

Psychometric Properties of the Irritable Bowel Syndrome Quality of Life Scale in Turkey

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Abstract

Background: Irritable bowel disease is a chronic disease which characterized by abdominal pain and discomfort along with changes in bowel habits. As in other chronic diseases, there is also a need for a scale that can be used by the members of the medical team to determine the quality of life of the patient, help them to have a better quality of life, enable the patients to cope with the disease and provide symptom control. This study is planned as a determiner of validity and reliability in order to apply the Irritable Bowel Disease Quality of Life Scale.

Methods: 200 cases whose colonoscopy results were normal were brought into the scope of the study. A psycholinguistic and psychometric analysis of the scale was made. For language validity, the back-translation method has been used. The structural validity of scale is analyzed with the simultaneous/similar scales method.

Results: From the analysis of the content-scope validity of the scale it is deduced that the Turkish language form of the scale is an appropriate means of measurement, while the internal consistency reliability of Cronbach Alpha Coefficient, which is used to calculate the general reliability of the scale, is estimated as 0.97. Accordingly, it is determined that reliability is high. The Weighted Kappa values of scale vary between 0.81 and 0.94, this value is confirmed to be "very good" and statistically significant.

Conclusion: The Irritable Bowel Disease Quality of Life Scale has quite high indicators of validity and reliability, and it can be used in Turkish society.

Keywords: Irritable bowel syndrome; Quality of life; Validity; Reliability; Validation

Introduction

Irritable Bowel Syndrome (IBS) is characterized by relapses and remissions of the gastrointestinal system, and is a functional disorder with a chronic course whose features and mechanism of existence are gradually being clarified under genetic, microbiological and epidemiological studies. It predominantly progresses with abdominal pain or discomfort along with changes in bowel habits. However, there are a variety of opinions about the etiology of disease, and there have not been any structural or biochemical indicator or indicators that may help to diagnose this disease yet [1-5].

In our country, there is a need for a scale that can be used by members of a medical team to determine the life quality of patient, help them to have a better quality of life, enable the patients to cope with the disease and provide symptom control in IBS.

In recent years in nursing research in our country, scales have been used increasingly for the purpose of evaluating the individuals who get nursing services and the attitudes and behaviors of the family and society about health. Most of these scales have been developed in different cultures and they are adapted for our country [6]. This study

considers that the adaptation of the scale of Irritable Bowel Syndrome Quality of Life (IBS-QOL) developed by Patrick et al. [7] can help to determine the life quality of patients with IBS in our country and to plan what can be done. In this study, planned in the light of this opinion, the aim is to conduct a validity and reliability study of the IBS-QOL in terms of evaluating the quality of life of patients.

Materials and Methods

The research was planned as a methodological study and a determiner of validity and reliability of IBS-QOL in order to evaluate the life quality of IBS patients [7-9]. 200 cases whose colonoscopy results were normal and who had attended a department of gastroenterology at a university hospital were taken into the scope of study in a 4-month period. This means that patients had no pathological findings such as bowel tumors, large polyps, inflammation, bleeding, fissure, fistula, etc.

The diagnosis of IBS was made by the Rome III criteria and the assessment of a single gastroenterology specialist, which was accepted as "the gold standard". The validation of Rome III criteria for IBS was made by Uran et al. [10]. Written permissions were granted for the study from the Ege University Medical Faculty Hospital Ethics Committee and from all the cases.

The following were used as data collectors in the study:

- Data Collection Form for Introductory Information about Individuals
- IBS-QOL Scale developed by Drossman and Patrick
- Short Form-36 (SF-36), which is one of the most common methods to measure the QOL

The Data Collection Form for Introductory Information about Individuals is a form which consists of 13 questions and was developed by the researchers with a literature review in order to obtain information about demographic data such as age, gender and profession, along with data about the disease of the individuals in the scope of the research.

The IBS-QOL scale consists of 34 items and 8 subgroups, and before it was used, full analyses about its psycholinguistic and psychometric features were made. In the Likert scale there are 5 answer choices for each question. The individual cases were asked to select one of the following choices: "1: Never", "2: Some", "3: Medium", "4: Much", "5: Too much".

