



An Investigation of the Psychometric Properties of Illness Perception Questionnaire for Schizophrenia (IPQS) in Iran

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ABSTRACT

The present study has been carried out in order to evaluate psychometric characteristics of Illness Perception Questionnaire for Schizophrenia. This is a descriptive correlational research. The study population consisted of all patients with schizophrenia aging 19 to 70 years old who were hospitalized in the Psychiatric Ward of Shafa Hospital, Rasht (2016). Out of this population, a sample size of 95 people was obtained using purposive sampling, Demographic Questionnaire, Illness Perception Questionnaire for Schizophrenia (IPQS), Positive and Negative symptoms Scale (PNSS), Scale to Assess Unawareness in Mental Disorder (SUMD), Beck Depression Inventory (BDI), and Calgary Depression Scale for Schizophrenia (CDSS). Exploratory factor analysis revealed that this questionnaire is composed of 10 dimensions, the first of which explaining 24.402 percent of all of variance. Besides, concurrent validity showed that the total IPQS score had a significant correlation with SUMD equal to 0.579 at the level of 1 percent; this correlation was 0.29 at the level of 5 percent and 0.615 at the level of 1 percent in relation to BDI and CDSS, respectively. However, no correlation was observed between IPQS score and PANSS. Cronbach's alpha coefficients of reliability for IPQS scale were 0.705, and, for the subscales, between 0.599 and 0.865. This result suggests a good reliability for the Illness Perception Questionnaire for Schizophrenia. The Illness Perception Questionnaire for Schizophrenia has helpful psychometric properties that make it an appropriate analysis tool.

Key Words: Psychometric Properties, Illness Perception Questionnaire, Schizophrenia

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Introduction

Schizophrenia is a chronic syndrome (Perälä J *et al.*, 2007) which has been given an extensive body of research in the context of psychological disorders. This disorder includes a wide range of symptoms, signs, and prognoses (Saki K & Bagheri M, 2004).

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) has

reported the prevalence of schizophrenia about 0.7 to 0.3 percent depending on differences in race, ethnicity, and geographical area (Association AP, 2013). About 30 percent of people with schizophrenia respond to at least one antipsychotic drug (Harvey PD & Rosenthal JB, 2016) and 24 percent of psychotic people do not participate in the treatment program (Nose M *et al.*, 2003).

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One of the main reasons for non-compliance with treatment is lack of insight into the disease (Myles JB *et al.*, 2016). Insight means having awareness of three factors of mental disorders, social implications, and the need for treatment (Verma D, 2016). In fact, lacking sufficient insight with respect to schizophrenia may be influenced by one's individual perception about the condition (Esfand Abadi SH, 2006) Illness perception, i.e. the organized cognitive representation of the beliefs that a patient holds about the disease, has a significant impact on one's behavior and is linked with a number of important outcomes such as adherence to treatment and performance improvement (Petrie KJ *et al.*, 2007).

This conception takes its roots from Weiner's Attribution Theory which postulates that human behavior is a combination of external forces (chance and environment) and internal forces (ability and knowledge) (Esfand Abadi SH, 2006) Indeed, what matters most is that which a person processes in his/her mind while observing a phenomenon and attributing internal or external causes to it (Karimi Y, 2006).

Thus, given that patients think differently about specific diagnoses, it is urgent to use distinct evaluation methods (Lobban F *et al.*, 2003).

Illness Perception Questionnaire for Schizophrenia (IPQS) is one of the instruments devised for assessing people's common beliefs about their health problems. This questionnaire has originally been developed to gauge beliefs based on the self-regulatory model of Leventhal *et al.* that proposed two types of illness representations: the first had a cognitive nature and included four core beliefs about the perceived (physical and social) identity of a disease and its causes. Lau and Hartman added a fifth item to the model which dealt with one's capacity to control or treat the disease. These five dimensions were appraised by IPQS. The second factor addressed in this model has to do with representation of a disease, which is an emotional factor and deals with emotional responses to health problems; furthermore, it is not evaluated using cognitive criteria (Lobban F *et al.*, 2005; Leventhal H *et al.*, 1984).

