

Psychometric properties of Persian version of irritable bowel syndrome- behavioral responses questionnaire (IBS-BRQ)

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ABSTRACT

Aim: This study aimed to determine the psychometric properties of Persian version of Irritable Bowel Syndrome-Behavioral Responses Questionnaire (IBS-BRQ).

Background: In addition to somatic symptoms and complaints, patients with irritable bowel syndrome have specific dysfunctional behaviors that lead to disease persistence and functional disturbance.

Methods: Participants included 170 patients with irritable bowel syndrome, who were diagnosed based on ROM-IV criteria and selected from patients referring to the Gastrointestinal Disorders Clinic, as well as 100 persons from the general population in Isfahan in 2020. Both groups completed the 26-item Irritable Bowel Syndrome-Behavioral Responses Questionnaire (IBS-BRQ). Also, questionnaires including the Irritable Bowel Syndrome Symptom Severity Scale (IBS-SSS), Irritable Bowel Syndrome-Quality of Life IBS-QOL, Illness Perception Questionnaire (IPQ-R), Irritable Bowel Syndrome-Patient Satisfaction (IBS-SAT), Hope Scale, Interpersonal Forgiveness Inventory (IFI), and Dysfunctional Attitude Scale- 26-item (DAS-26) were completed to determine the validity of IBS-BRQ. Tests of internal consistency, principal components analyses (PCAs), differentiation analysis, and correlation were used to determine its reliability, along with criterion and construct validity.

Results: IBS-BRQ was valid and reliable in both groups with a high degree of internal consistency. Cronbach's alpha was obtained in the sample of patients with IBS and the total sample of participants 0.87 and 0.95 respectively. This scale differentiated significantly between IBS patients and non-patients ($p < 0.001$). The criterion validity was high as evidenced by a high correlation with DAS-26 ($r = 0.53$, $p < 0.001$), IBS-QOL ($r = 0.76$, $p < 0.001$), IBS-SSS ($r = 0.44$, $p < 0.001$), IPQ-R ($r = 0.56$, $p < 0.001$), and reverse correlation with IFI ($r = -0.031$, $p < 0.001$), IBS-SAT ($r = -0.23$, $p < 0.001$), and HOPE ($r = -0.49$, $p < 0.001$).

Conclusion: The Persian version of the IBS-BRQ proved to be a well-defined behavioral response measure in IBS patients with high validity and reliability, making it a suitable measure to be used in future IBS clinical research in Iran.

Keywords: Psychometric properties, Irritable bowel syndrome, Behavioral responses questionnaire.

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Introduction

Irritable bowel syndrome (IBS) is a chronic, episodic functional gastrointestinal (GI) disorder marked by recurring abdominal pain/discomfort associated with altered defecation and irregular stool movements (1). The condition has a significant detrimental effect on one's

quality of life and frequently endures into adulthood (2). Around 8% of adolescents suffer from IBS worldwide (3). According to a systematic review, the prevalence of IBS in Iran ranges from 1.1 to 25% (4). IBS has several features that make it prone to stigmatization, despite being a widespread and non-life-threatening illness. Stigma, defined as a social categorization of an individual as abnormal, is an essential component for a range of chronic disease outcomes (5) and may thus have consequences for IBS treatment (6).

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Despite a significant amount of research, IBS remains poorly understood, necessitating the development of a more complete model. Currently, it is thought that symptom development is the result of a complex combination of variables such as motility disorders, GI sensation abnormalities, GI inflammation and infection, altered processing of afferent sensory information, psychological distress, and emotional problems (7). IBS patients frequently have several comorbid conditions. Coexisting psychosocial problems, such as anxiety, depression, and somatoform disorders, are common in IBS patients (8). In other words, IBS is classified as a biopsychosocial condition (9). According to the biopsychosocial model (10), sickness is regarded as a complex phenomenon caused by the interplay of psychological and biological variables involved in the disease's origin and development (11). This paradigm has gained popularity for its ability to explain and clarify the etiological mechanisms behind functional somatic syndromes in general and functional gastrointestinal diseases in particular (12). Numerous biopsychosocial models of irritable bowel syndrome have been suggested, some stressing the role of biobehavioral variables (13, 14) while others underscoring the role of psychosocial factors (15, 16). Thus, IBS symptom manifestation is influenced by a person's biology (e.g., genetics, GI physiology), behaviors (e.g., avoidance, eating, exercise), and higher-order cognitive processes such as coping, disease beliefs, along with information processing of environmental cues (17).