According to these choices, 5 points are given to first choice and 1 point is given to fifth choice, and the calculation of total points is made via the groups below [7]:

- Dysphoria points (8 items) (IBS_DY)
- Prevention of Activities points (7 items) (IBS_IN)
- Body Image point (4 items) (IBS_BI)
- Health Worries points (3 items) (IBS_HW)
- Food Avoidance points (3 items) (IBS_FA)
- Social Reaction points (4 items) (IBS_SR)
- Sexual points (2 items) (IBS_SX)
- Social Relationship points (3 items) (IBS_RL)
- Total points (34 items) (IBS_OV)

According to the scale, while items 1, 6, 7, 9, 10, 13, 16 and 30 constitute the Dysphoria subscale; items 3, 18, 19, 22, 27 and 29 constitute the Prevention of Activities subscale. Moreover, the Body Image subscale consists of items 5, 21, 25 and 26; the Health Worries subscale contains items 4, 15, and 32; the Food Avoidance subscale has items 11, 23 and 28; the Social Reaction subscale consists of items 2, 14, 17 and 34. While the items that constitute the Sexuality subscale are 12 and 20, the three items that constitute the subscale of Social Relationship are 8, 24 and 33.

After the points of each group are determined and the points of 34 items are determined in themselves; the minimum possible point is 34 and the maximum is calculated to be 170. An increase in points on the scale indicates an increase in life quality of those experiencing the disease.

SF-36 is one of the most used introduction scales to measure quality of life. The scale consists of 36 items and is evaluated within 8 subscales [11,12]:

- Physical Function (PF) (10 items)
- Social Function (SF) (2 items)
- Physical Role Difficulty (PRD) (4 items)
- State of Mind Role (SMR) (3 items)
- Mental Health (MH) (5 items)
- Energy/Vitality (4 items)
- Pain (2 items)

- General Perspective of Health (GH) (5 items)

The scale gives not only a points total but a group of total points for each of the subscales and these points vary from 0-100 points. 100 points indicates a good state of health and 0 points indicates a bad state of health [11,12].

The validity and reliability of SF-36 for Turkish language was tested by Koçyığıt et al. [12]. As a consequence of the study it is determined that SF-36 is valid and reliable for the Turkish language and that it can be used for chronic physical groups of patients.

Analyzing the psycholinguistic features/language adaptation

In order to minimize the differences of conceptualization and expression in language adaptation, the back translation method was used. For this method four independent translators studied the scale. Two of the translators translated the original items of scale from English to Turkish and the other two translators translated the already translated items from Turkish back to English. Translators did not consult each other and they worked independently. The researcher and three experts shared their opinions on the texts obtained from the translators, and they made the final corrections.

Analyzing the psychometric features (validity-reliability)

Validity methods for the IBS-QOL scale and the statistics [6,8,13]:

- For Content-Scope Validity: Expert Opinion
- For Criterion-Dependent Validity (predictive-prediction): Correlation test
- For Construct-Concept Validity:

Simultaneous/Similar scales method

Test of hypothesis and for the Analytics: Correlation Test

The reliability methods and the statistics for the IBS-QOL scale are as below [6,8,13-16]:

- For the Invariance (Test-Retest): Pearson Product-Moment Correlation Test
- Internal consistency:

For the Bisection Method: Cronbach Alpha Coefficient

For Item-total Correlation Coefficient statistics: Spearman Correlation Calculation

Expert Opinion: The scale items that were utilized after being translated were put to a group consisting of 10 people among whom there were doctors, nurses and academics. Experts evaluated each scale item point from "5: Most Suitable" to "1: Not Suitable". After the evaluation, in accordance with the opinions of experts, some corrections were made in the unsuitable items and the Turkish versions of these items were checked by a Turkish language expert.

After the expert opinion and the Kendall's W analysis that were made to test the accordance and cohesiveness of the Turkish form of items from the point of view of language and content, the Kendall's W score is calculated as 0.17 and $p < 0.05$. In the end, the language validity of the items of the IBS-QOL were confirmed and it was determined that it could be asked to the case study participants.

Test-Retest: In order to determine the permanence of this scale over time, test-retest activities were conducted. In the first phase of research, 200 cases were included. 119 of these cases practiced the test-

retest method. After the first phase, phone appointments were made with individuals for the test-retest — at the earliest for 15 days afterwards — and the test was carried out on their available days. For individuals who said that they were not able to attend, new phone appointments were made and test were carried out again.