In 2010, IPQS was translated and tested in Germany in accordance with the culture of its people. The results showed that this questionnaire is an essentially valid and reliable scale for evaluating the perceptions of the German people suffering from schizophrenia (Cavelti M *et al.*, 2012) Similarly, the study by Lobban *et al.* (Lobban F *et al.*, 2003), performed on 124 patients

diagnosed with schizophrenia, revealed that this scale had a good internal validity. They observed that this scale has correlations with severity of symptoms, emotional state, and beliefs about adherence to medication. In addition, after 6 months of follow-up, they reported a 82 percent retention of the study results.

Examining a sample of 38 psychotic patients, Clifford (Clifford C, 1998) reported acceptable levels of internal validity (ranging from 0.60 to 0.92) for the subscales of illness perception. Moreover, it was found that non-adherence to medication due to lack of insight and severe symptoms, shorter duration of illness, evidence suggesting an external cause, and severe negative consequences are associated with schizophrenia.

In the same vein, Talley (Talley SL, 1998) employed Illness Perception Questionnaire for Schizophrenia and realized that the subscales had a high internal consistency.

Shah *et al.* (Shah P *et al.*, 2009) reported that there is a correlation between IPQS and the University of Rhode Island Change Assessment Scale, so that IPQS can predict 46 percent of the changes recognized by the latter scale.

Some studies have examined the subtests of Illness Perception Questionnaire for Schizophrenia. For example, Stafford *et al.* (Stafford L *et al.*, 2008), in a prospective study on patients who had recently been hospitalized due to heart disease, found that having high scores in terms of consequences helps predict future adherence to treatment recommendations about changes to be made in one's lifestyle. In another study by Cooper *et al.* (Cooper A *et al.*, 1999), it was indicated that participation in cardiac rehabilitation programs has a significant positive correlation with both aspects of control (i.e. treatment and personal control).

Lobban *et al.* (Lobban F *et al.*, 2004) employed IPQS on a number of schizophrenic patients and achieved good results with regard to the validity and credibility of their analysis.

Considering the importance of, first, understanding the perception and insight of schizophrenic patients into selecting appropriate treatment strategies and, second, facilitating treatment by paying attention to patients' thinking and getting them involved in the process, and, finally, the need for having similar advanced equipment in Iran, the researchers of this study decided to investigate psychometric properties of Illness Perception Questionnaire for

Schizophrenia among patients referring to Shafa Hospital, Rasht (2016).

Materials and Methods

This is a descriptive and correlational research, and since the aim has been test standardization and the statistical method used is factor analysis, a minimum sample size of 100 was considered to be sufficient. (Hair JF *et al.*, 2010) Furthermore, judgment or purposive sampling has been employed. To this end, participants were non-randomly selected in order to achieve a particular goal. The study population consisted of all patients with schizophrenia (aging between 19 and 70 years) who had been hospitalized in the Psychiatry Center of Shafa Hospital, Rasht. Patients were diagnosed on the basis of DSM-5 and, subsequently, entered the study. It is noteworthy that patients were enrolled after the acute symptoms subsided prior to discharge. Of 100 patients, 95 individuals were able to answer the questionnaire fully, and the rest were eliminated from the study due to their incomplete answers.

This research was approved by the Ethics Committee of Gilan University of Medical Sciences. The questionnaire was completed anonymously by patients with interview. Consent was obtained from patients and their families and assured them about confidentiality and right to withdraw from research.

In order to measure the validity of this questionnaire, we used exploratory factor analysis and concurrent validity, and to assess the reliability we exploited internal consistency reliability. All data were analyzed using SPSS 22. The English version of the test was rendered into Persian using reverse translation; subsequently, it was presented to three psychiatrists in order to be checked in terms of content validity.

1. Illness Perception Questionnaire for Schizophrenia (IPQS)

This questionnaire, developed by Lobban *et al.* (2005), includes 131 items and 10 subscales that are scored, based on the 5-point Likert scale, from 1 denoting 'strongly disagree' to 5 representing 'strongly agree.' The subscales are as follows:

Identity (8 items), Cause (26 items), Acute/Chronic Timeline (6 items), Cyclical Timeline (4 items), Consequences (11 items), Personal control (4 items), Personal blame (3 items), Treatment control (5 items), Illness coherence (5 items), Emotional representation (9 items).