According to studies, fear and avoidance of symptoms are significant contributors to the maintenance of symptom intensity and impairment in people with IBS (18, 19). Medical and nutritional treatments can help IBS patients in different ways, but they usually do not affect a specific symptom of IBS (20). On this basis, CBT protocols that prioritize exposure exercises to reduce anxiety and avoidance behaviors in people with IBS have repeatedly shown significant treatment effects on symptoms and quality of life (21). Although a cognitive scale has been developed for functional bowel disorders (FBDs) to detect the cognitive component of IBS (22), a survey of the literature revealed a scarcity of research aimed at identifying IBS-related behavior. Cognitive-behavioral models of IBS might be further developed and refined, and cognitive-behavioral therapies could be enhanced if we were gain more awareness of unhelpful

behavioral reactions in these individuals (23). One of the tools that measures IBS behavior is the Irritable Bowel Syndrome-Behavioral Responses Questionnaire (IBS-BRQ). As this instrument has not been psychometrically examined eastern countries, and the studies in Iran have not been completed to the best of the present author's knowledge, the researcher planned to investigate the psychometrical properties of this instrument across the Iranian population. The findings of this study can serve as an evaluation and research guide for healthcare planning and management of patients with IBS and a foundation in resolving difficulties in various aspects of these patients' lives.

Methods

Participants and setting

The current cross-sectional methodological study was a psychometric investigation in Isfahan, Iran, in 2020 to determine the psychometric features of the IBS-BRQ in patients with IBS who referred to hospital-affiliated or private clinics. All individuals with IBS (aged between 18 and 65) who met the inclusion criteria of suffering from IBS with the diagnosis made by a gastroenterologist and based on Rome-IV criteria, consent to participate in the study, lack of serious mental disorders, minimal literacy, and no pregnancy were included in the study population. Failure to respond to more than 5% of questionnaire items constituted the exclusion criterion.

Translation phase

In the initial stage of the research, two experienced translators independently translated the English version of the questionnaire based on Persian common terminology into Persian. Following comparison of the two translations, a Persian version was created. This Persian version was then back translated into English by an English professional for content comparison. To discover any misunderstandings, mistranslations, or errors, the original and back-translated versions were compared with each other. After receiving input from gastrointestinal specialists, the final Persian language version of the IBS-BRQ questionnaire was created, with items adjusted to reflect the Iranian culture.

Measures

IBS Behavioral Responses Questionnaire (IBS-BRQ)

The IBS-specific Behavioral Response Questionnaire was developed by Reme and et al. 2010 to assess the

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pattern of avoidance behavior associated with IBS. "I avoid exercising when I have stomach pains," "I avoid going out if I have IBS problems," and "I avoid staying away from home overnight if my IBS flares up" are among the items in the instrument. It has 26 items with scores ranging from 1 (never) to 7 (always) (min-max = 26–182). Avoidance behavior and control behavior are the two primary characteristics derived from the scale. The IBS-BRQ has been validated for adults with IBS with convergent validity and good test-retest reliability. The scale has acceptable psychometric properties in terms of internal consistency (Cronbach's $\alpha=0.86$), split-half reliability ($r=0.62-0.80$), and test-retest reliability ($r=0.81-0.81$, $p=0.001$), as well as face and criterion validity, as determined by correlations with relevant measures in the same domain, e.g., IBS symptoms, IBS-related cognitions, psychological distress, and social adjustment ($r=0.37-0.67$, $p=0.001$). Discriminant validity was defined as statistically significant differences between groups for patients with irritable bowel syndrome and controls (23).