Internal consistency: For the internal consistency of the scale, item total correlation and the Cronbach alpha coefficient were used. Item total correlation indicates whether the items in scale have an addable feature in scale or not. The Cronbach alpha reliability coefficient is an indicator of the internal consistency and homogeneity of scale items. The higher the Cronbach alpha reliability coefficient is, the more coherent are the items of scale and this indicates that it consists of items which are searching for the elements of same feature. In a Likert scale, for a reliability coefficient to be regarded as adequate it must be as near as possible to 1 [14].

In the literature it is indicated that as the expected limits to confirm the internal consistence of scales, the item-total correlation coefficient should be higher than 0.25 and the Cronbach alpha reliability coefficient should be higher than 0.50 [14].

With the Split-half test analysis method, used in order to determine the internal consistency, the split half (two parts) procedure consistency analysis was made. For both the parts, with 17 questions each, the Cronbach alpha coefficients have been calculated.

All the data was analyzed with SPSS 16.0 programme. The percent distribution, Kruskal-Wallis, variance, Mann-Whitnet U, item-total correlations, Cronbach alpha reliability coefficient, Pearson product moment and Spearman correlation tests were used. A p value of less than 0.05 was considered statistically significant.

Ethics committee approval was obtained. In addition, the necessary written permissions were obtained from the patients, the institution in which the research was conducted and the authors of the data collection forms used in the study. Patients who refused to take part in the study were not taken into scope of the study.

Results

When the weighted kappa values of the questions in the IBS-QOL scale were analyzed in the retest group which consisted of 119 individuals, the minimum weighed kappa value was seen to be 0.82 and the maximum value was seen to be 0.94. These values were determined to be “very good” for all the questions and they were found to be statistically quite significant (Table 1). While the Cronbach alpha internal consistency coefficient for the general reliability of the scale is estimated to be 0.97, and Cronbach alpha coefficients of the subscales are seen to vary between 0.76 and 0.93 (Table 2).

Scale Question	Weighted Kappa Value	Consistency	Scale Question	Weighted Kappa Value	Consistency
Q 1	0.9	Very good	Q 18	0.9	Very good
Q 2	0.92	Very good	Q 19	0.91	Very good
Q 3	0.89	Very good	Q 20	0.92	Very good
Q 4	0.89	Very good	Q 21	0.94	Very good
Q 5	0.91	Very good	Q 22	0.91	Very good
Q 6	0.92	Very good	Q 23	0.9	Very good
Q 7	0.94	Very good	Q 24	0.9	Very good
Q 8	0.88	Very good	Q 25	0.91	Very good
Q 9	0.87	Very good	Q 26	0.9	Very good
Q 10	0.89	Very good	Q 27	0.92	Very good
Q 11	0.85	Very good	Q 28	0.91	Very good
Q 12	0.89	Very good	Q 29	0.89	Very good
Q 13	0.82	Very good	Q 30	0.86	Very good
Q 14	0.86	Very good	Q 31	0.9	Very good
Q 15	0.87	Very good	Q 32	0.9	Very good
Q 16	0.88	Very good	Q 33	0.91	Very good
Q 17	0.81	Very good	Q 34	0.9	Very good

(*N=119 – The Group of Retest)

Table 1: The consistency of IBS-QOL questions after Test-Retest.

Subscales	Subscales item number	Cronbach alpha coefficient	N
Dysphoria (mood state) (IBS_DY)	8 items	0.93	200
Prevention of Activities (IBS_IN)	7 items	0.92	
Body Image (IBS_BI)	4 items	0.79	
Health Worries (IBS_HW)	3 items	0.84	
Food Avoidance (IBS_FA)	3 items	0.82	
Social Reaction (IBS_SR)	4 items	0.82	
Sexual (IBS_SX)	2 items	0.84	
Social Relationship (IBS_RL)	3 items	0.76	
Total (IBS_OV)	34 items	0.97	

Table 2: The Cronbach alpha coefficients of the general and subscales.