All subscales, except for personal control and personal blame, demonstrated an acceptable level of internal consistency (0.70); besides, they had a high level of stability over time. (Cavelti M *et al.*, 2012).

2. Scale for Assessment of Negative and Positive Symptoms (PANSS)

This is a semi-structured questionnaire that measures positive and negative symptoms of schizophrenia. The thirty questions of this questionnaire are assessed based on a 7-point Likert scale (1 = no 7 = severe). In this questionnaire, high scores are indicative of an intense disorder. The total score is obtained by summing up individual items of the three subscales of positive symptoms (7 items), negative symptoms (7 items), and general disorder (16 items). The reliability and Cronbach's alpha of this scale were 0.73, 0.83, and 0.79 for the subscales of positive symptoms, negative symptoms, and general disorder, respectively (Cavelti M *et al.*, 2012).

3. The Scale to Assess Unawareness in Mental Disorder (SUMD)

The Scale to Assess Unawareness in Mental Disorder (SUMD) is a semi-structured interview that evaluates one's general insight about a disease and specific insights into its symptoms by taking into account the past and present of an individual (Cavelti M *et al.*, 2012) This scale has 9 questions that gauge three different dimensions of insight (awareness of mental disorder, awareness of the consequences of mental disorder, and awareness of the effects of drugs) (Mokhtarzadeh A *et al.*, 2010) Each question is given a distinct score ranging from zero to 3, with zero denoting the irrelevance of the item in question on the part of the patient. It needs to be pointed out that patients with better insight are given lower scores in this scale (Mokhtarzadeh A *et al.*, 2010) Nadi Sakhvidi *et al* (Mokhtarzadeh A *et al.*, 2010) found that the inter-rater reliability of this questionnaire ranges from 0.73 to 0.93.

4. Beck Depression Inventory—II (BDI-II)

The Depression Inventory proposed by Beck *et al.* (1996) is a self-report questionnaire that encompasses 21 items which help diagnose the symptoms and intensity of depression. The scores range from zero to 3. The total score could vary from zero to 63, with higher scores reflecting greater levels of depression Validity and reliability of the questionnaire have been supported by



researchers such as Van der Does (2002) and Osman *et al.* (2008) (Roelofs *et al.*, 2013).

5. The Calgary Depression Scale for Schizophrenia (CDSS)

This scale, developed by Addington *et al.* (1993), is a structured interview scale which is formed by 9 items, each one having 4 rates (0 = no, 3 = severe). This scale was designed primarily to measure depression in schizophrenia (Addington *et al.*, 1992). The total score results from the sum of all items, and a higher score indicates the severity of depression. The construct validity of the questionnaire was confirmed by comparing it with other depression scales. Hani *et al.* (Hani *et al.*, 2016) reported a good internal consistency as well as a Cronbach's alpha of 0.82 for this scale. Furthermore, they observed an internal reliability of 0.90 and test re-test reliability of 0.85 for SDSS.

Results

Table 1 shows the demographic characteristics of the study sample. The sample included 95 patients with schizophrenia aged 19 to 70 years old (mean age = 35.92, SD = 11.38). Of the total patients enrolled in this study, 18 patients (18.9 %) were female and 77 individuals (81.1 %) were male. During the study, the disease was under control using psychiatric drugs.

Descriptive survey showed that the average range of the questions of IPQS was between 3.263 and 5.234; moreover, standard deviation was observed between 0.154 and 0.665.

Validity

We obtained construct validity of IPQS using exploratory factor analysis (EFA) method. Principal components analysis (PCA) using Varimax (orthogonal rotation method). In order to evaluate the validity of data for performing EFA, the result of Bartlett's test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. The KMO index range from 0 to 1, with .6 suggests the minimum value for a good factor analysis. Bartlett's test should be significant ($p < .001$) for the factor analysis to be considered appropriate. In the present study, KMO was 0.893 ($p = 0.01$), which demonstrates the fitting of the chosen sample (Tabachnick BG & Fidell LS, 2007; Hair JF *et al.*, 2010) Bartlett's method is another way of determining the appropriateness of data. This test examines the hypothesis that the observed correlation matrix belongs to a population of independent variables. To obtain a useful and significant factor model, it is necessary

that the variables be correlated. In this study, Bartlett's test ($p < 0.001$) shows that there are significant relationships between the variables.