The Irritable Bowel Syndrome Symptom Severity Scale (IBS-SSS)

The IBS-SSS assesses five aspects of IBS symptoms as reported by the patient. On a scale of 0 to 100, pain severity, pain frequency, distension, bowel satisfaction, and overall influence on the quality of life are all assessed. A visual analog scale is used for each subscale, with the total score of 500. The severity of the condition is classified as mild (75–175), moderate (175–300), or severe (300+). The PCA supported a two-factor solution in both sets of data. The IBS-SSS has a strong concurrent validity with quality of life outcomes and has fair reliability (24).

Irritable bowel syndrome-quality of life IBS-QOL instrument

Huhen initially created this instrument, which consisted of 30 items divided into nine subscales. It was then updated by Patrick et al. (2000), who incorporated 34 questions on a 5-point Likert scale with eight subscales for dysphoria, interference with activities, body image, health concern, food avoidance, social response, sexual difficulties, and relationships. The resulting scores range from 0 to 100, with the entire process taking around ten minutes. A higher score on this test implies a worse quality of life. This instrument was created and utilized in accordance with the cultures of England, France, and Italy. Its construct validity has been found to be $r=0.30$ to 0.44 when SF-36 tools are used and $r=0.27$ to 0.46 when

SCL90-R is used. Its reliability has also been reported to be 0.95 based on Cronbach's alpha (25).

The illness perception questionnaire (IPQ-R)

Weinman et al. (26) developed it first, and Moss-Morris et al. then revised it to improve its psychometric performance. The IPQ-R is made up of three parts: Part I assesses illness identity using 14 items with a double yes-no response format, part II uses 38 items with a 5-point Likert scale response format (strongly agree to strongly disagree) to assess the seven dimensions of controllability (personal and treatment), timeline (acute/chronic and cyclical), coherence, emotional representations, and consequences, and part III applies the findings to present 18 items on causal attributions. Moss-Morris et al. investigated the IPQ-validity and reliability in patients with eight different illnesses. It demonstrated high test-retest reliability as well as a divergent, known group, and predictive validity. The construct validity of the seven-factor model of the IPQ-R part II was supported by exploratory analyses using principal component analysis (27).

Patient satisfaction (IBS-SAT)

IBS-SAT is a validated disease-specific instrument which assesses patients' satisfaction with IBS care. It consists of 38 items evaluating patient satisfaction across five subscales: [1] relationship with health care provider, [2] education, [3] visit benefits, [4] office characteristics, and [5] health care access. The first item is a measure of overall satisfaction, with the question "How pleased are you with the care you received for your IBS most recently?" graded as 1, not at all, 2 a little bit, 3 a reasonable amount, 4 a great lot, and 5 entirely. The remaining 37 items were responded on a 5-point Likert scale: 1 strongly disagrees, 2 disagrees, 3 neither agrees nor disagrees, 4 agrees, or 5 strongly agrees. The overall IBS-SAT score was derived by averaging the 37 individual item scores (28).

Hope scale

The Hope Scale is a 12-item self-report questionnaire developed to assess dispositional hope. The measure, which has four distracter items, is divided into two subscales: the Pathways subscale (i.e., perceived capacity to discover and build paths to goals) and the Agency subscale (i.e., perceived determination to successfully reach goals). Several examples include the following: 'There are numerous paths around any problem' (pathways) and 'Even when others become discouraged, I know I can find a solution (agency). Each item is rated on an eight-point Likert scale ranging from 1 (certainly false)

to 8 (definitely true). Snyder et al. (1991) reported an acceptable level of test-retest reliability ($r=0.85$ over three weeks). Internal consistency estimates for Hope Scale items were acceptable (Hope scale total: $\alpha=0.83$; Pathways: $\alpha=0.78$; Agency: $\alpha=0.73$) (29).

Interpersonal forgiveness Inventory (IFI)

This inventory was developed by McCullough et al. 1997 with 25 items. The maximum scale score is 100 and the minimum is 25, with high score indicating a high ability to forgive others (30). A study evaluated this scale psychometric properties in Persian version and appropriate reliability ($\alpha=0.8$) and validity were reported (31).

