disorder	5	11.1	5	11.1	-	-
	Conversion disorder	4	8.9	1	2.2	1.096	*0.361
	Somatoform disorder	11	24.4	6	13.3	1.813	0.178
	Body dysmorphic disorder	1	2.2	-	-	1.011	*1.000
<b>Mood / Adjustment disorders</b>	Major depressive disorder	12	26.7	8	17.8	1.029	0.31
	Other depressive disorders	1	2.2	-	-	1.011	*1.000
	Bipolar disorder type II	1	2.2	-	-	1.011	*1.000
	Adjustment disorder	1	2.2	2	4.4	0.345	*1.000
<b>Obsessive / Anxiety disorders</b>	Obsessive-compulsive disorder	15	33.3	5	11.1	6.425	0.011
	Specific phobia	-	-	5	11.1	5.294	*0.056
	Social phobia / Performance anxiety	3	6.7	2	4.4	0.212	*1.000
	Panic disorder	-	-	1	2.2	1.011	*1.000
	Post-traumatic stress disorder	-	-	1	2.2	1.011	*1.000
	Generalized anxiety disorder	4	8.9	3	6.7	0.155	0.694
<b>Personality disorders</b>	Paranoid	1	2.2	-	-	The comparison was made only for the personality disorders as a group.	
	Borderline	2	4.4	3	7.6		
	Narcissistic	-	-	1	2.2		
	Histrionic	1	2.2	-	-		
	Antisocial	1	2.2	-	-		
	Obsessive-Compulsive	4	8.9	1	2.2		
	Avoidant	-	-	2	4.4		
	Dependent	1	2.2	1	2.2		
	Passive-Aggressive	2	4.4	-	-		
Any personality disorder	12	26.7	8	17.8	1.029	0.31	

\*Fisher's exact test; IBS: irritable bowel syndrome

dimensions) was  $224.0 \pm 58.5$  mm. The overall severity of the IBS symptoms was not significantly different between the subgroups ( $F = 1.784$ ;  $p = 0.181$ ).

The mean score of the quality of life ( $\pm$  SD) was  $90.6 \pm 25.2$ . The mean score of the quality of life in the three groups of the patients with diarrhea-predominant, constipation-predominant, and alternating IBS was  $79.9 \pm 25.2$ ,  $96.4 \pm 23.0$ , and  $93.1 \pm 26.1$ , respectively, which did not show statistically significant difference ( $F = 1.614$ ;  $p = 0.212$ ).

### Defense Mechanisms

The mean score of projection, acting-out, somatization, autistic fantasy, passive-aggression, and reaction formation in the IBS group was significantly higher than the control group. However, the mean score of humor and anticipation was higher in the control group (table 2).

Also, the use of immature defenses in the IBS group was significantly higher than the control group, whereas the intensity of using mature defenses in the control group was significantly more than the other group.

The severity of immature, mature, and neurotic defen-

**Table 2:** Mean ( $\pm$ SD) scores of the defense mechanisms in subjects participating in the study

Defensive mechanism group	Defensive mechanism	IBS group	Control group	comparison statistics (t test)	
				t	p
<b>Immature</b>	Rationalization	11.4 $\pm$ 3.5	12.2 $\pm$ 3.8	1.125	0.264
	Projection	7.8 $\pm$ 4.0	5.6 $\pm$ 4.1	2.567	0.012
	Denial	6.2 $\pm$ 2.9	6.3 $\pm$ 3.8	0.031	0.975
	Omnipotence	8.3 $\pm$ 4.4	7.6 $\pm$ 3.7	0.781	0.437
	Devaluation	9.5 $\pm$ 3.9	9.3 $\pm$ 4.1	0.291	0.771
	Acting out	11.4 $\pm$ 4.3	9.5 $\pm$ 4.4	2.057	0.043
	Somatization	12.9 $\pm$ 3.9	10.6 $\pm$ 5.4	2.239	0.022
	Autistic fantasy	9.9 $\pm$ 5.3	6.9 $\pm$ 4.3	2.966	0.004
	Splitting	8.9 $\pm$ 3.6	8.6 $\pm$ 4.9	0.26	0.796
	Passive aggression	9.7 $\pm$ 2.9	7.9 $\pm$ 4.4	2.396	0.021
	Displacement	8.7 $\pm$ 4.7	7.4 $\pm$ 3.7	1.425	0.158
	Isolation	7.7 $\pm$ 3.8	6.9 $\pm$ 4.1	1.011	0.315
Total	112.5 $\pm$ 22.3	98.9 $\pm$ 25.3	2.709	0.008	
<b>Mature</b>	Suppression	8.7 $\pm$ 4.1	9.5 $\pm$ 4.1	0.86	0.387
	Sublimation	10.2 $\pm$ 4.4	9.8 $\pm$ 4.2	0.491	0.625
	Humor	8.0 $\pm$ 4.5	10.8 $\pm$ 4.6	2.948	0.004
	Anticipation	12.9 $\pm$ 3.6	14.4 $\pm$ 3.1	2.018	0.047
	Total	39.9 $\pm$ 11.1	44.5 $\pm$ 10.8	1.989	0.0498
<b>Neurotic</b>	False altruism	13.0 $\pm$ 3.9	12.8 $\pm$ 3.6	0.308	0.759
	Reaction formation	10.0 $\pm$ 3.8	7.8 $\pm$ 4.3	2.584	0.011
	Intellectualization	11.0 $\pm$ 4.6	11.3 $\pm$ 4.9	0.29	0.773
	Undoing	11.8 $\pm$ 3.1	11.9 $\pm$ 4.0	0.089	0.929
	Total	45.9 $\pm$ 10.6	43.8 $\pm$ 12.4	0.872	0.386