Table 1. Demographic Characteristics the Study Sample

Variables		Frequency	Percentage
Gender	Female	18	18.9
	Male	77	81.1
Age	19-25	17	17.89
	26-35	38	40
	36-45	22	23.15
	46-55	11	11.57
	56-65	4	4.21
	More than 65	3	3.15
Marital Status	Single	61	64.2
	Married	20	21.1
	Divorced	14	14.7
	Illiterate	16	16.84
Education	Secondary School	28	29.47
	High School	12	12.63
	High School Diploma	25	26.31
	Associate Degree	5	5.26
	Bachelor Degree	9	9.47

Table 2 illustrates the correlation matrix in each items. The initial extraction coefficient refers to the estimates of variance for each items that are considered with all the components or factors. EFA was conducted using principal component analysis (PCA). Table 3 presents the component matrix of each item in the IPQS. Eigenvalues and rotation of Varimax were explained by each factor. Items were retained when the loading was greater than 30. The rotation method of Varimax with Kaiser Normalization was selected because the purpose of this study is to reduce a large number of variables to a smaller set of uncorrelated variables. Smaller values indicate that there exist variables which do not comply with factor analysis and they should be removed from the analysis.

In principal component analysis, only factors whose eigenvalues were greater than 1 were considered significant.

Consequently, all factors that had eigenvalues less than 1 were excluded from the analysis. Many researchers, including Kaiser, have proposed eigenvalue 1 as the basis for determining the number of factors. However, when common factor analysis is to be employed (Hair JF *et al.*, 2010 ; Tabachnick BG & Fidell LS, 2007).



Table 2. Component matrix of Illness Perception Questionnaire for Schizophrenia (IPQS)

Row	Questions	Factor 1
1	Anxiety or fear (e.g. avoiding scary situations)	.623
2	Sadness or depression	.541
3	Physical complaints	.629
4	Social problems or relationship difficulties	.410
5	Anger and aggression	.675
6	Cognitive complaints (e.g. lack of concentration, forgetfulness, anxiety)	.589
7	Behavioral problems (e.g. lacking control over repetitive behaviors)	.676
8	Sleep problems	.458
9	I regard my complaints or problems as.....	.567
10	A reaction to the environment or events	.595
11	One of the symptoms of my disorder	.506
12	Expressive of my character	.610
13	Stress and anxiety	.676
14	It is hereditary in my family	.607
15	Microbes or viruses	.749
16	Diet or eating habits	.681
17	Luck or misfortune	.554
18	Poor medical care in my past	.544
19	Pollution in the environment	.660
20	My own behaviors	.207
21	My family behavior	.684
22	Financial worries	.509
23	Family problems	.587
24	Overwork	.546
25	Alcohol	.612
26	Taking illegal drugs	.573
27	My personality	.693
28	Brain injury or abnormality	.748
29	No friends or people to take care of me	.842
30	Chemical imbalance in the brain	.808
31	Death of a loved one	.789
32	Insomnia	.644
33	Thinking excessively about things	.609
34	My upbringing	.641
35	Being abused at school	.544
36	My mental attitude (e.g. thinking negatively about life)	.774
37	Trauma (A disturbing or shocking event that has happened in my life)	.509
38	Somebody has polluted my drink with illegal drugs	.557
39	My mental problems will be temporary	.650
40	Perhaps, my mental problems are permanent	.587
41	My mental problems will last for a long time	.582
42	My mental problems will be solved in no time	.720
43	I feel I have to struggle with my mental health problems for the rest of my life	.669
44	My mental problems will be resolved soon	.702
45	The symptoms of my disease are changing a lot everyday	.434
46	My symptoms appear and disappear periodically	.680
47	My problems are highly unpredictable	.728
48	My problems worsen and improve during my illness	.681
49	My mental health problem is quite serious	.565
50	My mental problems do not greatly affect my life	.485
51	My mental problems cause financial difficulties	.660
52	Mental problems will make everything increasingly difficult for me	.750
53	My mental problems cause difficulties for those close to me	.750
54	I do not have a good time with my family when they have mental health problems	.800
55	Mental problems have disturbed my social life	.843
56	My mental problems imply that my esteem has been damaged in front of other people	.653
57	Mental problems have caused difficulties in my work	.579
58	I have lost my key relations as a result of my psychological problems	.723
59	Mental problems have had some positive effects in my life	.458
60	There are some ways whereby I can control my symptoms	.716
61	I can roughly determine whether my psychological problems have improved or worsened	.727
62	My absence from work will affect my mental health problems	.420
63	My own actions will have no effect on the consequences of my mental health problems	.567
64	If I try harder, I will be able to control the symptoms	.714
65	I can do more to help improve myself	.761
66	It would be better if I were a more strong person	.781