The analysis of reliability of the IBS-QOL scale is given in Table 3. When the scale is divided into two sections (two half test or split half), their Cronbach alpha value is estimated to be 0.95. This value's

proximity to 1 show that in the Likert scales the items is consistent with each other and they consisted of items which are researching the same feature. According to this, the IBS-QOL scale is determined to be reliable. Moreover, the two half tests reliability value is estimated as $r=0.95$ and this value is found to be statistically significant.

Scale Assessment	Alpha Value		N
Cronbach's Alpha	1st Part (First 17 questions)	0.95	200
	2nd Part (Last 17 questions)	0.95	
Split Half Value		0.95	
Total Correlation		0.91	

Table 3: IBS-QOL scale reliability.

In Table 4, the item-total correlation points of scale items and Cronbach Alpha reliability coefficients when an item is excluded from the scale are given. The item-total correlation points of IBS-QOL scale items are seen to vary between 0.44 and 0.87. Since these points are higher than 0.20, no item is excluded from the scale. Also, the item-total correlation points being higher than 0.25 shows that internal consistency of scale is confirmed.

IBS-QOL Scale Item	Scale Mean If Item Deleted	Scale Variance If Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha If Item Deleted
Dysphoria-Q 1	110.40	1121.99	0.80	0.97
Social Reaction-Q 2	110.41	1130.69	0.69	0.97
Activities-Q 3	110.37	1127.68	0.74	0.97
Health Worries-Q 4	110.09	1121.63	0.80	0.97
Body Image-Q 5	110.05	1139.08	0.57	0.97
Dysphoria-Q 6	109.69	1114.38	0.87	0.97
Dysphoria-Q 7	109.98	1122.80	0.73	0.97
Social Relationship-Q 8	109.74	1132.88	0.69	0.97
Dysphoria-Q 9	110.12	1119.10	0.80	0.97
Dysphoria-Q 10	108.93	1135.94	0.71	0.97
Food Avoidance-Q 11	109.93	1138.07	0.70	0.97
Sexual-Q 12	108.79	1157.74	0.52	0.97
Dysphoria-Q 13	109.91	1128.89	0.74	0.97
Social Reaction-Q 14	109.37	1129.65	0.74	0.97
Health Worries-Q 15	110.51	1129.53	0.75	0.97
Dysphoria-Q 16	110.41	1122.08	0.80	0.97
Social Reaction-Q 17	109.46	1138.61	0.68	0.97
Activities-Q 18	109.63	1130.79	0.74	0.97
Activities-Q 19	110.24	1128.30	0.69	0.97
Sexual-Q 20	108.79	1166.07	0.44	0.97

Body Image-Q 21	109.61	1139.66	0.61	0.97
Activities-Q 22	109.80	1122.10	0.81	0.97
Food Avoidance-Q 23	110.54	1134.39	0.68	0.97
Social Relationship-Q 24	109.34	1134.32	0.67	0.97
Body Image-Q 25	109.97	1124.01	0.75	0.97
Body Image-Q 26	109.35	1131.72	0.70	0.97
Activities-Q 27	109.87	1113.40	0.77	0.97
Food Avoidance-Q 28	109.62	1122.37	0.75	0.97
Activities-Q 29	109.91	1116.44	0.79	0.97
Dysphoria-Q 30	109.81	1114.70	0.80	0.97
Activities-Q 31	110.18	1119.40	0.72	0.97
Health Worries-Q 32	110.23	1120.81	0.70	0.97
Social Relationship-Q 33	109.34	1128.99	0.72	0.97
Social Reaction-Q 34	108.98	1149.79	0.61	0.97
N=200				

Table 4: IBS-QOL item total statistics.

In the literature it is indicated that for the expected limits to confirm the internal consistence of scales, the item-total correlation coefficient should be higher than 0.25 and the Cronbach alpha reliability coefficient should be higher than 0.50 [14]. In order to test the construct validity of the scale the simultaneous/similar scales method was used. The relationship between SF-36 QOL Scale and IBS-QOL Scale was analyzed. In Table 5, the Spearman correlation between IBS-

QOL subscales and the SF-36 subscales are shown. For the sub dimensions of scale, values at a significant level varying between 0.16 and 0.64 were acquired. There is a positive relationship between the IBS-QOL activity subscale and SF-36 physical function, social function, pain, emotional and physical role limitations, mental health and the general perception of health subscales, and the all the values in subscales were estimated to be statistically significant ($p=0.00$).

