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Original Article

The Illness Belief Network Questionnaire: Development and Evaluation of a Psychosomatic Assessment Tool

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Abstract

Objective: Patients' beliefs and emotions toward an illness can influence their coping responses, illness behaviors, adherence to treatment, quality of life, and even the psychoneuroimmune responses. The aim of present study was to develop and validate a novel questionnaire assessing both rational and irrational beliefs of patients regarding their illness.

Method: In a cross sectional methodological study, the items of the Illness Belief Network (IBN) were developed regarding patients and clients' opinions about and attribution of their disease extracted from 400 clinical interviews and were coded based on Leventhal's self-regulation model. An expert panel coded the items. A total of 400 patients with different medical conditions completed the questionnaire. Participants additionally rated the Illness Perceptions Questionnaire in its revised form (IPQ-R) to assess convergent validity. Construct validity was examined by conducting exploratory and confirmatory factor analysis. The Cronbach alpha and Intracluster Correlation Coefficient (ICC) were used for examining Internal consistency and test-retest reliability of the IBN.

Results: The IBN questionnaire was finalized with 84 items, and the results of factor analysis revealed 5 factors: psychosocial causes, environmental causes, control, meaning, and consequence/timeline; extracted factors were confirmed by confirmatory factor analysis. Cronbach's α coefficient for scale was 0.92 and it ranged from 0.79 to 0.89 for the subscales. IBN indicated excellent test-retest reliability results based on ICC 0.842(95%CI: 0.798-0.846). The correlation coefficients of all items exceeded the prespecified acceptable value of 0.40, indicating satisfactory item discriminant validity, and correlation between IBN and IPQ-R subscales were statistically significant (all p values < 0.01), indicating acceptable convergent validity.

Conclusion: The IBN questionnaire is a valid and reliable phenomenological, non-judging, and clinical tool to assess patient's rational and irrational or faith-based beliefs about the illness. This tool can be used to improve doctor-patient communication by exploring the complex nature of human thinking.

Key words: *Illness; Belief; Perception; Psychosomatic Medicine; Reliability and Validity*

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In a medical framework, a disease can be described with regards to its etiology, timeline, consequence, and treatment from an objective, biomedical, and scientific point of view. Similarly, patients have their own illness perceptions. However, how patients perceive their illness may be more complex, irrational, and/or heterogeneous than the description in medical terms. Although patients' illness perceptions may be partly related to objective features of a disease, they can be influenced by emotions and irrational beliefs that may be in contradiction to an individual's rational judgment and knowledge (1). In this study we report the development and validation of a tool for the assessment of patients' illness beliefs that takes into account this emotionality and irrationality.

Patients' illness perceptions are defined as individual representations of a disease that are shaped by various sources and beliefs (2). The self-regulation model by Leventhal et al is one of the most prominent theories regarding illness representations (1). The model suggests that patients' illness representations can be conceptualized on 5 dimensions: identity, cause or etiology, timeline, curability/controllability, and the consequences of the disease. Over the past years, numerous studies examining various medical conditions have provided evidence for the impact of patients' illness representations on the course and the treatment success of a disease (2-6).

However, the traditional concepts of patients' illness perceptions may not be appropriate in reflecting all emotional and irrational components of patients' individual views on their disease. For instance, when a person is diagnosed with a certain disease, he or she develops a cognitive schema to explain the disease for oneself and to guide illness behavior. Therefore, the term "figuration" may be more appropriate than the positivistic term of "representation" in considering all aspects of human mind. The former reflects the phenomenological nature of beliefs and implies an active role of a person's mind in forming beliefs. By contrast, the latter term implies a more mirror-like passive formation of beliefs and attitudes, which might be the case for many patients according to our clinical observations. Despite all latitudinally, the terms "representation" and "figuration" are employed as interchangeable in current article. The model explains that illness representation by the patient consists of 5 key components: identity, cause or etiology, timeline, curability/controllability, and the consequences of the disease. Several studies evaluating a variety of clinical conditions have confirmed the consistency and validity of these 5 components of the patient's illness representation (7- 9).