Dysfunctional Attitude Scale- 26-item (DAS-26)

Beck and Weismann developed the core version of DAS, which consists of 40 components (32). A new version of DAS, DAS- 26, with 26 elements, was created in order to utilize a shorter but still valid and reliable form of DAS in the Iranian population. A psychometric survey was used to determine the psychometric characteristics of DAS-26. Cronbach's alpha for this study was 0.92. The correlation coefficient with the original form was 0.98, and the validity of its prediction was determined by comparing it to GHQ-28 scores ($r=0.56$). The new form has 26 questions on a seven-point Likert scale. The following are the four essential factors addressed by DAS-26: Perfectionism, obtaining others' approval (confirmation), obtaining others' happiness, vulnerability (33).

Statistical analysis

Parametric statistical tests, such as the independent-sample t-test, were employed in this work to compare subgroups. Cronbach's alpha was used to determine the questionnaire's overall reliability, as well as the reliability of its scales and questions, whereby correlation coefficients were used to determine the instrument's concurrent validity. The variables were also studied using exploratory factor analysis with Principal Component Analysis Extraction Method. Finally, all of the data were analyzed using version 26 of the Statistical Package for Social Sciences (SPSS) program.

For discriminant validity, by Med-Calc software, these indicators were determined for this scale: sensitivity (True Positive Rate), which measures the proportion of positives that are correctly identified; specificity (True Negative Rate), which measures the proportion of negatives that are correctly identified. In addition, negative predictive values (NPV) and positive

predictive values (PPV) were measured, which indicate the proportion of positive and negative results in statistics and diagnostic tests. On the other hand, Positive likelihood ratio (+LR) and negative likelihood ratio (-LR) for assessing whether a test result usefully changes the probability of a condition were examined. Also, the Youden index was calculated to determine the best cut-off point between these two groups.

Results

Demographic features

The age range of 270 participants (100 people in the healthy group and 170 persons in the patient group) was 30.5 with standard deviation of 11.2, with 96 male (34.3%) and 171 female (61.1%) participants. The demographics of the study participants are summarized in Table 1.

Table 1. Demographic characteristics of participants

| Characteristics | Frequency (%) |
|-----------------------------|---------------|
| Sex | |
| Female | 171(61.1) |
| Male | 96(34.3) |
| Missing | 3(4.6) |
| Education | |
| Up to high school diploma | 107(38.2) |
| Four-year university degree | 90(32.2) |
| Postgraduate education | 71(25.4) |
| Marital status | |
| Married | 117(41.8) |
| Single | 133(47.5) |
| Divorced or widowed | 5(2) |
| Income levels | |
| High | 15(5.4) |
| Moderate | 219(78.2) |
| Low | 35(12.5) |

Investigating the difference between the mean scores of IBS-BRQ in the two groups

The mean scores of the IBS-BRQ in persons with IBS and the control group are compared in Table 2. The assumption of normality (Kolmogorov-Smirnov test) of variable distribution in both groups was initially tested, as well as the homogeneity of variances in both groups, whereby the assumptions were maintained. There was a statistically significant difference between the mean scores of IBS-BRQ in persons with irritable bowel syndrome and the control group, according to the findings of a t-test of two independent samples (Table 2 and Figure 1). This demonstrates the differentiated validity of this tool by demonstrating the varied performance of patients and the general population in this questionnaire.

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Convergent and divergent validity

The correlation of IBS-BRQ scores with DAS-26, IBS-QOL, IBS-SSS, and IPQ-R scores was $r=0.53$, $r=0.76$, $r=0.44$, and $r=0.56$ respectively, indicating convergent validity of this inventory. Also, divergent validity of IBS-BRQ was concluded based on correlation between divergent tools such as Hope Scale, IFI, and IBS- SAT revealing $r=-0.49$, $r=-0.031$, and $r=-0.23$ respectively with significant P-value (Table 3).

Consistency

Cronbach's alpha total score was 0.95, which indicates this questionnaire has a good fit across the Iranian population. The total Cronbach alpha coefficient was calculated for sub-groups of this questionnaire from 0.87 to 0.95. Cronbach's alpha higher than 0.70 shows high internal consistency (34); thus, this questionnaire has an acceptable internal consistency (Table 4).