N=200 (Test + Retest)	Physical Function		Social Function		Pain		Energy/Vitality		State of mind role		Physical role difficulty		Mental health		General perspective of health	
	Rho	p	Rho	p	Rho	p	Rho	p	Rho	p	Rho	p	Rho	p	Rho	p
Dysphoria	0.29**	0.00	0.54**	0.00	0.50**	0.00	0.54**	0.00	0.41**	0.00	0.42**	0.00	0.51**	0.00	0.47**	0.00
Activities	0.40**	0.00	0.64**	0.00	0.52**	0.00	0.56**	0.00	0.50**	0.00	0.56**	0.00	0.52**	0.00	0.54**	0.00
Body Image	0.34**	0.00	0.45**	0.00	0.50**	0.00	0.42**	0.00	0.32**	0.00	0.35**	0.00	0.35**	0.00	0.40**	0.00
Health Worries	0.31**	0.00	0.50**	0.00	0.48**	0.00	0.58**	0.00	0.45**	0.00	0.42**	0.00	0.49**	0.00	0.53**	0.00
Food Avoidance	0.27**	0.00	0.49**	0.00	0.48**	0.00	0.42**	0.00	0.42**	0.00	0.40**	0.00	0.38**	0.00	0.39**	0.00
Social Reaction	0.23**	0.00	0.48**	0.00	0.44**	0.00	0.43**	0.00	0.34**	0.00	0.33**	0.00	0.40**	0.00	0.40**	0.00
Sexual	0.17*	0.00	0.26**	0.00	0.36**	0.00	0.18*	0.00	0.19**	0.00	0.16*	0.02	0.25**	0.00	0.19**	0.00
Social Relationship	0.27**	0.00	0.48**	0.00	0.41**	0.00	0.41**	0.00	0.33**	0.00	0.34**	0.00	0.39**	0.00	0.33**	0.00
*p<0.05; **p<0.01																

Table 5: Spearman correlations between IBS-QOL subscales and SF-36 subscales.

There is also a positive relationship between the IBS-QOL health worries subscale and SF-36 vitality subscale and this value is also statistically significant ($p=0.00$). In these Spearman analyses, no important changes were seen and variables showed distribution close to normal.

Discussion

As a result of expert opinions, the Turkish form of the IBS-QOL Scale can say to be an appropriate measurement instrument ($W=0.17$, $p<0.05$).

Also, to determine the unchangeability of the scale according to time, the test-retest method was practiced. It is determined that weighted kappa values of the result of the scale vary between 0.82 and 0.94 and this is seen to be "very good".

In the analysis of reliability, the two half tests reliability (split half) value is estimated as $r=0.95$ and this value is found to be statistically significant.

Item-total correlation coefficient of the scale varies between 0.44 and 0.87.

In the literature it is indicated that for the expected limits to confirm the internal consistency of scales, item-total correlation coefficient should be higher than 0.25 and the Cronbach alpha reliability coefficient should be higher than 0.50 [14]. After this analysis the IBS-QOL Scale is seen as a reliable measurement instrument.

When the relationship between the points of the SF-36 QOL scale and the IBS-QOL scale, that were used to test the construct validity of the scale, are analyzed, values varying between 0.13 and 0.46 were acquired at a significant level. As a result, the IBS-QOL is determined to be a measurement instrument that has adequate reliability and validity indicators for Turkish society.

If we evaluate all these results, the IBS-QOL scale is determined to be an appropriate instrument to measure the life quality of patients with IBS.

In the study by Patrick et al. [7] in all subscales except for the social relationship subscale, the Cronbach alpha value varies between 0.74 and 0.93. The general value of scale is found to be 0.95.

The validation study by Park et al. [17] was carried out on 103 IBS patients. According to this study, it is determined that the Cronbach alpha value in the subscales varies between 0.69 and 0.97, and in the general scale the Cronbach alpha value is 0.97.

The study by Jafari et al. [18] on 91 IBS patients determined that, in the general scale the Cronbach alpha value is 0.91. The Cronbach alpha value in the subscales varies between 0.56 and 0.90.

In the validation study by Kanazawa et al. [19] in a university hospital in Japan, the internal consistency (Cronbach alpha) of the general scale is seen to be 0.96; in the subscales it is seen to vary between 0.48 and 0.94.