For instance, a 32-year-old man with multiple sclerosis visited our psychosomatic health center. He believed his disease had been initiated by a dream: "He who had been alone in wilderness heard a horrible divine cry saying he would die. He moaned and pleaded to that voice: 'Give me a disease but do not kill me.'" Two days later, he got blurred vision which was diagnosed later as symptom of MS. Being a strongly religious person, he believed his disease was a punishment for his sins; therefore, he became more pious and devoted to God's instructions. He believed that if he did so, he would be healed by God, while psychotherapy and medication could not help him .

Emotions and beliefs of an individual toward an illness can influence the coping responses, illness behaviors, adherence to treatment, quality of life, and even the course of a disease (10). Various signs in the forms of matter (eg, atoms, molecules, and cells), energy (eg, mechanical, electromagnetic, chemical), symbols (eg, visual, verbal, and mathematical), and reflective (eg, reminding, mindfulness, contemplation) are interpreted in different levels of organization and integrated in vital functions and performances (11). Therefore, only dealing with the diagnosis and treatment and not considering a patient's phenomenal world, emotions, concerns, and thoughts would harm the physician-patient relationship, which in turn may affect the patient's compliance and dampen the placebo response (12). Some studies have shown negative perception and attitude toward the disease, independent of the real severity of the disease, which is associated with slower cure, more disability, and more frequent use of medical services (13, 14).

To assess patients' illness representations, Weinman et al (15) developed the "Illness Perceptions Questionnaire" (IPQ), conceptually based on Leventhal's self-regulatory model. This self-report questionnaire has been used in many studies examining various medical conditions, such as cardiovascular diseases (16), rheumatoid arthritis (17, 18), cancer (19), psoriasis, and chronic lung diseases (18). The IPQ has been revised and expanded (IPQ-R) (20), and it also has a brief version (21). Although the IPQ is a valuable instrument for assessing the illness perceptions, it has some limitations in our view. First, the IPQ does not sufficiently consider patients' faith-based or irrational ideas concerning their disease, as described in the clinical example mentioned above. Second, patients who rationally do not agree with certain ideas concerning their disease but still think so quite often. Therefore, the response format of the IPQ, ranging from "strongly disagree" to "strongly agree", might not be suitable for each patient. Instead, we suggest to assess how frequently an idea comes to a patient's mind via self-talks and ruminations. Thus, the aim of this study was to develop and validate the Illness Belief Network (IBN) questionnaire as a new measure for both patients' rational and irrational beliefs about their illness .

This could help to improve patients' satisfaction and to provide more tailored illness perception interventions for different subgroups of patients.

Materials and Methods

Scale Development and Items Generation

In a cross sectional mythological study, the IBN questionnaire was developed in 2 phases using an accepted methodology of item development and validation.

The first phase was the generation of items. For this purpose, we focused on how patients and clients perceived their various physical and/or psychological complaints. For the scale development, we conducted structured qualitative and comprehensive clinical interview with 400 patients with different chronic diseases who attended to Psychosomatic Health Center of Danesh-e Tandoresti Institute, Isfahan, Iran, during 2008-2012. The patients were included in a bioenergy economy-based healing program. Bioenergy economy is an integrative approach to health focused on integrating our bioenergy investment through body, narrative, and intention (22, 23). This model of care is based on biosemiotic medicine, which explains how physical and symbolic signs are translated to each other. In this model, dysfunctional and paradoxical beliefs are interpreted as noneconomic, symbolic pathways of bioenergy which can overwhelm and construct health and illness (24) and/or disturb psychoneuroimminologic functions; coherence of belief system is the key to sustain security and health (25). We aimed at collecting items that represent patients' subjective explanations for their illnesses. Item generation was done in different content-based categories, including control, environmental causes, psychosocial causes, consequences/timeline, and meaning. On this basis, we prepared the first version of the questionnaire including 84 items. The items were put as first-person statements to ensure that the items reflect self-talks that are often experienced by our patients. As such, these self-talks often have an irrational and faith-based component, which we aimed to cover by the items collected for the IBN .