\*IBS: irritable bowel syndrome

**Table 3:** Mean ( $\pm$ SD) scores of immature, mature, and neurotic defense mechanisms in subgroups of patients with irritable bowel syndrome

Subscale	Diarrhea-predominant	Constipation-predominant	alternating IBS	Statistical tests (ANOVA)	
				F	p
<b>Immature</b>	108.5 $\pm$ 25.1	112.4 $\pm$ 22.9	115.9 $\pm$ 20.3	0.377	0.688
<b>Mature</b>	39.8 $\pm$ 8.6	37.6 $\pm$ 12.8	42.3 $\pm$ 11.1	0.691	0.507
<b>Neurotic</b>	45.6 $\pm$ 12.4	46.3 $\pm$ 10.1	45.8 $\pm$ 10.0	0.013	0.987

sive mechanisms did not depend on the existence of any other somatoform disorders ( $F = 1.014$ ,  $p = 0.317$ ;  $F = 0.326$ ,  $p = 0.570$ ; and  $F = 0.008$ ,  $p = 0.927$ , respectively) and the interaction of IBS and any other somatoform disorder was not statistically significant ( $F = 0.416$ ,  $p = 0.521$ ,  $F = 3.144$ ,  $p = 0.080$ ; and  $F = 1.648$ ,  $p = 0.203$ , respectively).

Similarly, the diagnosis of obsessive-compulsive disorder (which had a different frequency between the

two groups) did not show a significant difference in the use of immature, mature, and neurotic defense mechanisms ( $F = 1.063$ ,  $p = 0.306$ ;  $F = 2.409$ ,  $p = 0.124$ ; and  $F = 0.144$ ,  $p = 0.725$ , respectively) and there was no significant interaction with the main group (IBS or control) ( $F = 1.133$ ,  $p = 0.290$ ;  $F = 0.005$ ,  $p = 0.941$ ;  $F = 0.201$ ,  $p = 0.201$ , respectively).

The subgroups of IBS did not have a significant statistical difference in this regard (table 3).

**Table 4:** Pearson's correlation coefficients between defense mechanisms and the quality of life and severity of irritable bowel syndrome

	Immature defenses	Mature defenses	Neurotic defenses
Quality of life	0.226 ( <i>p</i> = 0.145)	0.125 ( <i>p</i> = 0.426)	0.087 ( <i>p</i> = 0.577)
Severity of disease	0.212 ( <i>p</i> = 0.163)	0.137 ( <i>p</i> = 0.369)	0.095 ( <i>p</i> = 0.534)

#### Relationship between Types of Defensive Mechanisms with Quality of Life and Severity of IBS

Quality of life (higher scores mean a lower quality of life) had no significant correlation with immature, mature, and neurotic defensive mechanisms. Furthermore, there was no significant correlation between the severity of the disease and the scores of defense mechanisms (table 4).

## DISCUSSION

Psychological and psychobiological factors play a major role in the incidence and the persistence of gastrointestinal functional disorders, including IBS.<sup>2,4-7</sup> The present study examined the use of defense mechanisms as a group of psychological factors in the patients with IBS.