Exploratory factor analysis

Before performing the exploratory factor analysis, Keiser-Meyer Olkin (KMO) test and Bartlett sphericity

test were used to evaluate the sample size's adequacy. The measurement indices of KMO equal was 0.89 and the Bartlett sphericity test's was significant, demonstrating the adequacy of the sample size's adequacy for factor analysis. In order to determine the factor structure of the Iranian version of IBS-BRQ, exploratory factor analysis was performed with oblique rotation. The results identified five factors. All items on five factors had a significant factor loading based on the oblique rotation (Table 4, Figure 2). For comparison with the factor structure of the original version, confirmatory factor analysis was performed. In the two-factor model (according to the original model), items 5, 16, and 25 were removed because of their weak factor loading. In this study, the 5-factor structure of the Persian version of IBS-BRQ has been reported, derived from Iranian patients' attitude and approach to IBS based on context and culture (Table 4 and Figure 1).

Discriminant Validity

Table 2. The mean differences of scores of IBS-BRQ Persian version in two groups (control group and IBS group).

| Variable | Sub-Groups | Mean (Std. Deviation) | Std. Error Mean | Equality of Variance | | Test for Means | |
|----------|---------------|-----------------------|-----------------|----------------------|---------|----------------|---------|
| | | | | F | P-value | T | P-value |
| IBS-BRQ | Control group | 40.02 (17.2) | 1.7 | 0.052 | 0.81 | -11.43 | 0.001 |
| | IBS patients | 72.58 (16.9) | 2.2 | | | | |

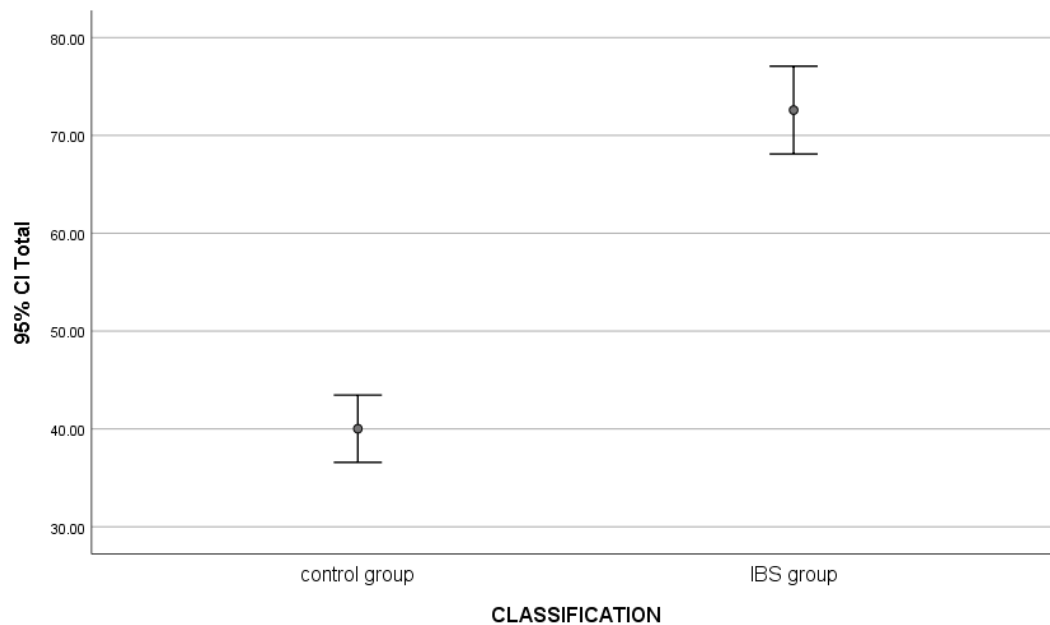


Figure 1. Error bar graph for independent sample test in two groups (control group and patient group) with 95% confidence Interval.

The area's value under the curve for this scale was 0.911 (Table 5 and Figure 3). Based on the results, the cut-off point of 48 with the best balance has had sensitivity and specificity values of 92.9 and 81.8 for the IBS-BRQ respectively, with the Youden index 0.74 (Table 5). Thus, those who scored higher than 48 on the scale are known as

patients who need medical interventions. According to the results, this tool's sensitivity and specificity in the Iranian population have been recognized as excellent, and therefore this tool has an acceptable ability to screen cases in Iranian patients (Table 5).