In second step the items were coded as the following categories based on Laventhal's self-regulation model (26). We evaluated the face and content of generated items qualitatively and we did this step through an expert panel, including a psychologist, a psychiatrist, an epidemiologist, and anthropologist. They selected items based on the constructed concepts and the obtained information of previous steps. Then, they reviewed all the items and examined the content validity of the questionnaire. This 84-item IBN questionnaire assesses patients' illness beliefs using a 5-point Likert scale ranging from" I always think so" to "I never think so". The score of each item and also each domain was interpreted as the main concerns and cathexis model of the patients. For example, higher score of control or meaning represents higher energy investment and stressing on it for healing expectations. The minimum and maximum values of IBN are 84 and 420, respectively .

Participants and Data Collection

Those finalized 84 items in the second step were given to the 342 participants who had a chronic illness for more than 1 year between 2012 to 2013. Patients were included from 2 referral academic clinics in Isfahan and Mashhad province. Convenience sampling method was used for enrolling patients. Patients with chronic diseases, such as cancers, cardiovascular, renal, neurological, and rheumatological diseases, who referred to the studied clinics and met the inclusion criteria were entered into the study .

Ethics

The of Isfahan University of Medical Sciences ethical committee approved the study (Reference number: 92125). All participants provided written informed consent.

Measures

In addition to the newly developed IBN and sociodemographic aspects, to evaluate the convergent validity in this study, participants completed the revised version of the Illness Perceptions Questionnaire (IPQ-R) (20). The IPQ-R enables a quantitative assessment of patients' illness representations. The IPQ-R is an 84-item self-completed questionnaire developed to provide a quantitative measurement of the components of illness representations in the framework described by Leventhal's Common-Sense Model (CSM) of self-regulation (26). It is categorized into 3 sections: identity subscale (14 symptoms), causal subscale (18 causes), and third section contains 7 subscales, including consequences, timeline acute/chronic and cyclical, personal and treatment control/cure, illness coherence, and emotional representations. Reliability and validity of the IPQ-R have been shown in numerous studies (20, 27). After excluding the subscales identity (14 symptoms) and causal subscale (18 causes), the IPQ-R was reduced to 7 domains, including personal control, treatment control, consequences, timeline (acute/chronic), timeline cyclical, emotional representation, and illness coherence. Higher scores in the domains consequences and timeline reflect a negative view of patients on their illness. Higher scores in the domains of personal control, treatment control, and coherence reflect positive beliefs about controllability and a personal understanding of the illness. Internal consistency of the IPQ-R in the present study has been evaluated using Cronbach alpha and was obtained to be $\alpha = 0.86$, indicating excellent internal reliability.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences and AMOS (version 16.0 for Windows, SPSS Inc., Chicago, IL, USA). Continuous and categorical data were respectively presented as mean ± standard deviation or frequency (percentage). Face and content validity were performed qualitatively by conducting an expert panel. We followed Gorsuch rule to determine the required sample size for conducting

exploratory factor analysis and he proposed minimum of 1:5 per item (28). Construct validity was evaluated by exploratory factor analysis. When conducting exploratory factor analysis, we used principal component method for factor extraction. Varimax rotation method was selected for interpretability of extracted factors. The Kaiser-Meyer-Olkin (KMO) criterion of sample size adequacy was computed and values > 0.7 was considered as acceptable and Bartlett's test of Sphericity was used (P < 0.05). The number of factors were guided by scree plot and eigenvalues >1.0 (29). After doing exploratory factor analysis, a confirmatory factor analysis (CFA) was conducted to confirm the structure of factors extracted during EFA. To evaluate the goodness-of-fit model, we used 4 fit indices (chi- square/df [relative chi- square], root mean square error of approximation [RMSEA], comparative fit index [CFI], and Tucker- Lewis index [TLI]). Relative chi-square <5.00, a CFI and TLI value of >0.90, and a RMSEA value of <0.08 were taken into consideration as acceptable model fit (30).

Convergent validity was evaluated by computing Pearson's correlation of the IBN total score and/or subscales and the IPQ-R domains (20). Pearson correlation coefficients were categorized as below 0.30 weak, 0.30 to 0.59 moderate, and≥0.60 high (31).