67	There are few treatments to cure my mental health problems	.572
68	Treatment will be effective in managing my mental health problems	.736
69	Treatment can help me prevent the negative effects of mental health problems	.803
70	Treatment can help control my mental health problems	.773
71	There is no treatment that would be of any use in my present condition	.529
72	I am puzzled about my mental health problems	.673
73	I have no understanding with regard to my mental health problems	.690
74	I feel I do not know anything about my mental health problems	.787
75	My mental health problems have not triggered any especial feeling in me	.731
76	I have a clear vision and sense of my mental health problems	.579
77	I get depressed when I think about my mental health problems	.712
78	I feel sad when I think about my mental health problems	.791
79	My mental health problems make me angry	.629
80	My mental health problems do not make me worried	.310
81	My mental health problems make me anxious	.773
82	My mental health problems frighten me.	.678
83	My mental health problems make me lose my self-esteem	.716
84	I strongly feel frustrated due to mental health problems	.641
85	I feel lost due to mental health problems	.538
86	Difficulty in establishing close relationships	.449
87	Unfortunate incidents have occurred in the past	.708
88	Problems experienced in upbringing	.825
89	Unresolved emotions from the past	.694
90	Difficulties in family relationships	.687
91	Chemical imbalance in my brain	.751
92	Physical structure of my body	.348
93	Since I stopped medication	.473
94	Allergy to certain materials	.732
95	Specific genes were inherited within the family	.573
96	Chemical imbalance in my body	.764
97	Non-constructive attitude of others toward me	.640
98	Lack of support from society	.683
99	Non-constructive attitude of others toward my age	.684
100	Stress caused by a recent unfortunate event	.402
101	Conflict with former life-partner after separation	.825
102	An experience of serious marital conflict	.825
103	Loss problems associated with death or separation	.358
104	Patient's physical problems intensify the need to deal with emotional concerns	.508
105	Difficulty in getting adapted to changes in family life (e.g. children leaving home)	.690
106	The threat of an unpleasant event (e.g. getting fired or evicted out of home)	.428

The criterion of eigenvalue 1 should be adjusted to some extent. It is noteworthy that in this study, eigenvalue has been 0.78. Based on the extracted components, Illness Perception Questionnaire for Schizophrenia is featured by one factor which explains 66.83 percent of the total variance. To interpret the factors, we had to determine which factor loadings were to be considered significant. To this end, we did as follows. As the amount of a factor loading rises, its significance level for interpreting factor matrix increases. Using this measure is appropriate only when the sample size is above 50. Whereas factor loadings greater than ± 0.3 are considered significant, those greater than ± 0.4 have a high significance level, and those above ± 0.5 are considered very significant. After varimax rotation, it was determined which questions belong to each of the first to tenth factors, and if a question had a correlation lower than 0.3, it would be excluded from the questionnaire. According to the results, no question was excluded (Table 3).

Table 3 displays the extracted components. According to this table, IPQS has 10 components, the first one explaining 24.402 percent of the total variance. The remaining 9 factors can respectively explain 6.702, 5.921, 5.029, 4.236, 3.022, 2.942, 2.362, 1.801, and 1.606 percent of the total variance. The total variance is estimated at 58.221. It is notable that any eigenvalue below 1 is ignored in factor analysis.