In general, humans use three types of coping mechanisms to dominate stressful situations. These practices include helping out others, a conscious cognitive way or coping styles, and unconscious defense mechanisms.<sup>30</sup> Although defense mechanisms are first used to deal with external stressors and internal conflicts, it distorts one's perception of the inner and outer reality, such as denial, suppression, or rejection; thus, this reduces individual anxiety and depression in this way.<sup>30,31</sup> Some of these mechanisms, such as projection and splitting, are maladaptive, and some, such as denial or suppression, may be adaptive or maladaptive, depending on the severity, flexibility, and context of their occurrence.<sup>31</sup>

In our study, the intensity of the use of projection, acting-out, somatization, autistic fantasy, passive-aggression, and reaction formation was higher in the group with IBS. The major defense mechanisms that were used in the patients with IBS were more common in immature defenses than in the control group. Some of these defense mechanisms, such as somatization and passive-aggression, are obviously associated with anger and anxiety against the patient himself/herself. This finding was also reported in the study of Pokroy and colleagues.<sup>18</sup>

It has been shown that patients with IBS had more

escape-avoidance mechanisms in their coping strategies than those in the control group. In the defense mechanisms, turning-against-self defense mechanisms were common. The researchers concluded that the patients with IBS were consciously trying to avoid or escape the problem, rather than effectively coping with them. Some of these tensions are internalized into the gastrointestinal tract. The use of such immature defenses makes it possible for the person to use his anger against himself rather than to resort to a tense agent to deal effectively with it and, according to Ehilovich and Gleser, to use it as a kind of self-punishment.<sup>32</sup>

Some of these mechanisms are different from turning-against-self mechanisms. For example, based on the classification of Ihilevich and Gleser, acting-out is a kind of defensive mechanism distorting reality towards object. Reaction formation is a kind of reversal defense mechanism, and projection is within a separate category of defense mechanisms.<sup>13,19</sup> In two other studies that examined the mechanisms used in IBS, there was no significant difference between the two groups of patients and the control group.<sup>18,19</sup> However sample sizes were obviously limited in the mentioned studies.

Since somatoform disorders have a psychological view of proximity to IBS and as the frequency of obsessive-compulsive disorder in the patients group was higher than the control group, we considered these disorders as the probable interfering factors. But the analysis of variance showed that these disorders did not have an independent role or intervention with IBS in using defense mechanisms. The excessive use of immature mechanisms was also observed in the patients with obsessive-compulsive disorder.<sup>33</sup>

In our study, the use of defense mechanisms neither had any connection with the dominant pattern of the disorder nor showed a significant correlation with the severity of disease or the quality of life. To the best of our knowledge, no other study has addressed this issue.

In fact, the discrepancy between the three patterns of the disease can be attributed to the limited sample size of the study. Moreover, the incidence of IBS, such as the central amplification of pain<sup>5</sup> and a decrease of cognitive flexibility,<sup>7</sup> may be a common factor in all types of IBS. However, it can be thought that reducing inhibitory feedback in the emotional arousal network<sup>8</sup> and the impairment in the control of the autonomic function of the gastrointestinal tract and the intestinal motor activity<sup>9</sup> between the different types of the syndrome are different. The relationship between these clinical findings and the psychological mechanisms of the field needs further investigation.

Finally, it should also be noted that in addition to the limited number of the samples, the present study experienced other constraints. The lack of control, among other functional gastrointestinal disorders, does not make it clear whether the difference in the use of defense mechanisms is a common factor among all types of functional gastrointestinal disorders or is only attributed to IBS. The common complication of psychological disorders is also restricting the ability to carefully examine the role of mediator of these disorders. To evaluate this role, we need to review and then compare the patients with no psychiatric disorder with the patients with comorbid psychiatric disorders. Furthermore, although analytical psychotherapy is useful in the treatment of IBS,<sup>13</sup> the role of these defense mechanisms in the treatment of IBS is unclear.

## CONCLUSION

Based on the findings of the present study, the patients with IBS use more immature defense mechanisms and less mature mechanisms in comparison with healthy people. These findings may play significant roles in psychodynamic and supportive psychotherapy of the patients with IBS. However, the importance of using these mechanisms and their exact role in the formation of disruptions to supplementary studies are essential.

## ETHICAL APPROVAL

There is nothing to be declared.

## CONFLICT OF INTEREST

The authors declare no conflict of interest related to this work.

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