Table 3. Correlation between convergent and divergent tools in patient groups

| Questionnaire | Convergent Tools | | | | Divergent Tools | | |
|----------------------|---------------------|------------------|----------------------|------------------|------------------|----------------------|-----------------|
| | DAS-26 ^b | QOL ^c | IBS-SSS ^d | IPQ ^e | IFI ^f | IBS-SAT ^g | HS ^h |
| IBS-BRQ ^a | 0.53*** | 0.76*** | 0.44*** | 0.56*** | -.31** | -0.23* | -0.49*** |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. ^a IBS Behavioral Responses scores, ^b dysfunctional attitude scores, ^c Irritable bowel syndrome-quality of life scores, ^d Irritable Bowel Syndrome Symptom Severity scores, ^e illness perception scores, ^f Interpersonal forgiveness scores, ^g Patient satisfaction scores, ^h Hope scores.

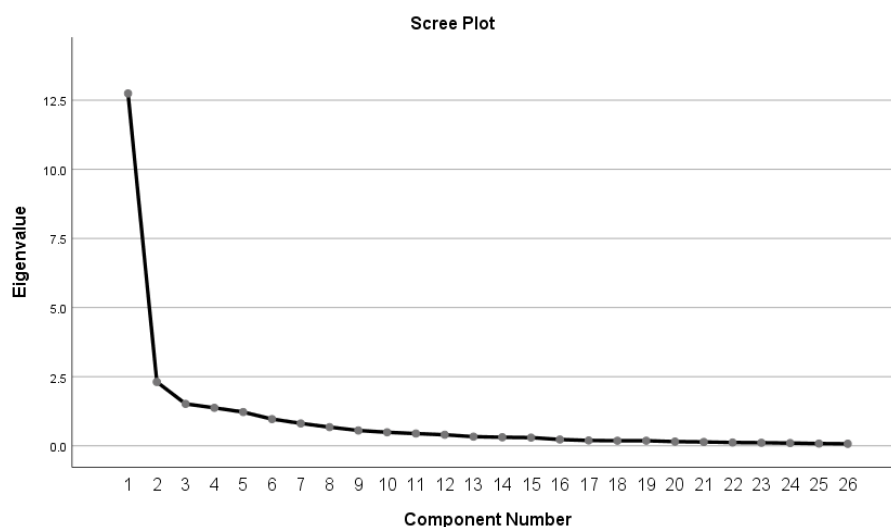


Figure 2. The Scree plot of factor analysis of Persian version of IBS-BRQ

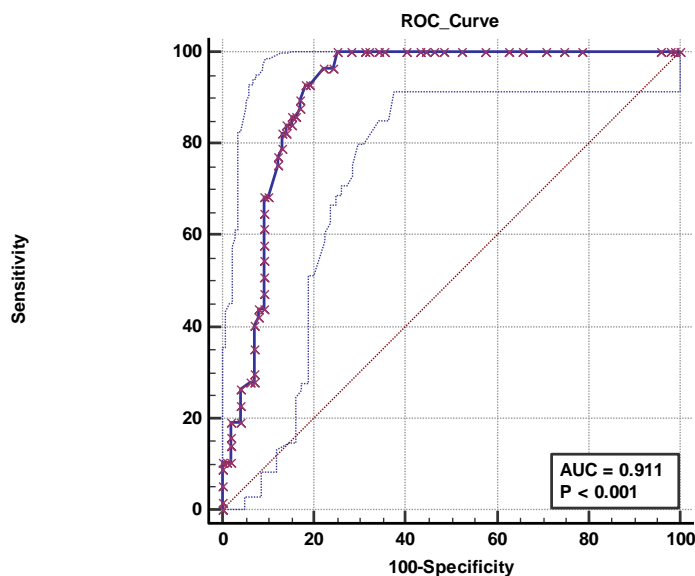


Figure 3. Area under the ROC curve for IBS-BRQ

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Table 4. Rotated component matrix (Extraction Method: principal component analysis) of Persian version of IBS-BRQ in Iranian samples and Cronbach's Alpha