Criterion-related validity

Concurrent validity of this questionnaire was measured through employing simultaneously Illness Perception Questionnaire for Schizophrenia (IPQS), Positive and Negative Syndrome Scale (PANSS), Scale to Assess Unawareness in Mental Disorder (SUMD), Beck Depression Inventory (BDI), and Calgary Depression Scale for Schizophrenia (CDSS) respectively, were investigated using Pearson product correlation coefficient.



Table 3. Total variance of each question in the Illness Perception Questionnaire for Schizophrenia

Components	Eigenvalue			Rotation sum of squared loading		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	26.926	25.402	25.402	24.926	24.402	24.402
2	7.104	6.702	32.104	7.104	6.702	31.104
3	6.276	5.921	38.025	6.276	5.921	37.025
4	5.331	5.029	43.054	5.331	5.029	42.054
5	4.490	4.236	47.290	4.490	4.236	46.29
6	4.263	4.022	51.311	3.263	3.022	49.51
7	3.543	3.342	54.654	2.543	2.942	51.852
8	3.140	2.962	57.616	2.140	2.362	54.814
9	2.969	2.801	60.417	1.969	1.801	56.615
10	2.762	2.606	63.023	1.762	1.606	58.221

Table 5. Cronbach's alpha's Coefficients of Illness Perception Questionnaire for Schizophrenia

Subscale	Cronbach's alpha
Identity	0.677
Cause	0.865
Acute/Chronic Timeline	0.717
Cyclical Timeline	0.599
Consequence	0.831
Personal Control	0.720
Personal Blame	0.734
Treatment Control	0.679
Illness Coherence	0.717
Emotional Representation	0.802
Total	0.705

Table 4. Correlation Matrix between IPQS and PANSS, SUMD, BDI-II, and CDSS

Questionnaire Dimensions	IPQS	PANSS	SUMD	BDI-II	CDSS
IPQS	1	-.155	.579**	-.290**	-.615**
PANSS	-	1	.028	.317**	.239*
SUMD	-	-	1	-.147	-.268**
BDI-II	-	-	-	1	.608**
CDSS	-	-	-	-	1

** Correlation at the level of 0.01 and * 0.05 (2-tailed) was significant.

The correlation results indicated that there is a significant relationship (0.579 at the level of 1 percent) between the total score of IPQS and SUMD. Also, it was seen that IPQS has a significant relationship (0.615 at the level of 1 percent) with CDSS. However, no similar correlation was observed between IPQS and PANSS.

Internal Consistency

Table 5 presents Cronbach's alpha's coefficients. Cronbach's alpha coefficient was obtained 0.705 for the whole questionnaire, indicating a good reliability for the Illness Perception Questionnaire for Schizophrenia. In addition, the subscales showed an internal consistency between 0.599 and 0.865, which represents a high reliability of the test (Table 5).

Table 6 illustrates the correlation of the components of IPQS with SUMD, BID, CDSS, and PANSS tests. As can be seen, whereas the component of identity demonstrated a positive

correlation with SUMD and a negative correlation with CDSS and BDI ($p = 0.01$), it had no significant relationship with PANSS test.

Moreover, the component of IPQS structure had a positive correlation with SUMD and a negative correlation with CDSS ($p = 0.01$). This component also had a negative correlation with BDI ($p = 0.05$), but it did not reveal any significant relationship with PANSS.

Eventually, the component of chronic/acute timeline showed a positive correlation with SUMD test ($p = 0.01$).

Discussion

In recent years, research on the role of illness perception has surged. This issue reaffirms the need in psychiatry for having a valid and reliable instrument to assess patients' perception of their disease and its impact on their behavior. Illness Perception Questionnaire for Schizophrenia (IPQS) is a valid and reliable tool for representing



mental health problems in people with a diagnosis of schizophrenia (Lobban F *et al.*, 2005). The results showed that the Persian translated version of this questionnaire possesses a number of good psychometric properties, in terms of reliability and validity, for patients with schizophrenia.