In the study by Haghayegh et al. [9] in Iran, the Cronbach alpha value in the food avoidance subscale is the minimum (0.52), in the dysphoria subscale it is the estimated maximum (0.88). In the subscales of social relationship, health worries and prevention of activities, the Cronbach alpha value is seen to be below 0.70.

However, these values are quite similar in our study. The Cronbach alpha value of social relationship is estimated as 0.76. It is also

estimated that the Cronbach alpha value of the subscales varies between 0.76 and 0.93, in the general scale the Cronbach alpha internal consistency coefficient is 0.97, and the scale has strong reliability.

Validity coefficient is a relationship coefficient between the values that are acquired from scale and the scales along with team of criteria that are determined according to the intended purpose of scale; it takes values between -1.00 and +1.00. The higher the correlation coefficient is, the more the scale is appropriate for purpose. In other words the correlation coefficient is approximate +1.00, it means the more efficacious the scale is. Being higher than 0.50 of Cronbach alpha coefficient shows the strength of the reliability of scale. According to these results, it can be said that reliability of the scale is at a very high level [14].

Cronbach alpha values of IBS-QOL subscales vary between 0.76 and 0.93. The general Cronbach alpha internal consistency coefficient for the reliability of scale is calculated as 0.97.

As a result of the single analysis of items of scale it is estimated that item total correlation values are above 0.20, that the items are in a full correlation with the entire scale and no items are excluded from the scale.

A statistically medium-level positive correlation is seen between the IBS-QOL activity subscale and SF-36 physical function, social function, pain, emotional and physical role difficulty, mental health and the general perspective of health ($p=0.00$). Because when there is an increase in individuals' points in the subscales there is also an increase in their points in the SF-36 subscales (except in the subscale of vitality), we can say that there is a direct proportion between these variables.

An individual who gets high points from the activity subscale shows a more healthy and active life, physically and socially. Moreover, the points obtained from the pain subscale will increase because of the increase in pain threshold. With the point increase in the activity subscale, individuals will experience fewer problems in role difficulty and their points from these subscales will be higher. All these changes will increase the quality of life of individuals.

There is a statistically positive correlation between the IBS-QOL health worries subscale and the SF-36 vitality subscale ($p=0.00$). Individuals' points in the IBS-QOL health worries subscale and SF-36 vitality subscale will show an increase in direct proportion.

In the conducted Spearman analysis, the existence of a relationship is spoken of because there is no value whose correlation coefficient is zero ($Rho=0$). As a result, it is seen that there is no important change and the variables show a near-normal distribution.

In the study of Patrick et al. [7] it is determined that there is a poor relationship between the IBS-QOL scale and the SF-36 physical function, emotional role difficulty, mental health and general health subscales, and a strong relationship between other SF-36 subscales (social function, physically role difficulty, vitality and pain).

In the study of Park et al. [17] it is determined that there is a positive correlation between the IBS-QOL scale and SF-36 scale ($p<0.05$), especially the correlation coefficients of social function, pain and general health ($r>0.4$) are high.

In the study of Kanawaza et al. [19] it is seen that there is a negative and poor correlation between the IBS Symptom Score (IBS Severity Index) and life quality scale ($r=-0.36$, $p=0.01$).

In this study a correlation value under 0.40 is seen as “poor”, while above this value is seen as “strong”.

Quality of Life studies, which are one of the essential criteria for the profession of nursing in order to diagnose the patients’ physical and psychosocial needs with regard to a specific disease, and to determine weak periods in the health-disease process, are used for monitoring the results of arrangements related to nursing services and to evaluate the quality of care.

The IBS-QOL Scale is determined to have high validity and reliability after the results of expert opinions and the arrangements that have been made.

After the results of internal consistency and factor analysis, it is decided that the scale can be used for determining the QOL of patients with an IBS diagnosis in Turkish society.

To ease clinical decision-making, to help patients towards correct decisions, to measure the life quality of IBS patients and, because of this, to plan and arrange the necessary treatment and care, the IBS-QOL scale is recommended for use by members of the profession and as a means of assisting the profession of nursing through the support of various scientific publications. The IBS-QOL Scale allows providers to choose programmes of care which can improve the functional abilities, well-being and general health perspectives of the patients.

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