| Items | F1 | F2 | F3 | F4 | F5 | Cronbach's Alpha if Item Deleted |
|--|-------|-------|--------|-------|--------|----------------------------------|
| 13. Avoid making plans in case problems with IBS | 0.874 | | | | | 0.955 |
| 12. Avoid going out in case problems with IBS | 0.864 | | | | | 0.955 |
| 21. Avoid social situations because of IBS | 0.815 | | | | | 0.955 |
| 18. Make sure to know where nearest toilet is | 0.757 | | | | | 0.953 |
| 26. Avoid staying away from home overnight in case IBS flares up | 0.690 | | | | | 0.954 |
| 20. Avoid work situations because of IBS | 0.640 | | | | | 0.955 |
| 19. Ask for reassurance about IBS | 0.516 | | | | | 0.955 |
| 14. Carry other items in case IBS flares up | 0.447 | | | | | 0.954 |
| 9. Avoid exercise when having stomach pains | 0.443 | | | | | 0.956 |
| 3. Strain when opening bowels | | 0.928 | | | | 0.956 |
| 6. Spend more time on the toilet than ideally | | 0.783 | | | | 0.954 |
| 7. Often go to toilet then do not pass anything | | 0.764 | | | | 0.955 |
| 1. Eat specific foods to help open bowels more | | 0.649 | | | | 0.955 |
| 4. Check for blood after opening bowel | | 0.618 | | | | 0.955 |
| 10. Avoid certain foods when having bowel problems | | 0.567 | | | | 0.955 |
| 11. Wear baggy clothing when bloated | | 0.530 | | | | 0.957 |
| 25. Constantly aware of stomach | | 0.529 | 0.415 | | | 0.953 |
| 15. Take medication before going out in case IBS flares up | | | 0.782 | | | 0.955 |
| 16. Carry medication in case IBS flares up | | | 0.481 | | | 0.953 |
| 17. Avoid sex in case IBS flares up | | | 0.470 | | | 0.953 |
| 8. Go to toilet to pass water then open bowels | | | | 1.000 | | 0.957 |
| 2. Eat specific foods to help open bowels less | | | | 0.696 | | 0.956 |
| 24. When I have diarrhea, I do things to ease it | | | | 0.665 | | 0.955 |
| 23. Wipe more than I would like after I open my bowels | | | | 0.572 | | 0.954 |
| 5. Check for stool abnormalities | | | | | 0.630 | 0.956 |
| 22. Avoid certain foods because of IBS | | | | | -0.436 | 0.954 |
| Total Variance Explained | | | 73.719 | | | |
| Total Cronbach's Alpha | | | 0.956 | | | |

Table 5. Criterion values and coordinates of the ROC curve

| | |
|--------------------------------------|----------------------------|
| Area under the ROC curve (AUC) | 0.911 |
| Standard Error ^a | 0.0236 |
| 95% Confidence interval ^b | 0.855 to 0.950 |
| z statistic | 17.410 |
| Significance level P (Area=0.5) | <0.0001 |
| Youden index J | 0.7480 |
| Associated criterion | >48 |
| Sensitivity | 92.98(95% CI: 83.0 - 98.1) |
| Specificity | 81.82(95% CI: 72.8 - 88.9) |
| +LR | 5.11 |
| -LR | 0.086 |

^a DeLong et al., 1988, ^b Binomial exact.

Discussion

IBS patients have a wide range of behavioral responses, many of which result in severe limitations and impairment. The results of this investigation supported the psychometric properties of the Persian version of IBS-BRQ across an Iranian population sample. The behaviors and reactions of IBS patients to their symptoms may be due to the perception of the

disease, as well as dysfunctional attitudes toward the disease and its symptoms. Such reactions lead to more avoidance, increase the psychological problems of these patients, and reduce their quality of life.