Table 6. Correlation Matrix between components of IPQS and BDI, CDSS, PANSS and SUMD

Components	BDI	CDSS	PANSS	SUMD
1- Identity	-	-.540**	-.172	.543**
2-Cause	.338**	-.394**	-.143	.493**
3-Acute/Chronic Timeline	-.224*	-.154	-.146	.426**
4-Cyclical Timeline	-.023	-.445**	-.220*	.206*
5-Consequence	-	-.515**	-.055	.515**
6- Personal control	.295**	-.382**	-.058	.343**
7-Personal blame	-.199	-.151	.000	.372**
8-Treatment Control	-.098	-.293**	.020	.524**
9-Illness coherence	-.140	-.362**	-.198	.230*
10-Emotional expression	-.199	-.543**	-.155	.348**

.** Correlation is significant at the level of 0.01 (2-tailed).

* Correlation is significant at the level of 0.05 (2-tailed).

Most patients with schizophrenia who were tested had started to have their mental health problems in a chronic and periodic way. They stated that these problems had entailed numerous negative consequences in their lives. Many patients believe they have some control over their disease and that treatment can help them. They blame themselves for their problems and experience negative feelings due to their mental health problems and mental experience. They perceive their mental problems incoherently (Lobban F *et al.*, 2005). Considering patients' ideas and beliefs about their mental health problems, one could argue that stress and anxiety are the most accepted causal factor on this matter (Cavelti M *et al.*, 2012).

Cavelti *et al.* (Cavelti M *et al.*, 2012). have reported the internal consistency of this questionnaire to be 0.70 for the subscales of chronic/acute timeline, consequences, treatment control, and emotional expression; moreover, they observed this value to be 0.67, 0.52, 0.51, and 0.48 for the subscales of cyclical timeline, personal control, personal blame, and illness coherence, respectively. The correlation between items within the subscales was between 0.24 and 0.40, and correlation between the subscales ranged between 0.22 and 0.67. These researchers

maintained that the subscales demonstrated a strong positive correlation (ranging from 0.49 to 0.72) in the test re-test. Besides, a significant relationship (between 0.18 and 0.63) was seen between the subscales of IPQS and other reliable tools.

Lobban *et al* (Lobban F *et al.*, 2005) reported Cronbach's alpha for the subscales of IPQS as ranging between 0.7 and 0.9, indicating a good value. Furthermore, correlation between items was found to fluctuate between 0.23 and 0.53. Also, correlation between the subscales was below 7, which implies that they measure the same underlying structure. The reliability of subscales of IPQS was studied for more than two weeks and six months. Remarkably, they reported that all subscales, except for personal blame, showed a high positive correlation in both follow-ups. These results are consistent with those of the present study, which indicates that this study is featured by an appropriate reliability and validity, and that this questionnaire is an effective tool for evaluating patients' perception of their disease.

Clifford (Clifford C, 1998) obtained acceptable levels of internal validity for the subscales of IPQS (0.60 and 0.92). In this regard, Talley (Talley SL, 1998) used the concept of illness perception to assess disease management in patients with schizophrenia. Talley realized that the subscales had a great internal consistency.

Studies that investigate the subscales of IPQS have also achieved some results that are compatible with those of this research. Stafford, Jackson, and Berk (Stafford L *et al.*, 2008) observed that achieving high scores in terms of consequences could predict adherence to medical recommendations about changing one's lifestyle. In another study by Cooper, Lloyd, Weinman, and Jackson (Cooper A *et al.*, 1999), it was found that participating in cardiac rehabilitation programs has a significantly positive correlation with two dimensions of control: treatment control and personal control. Beliefs about the causes of mental illness can lead to stress and anxiety, which in turn could affect patients' perception of their condition (Morrison AP., 2001).

Given the reliable results of the present study, it is proposed that IPQS can be a useful tool for screening at medical centers, and it is recommended that:

1. This instrument be used in psychological studies on patients with schizophrenia disorder.
2. This questionnaire be studied further in various centers and hospitals.

The main limitation of this study is that the results are generalizable only within the inclusion criteria, and they cannot be applied to people outside this circle.

Conclusion

Schizophrenia is one of the most debilitating psychiatric disorders that affects one's thinking, understanding, as well as performance, and imposes heavily negative consequences on patients. Given the importance of insight and compliance of treatment in patients, illness perception questionnaire can be an appropriate tool for diagnosing a disease, as confirmed by various studies.

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Conflicts of interest

There are no conflicts of interest.

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