The degree to which a scale is devoid of random error is determined by its reliability. Cronbach's alpha was used to calculate the total reliability of the Persian version of IBS-BRQ, which was 0.95, with subscale reliability of 0.87 and 0.95. Cronbach's alpha was

calculated as 0.86 in the initial edition of IBS-BRQ (23). Internal consistency was determined to be excellent, indicating that the scale's components are all assessing the same underlying characteristic. Thus, questionnaire users can trust the instrument in terms of decision-making and interpretation of results.

Validity refers to whether or not a test measures what it claims to measure. Face validity along with criterion, concurrent convergent, and divergent validity were used to assess the Persian version of IBS-BRQ validity. Face validity reveals unambiguous signals and descriptions of bowel-related behavior approved by an expert panel including a gastroenterologist, clinical psychologist and fellowship in psychosomatic medicine. The criterion validity of the scale was explored by comparing it to other comparable scales. The participants completed DAS-26, IBS-QOL, IBS-SSS, IPQ-R, IBS-SAT, Hope Scale, and IFI in order to investigate convergent and divergent validity. The convergent validity between the IBS-BRQ scores and DAS-26, IBS-QOL, IBS-SSS, and IPQ-R scores had a significant P-value ($r=0.53$, $r=0.76$, $r=0.44$ and $r=0.56$, respectively). Also, a significant correlation was observed with divergent tools (Hope Scale, IFI and IBS-SAT) ($r=-0.49$, $r=-0.031$, and -0.23 , respectively). Catastrophic thinking, hypervigilance, and avoidant behavioral reactions have the potential to generate vicious cycles, perpetuating and exacerbating pain-related symptoms and impairment, as well as lowering the quality of life (35). The impact on quality of life may be due to stereotyped maladaptive behavioral patterns which are frequent in IBS (36). These tendencies are frequently linked to aberrant disease behaviors including somatization and excessive consultation (37).

In addition to the total factor of Persian version of IBS-BRQ, exploratory factor analysis revealed the presence of five factors with a 73% common variance. In terms of the number of factors gathered, it can be explained by cultural factors and the attitude of Iranian patients toward IBS symptoms.

With a cutoff point of 48, the Persian version of IBS-BRQ had sensitivity and specificity values of 92.9 and 81.8. Therefore, those who scored higher than 48 on the scale are known as patients who need medical and psychological interventions. Cognitive-behavioral treatments may be enhanced, by raising awareness of unhelpful behavioral reactions in these individuals. Pretreatment IBS-BRQ (avoidance) scores moderated the effect of exposure therapy during the specific phase in which exposure was

implemented in internet-delivered cognitive-behavioral treatment which included exposure (ICBT), with higher avoidance scores linked to stronger positive effects of exposure, according to a study evaluating the moderating ability of behavioral avoidance on exposure therapy for irritable bowel syndrome using IBS-BRQ at pretreatment (38). In another study examining the mediators in psychological treatment for adolescents with IBS, it was discovered that the impact of ICBT on GI symptoms was mediated by changes in avoidance behavior based on IBS-BRQ. A considerable part (67%) of the entire treatment effect was explained by a reduction in avoidance behavior based on IBS-BRQ (39). A unidirectional association between avoidance behavior and GI symptoms was also detected over time, supporting a causal effect. Taken together, the findings suggest that reduced avoidance may be a crucial mediator in adolescents with IBS. Thus, with the perceived cut-off point of 48 in this study, we could significantly monitor IBS patients during ICBT interventions. Further, in previous studies, fear and avoidance have also been suggested as an important mechanism in treating chronic pain both in adults as well as in children and adolescents (40, 41).

This inventory can be utilized as a valuable instrument for evaluating behavioral response in patients with IBS in treatment centers and can be applied in psychosomatic, psychiatric, and gastroenterology studies with IBS issues, based on the acquired results along with high sensitivity and specificity of this tool.

Conclusion

Overall, the Persian version of the IBS-BRQ offered a well-defined behavioral response measure in IBS patients with high validity and reliability, making it a suitable measure to be used in future IBS clinical research in Iran. The Persian version of IBS-BRQ can be used in both clinical and research settings; by identifying abnormal behavioral reactions in individuals, the intervention required for altering and correcting their attitudes and behaviors is better recognized, which aids in the therapy process.

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Conflict of interests

The authors declare that there is no conflict of interest

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