To evaluate item-discriminant validity, we assessed the correlation of each item with its own domain and other domains. Reliability of the IBN in the context of internal consistency was evaluated by computing Cronbach's-α coefficient (Alpha values were interpreted as: >0.7: acceptable, >0.8: good, and >0.9: excellent). The 2-way mixed effect model intraclass correlation coefficient (ICC) was calculated for evaluating the test-retest reliability for each subscale and total scores of IBN. ICC greater than 0.70 was assumed as the evidence of excellent stability (32).

Results

The mean (SD) of age of 342 participants was 47.7 (14.4); 64.1% of participants were male, 35% had academic education, and 27% were single. The mean (SD) of the total score of IBN obtained by study participant was 211.35 (44.69) (min = 91, max = 348) .

Construct Validity

Construct validity was evaluated by using both EFA and CFA. EFA with Varimax rotation extracted 5 domains (factors) from the 84 items of IBN, which were labeled as "psychosocial cause", control, meaning, environmental cause, consequence/timeline, explaining for 16.3%, 8.5%, 4.9%, 4.2, and 3.7% of the total variance, respectively. All domains explained 37.6% of the total variance. A KMO value of 0.84 and P <0.001 for the Bartlett's test confirmed the data viability for factorability. Table 1 shows the factor loadings for 5 extracted factors from EFA on the 84 items of IBN. The results of confirmatory factor analysis illustrated the adequacy of extracted constructs from EFA (Table 2). Values of goodness-of-fit indices were within predefined acceptable values (Chi- square/df = 2.1, RMSEA = 0.056; CFI = 0.954; TLI = 0.934); also, all items loaded significantly on their corresponding factors (Table 1) .

Convergent and Iitem Discriminant Validity

Convergent validity of the IBN was examined by the Pearson's correlations between the IPQ-R domains and the IBN domains. The results have been summarized in Table 2. The domain "psychosocial cause" was significantly correlated with the domain "emotional representations" from the IPQ-R (r = 0.209, P<0.05). The domain "meaning" was inversely related to the domains "illness coherence" (r = -0.541) and "emotional figuration" (r =-0.572, P < 0.001) from the IPQ-R. Moreover, IBN domain "control" was significantly correlated with the domains "personal control" and "treatment control" from the IPQ-R (r = 0.400 and 0.431, respectively, P < 0.01). Finally, there was a significant correlation between the domains "consequence/timeline" from the IBN and the domains "timeline" and "consequences" from the IPQ-R (r = 0.408 and 0.300, respectively, P < 0.05) .

The results for item discriminant validity were satisfactory. Items had a significantly higher correlation with its own domains. Our findings showed that the range of item correlation in its own domains were respectively (0.416-0.696), (0.362-0.663), (0.370-0.614), (0.408-0.733), (0.530-0.698) in psychosocial causes, control, meaning, environmental causes and consequence/timeline domains. The correlation of each item with other domains was lower than 0.25.

Reliability Analyses

Cronbach's α was used for evaluating Internal consistency and it was obtained to be α =0.92 for the complete scale, that indicating high internal consistency of the scale. Cronbach's α for the 5 subscales ranged from α = 0.79 to α = 0.89, all indicating high internal consistency. Also, we evaluated the test retest reliability by ICC and the results showed ICCs ranged from 0.728 to 0.889 for all domains and it was 0.842 (95%CI: 0.798-0.846) for total items (Table 3).

Table 1. Factor Loadings Resulted from Exploratory and Confirmatory Factor Analysis of Illness Belief Network Questionnaire

Number	Item	Factor loadings from EFA	Factor loadings from CFA
1	**Psychosocial cause**		
77	I got the disease since I took so hard on myself	0.645	0.615
46	Problems caused by cultural norms and conflicts caused me to be ill	0.634	0.532
19	Boring repetitive life is the cause of my illness	0.622	0.712
44	Inappropriate irregular life schedule is the cause of my disease	0.597	0.507
51	I bottled up my feelings to the extent that I become ill	0.590	0.495
45	Unkindness of people around me is the cause of my illness	0.584	0.525
50	If I could relax myself, I would not fall ill	0.584	0.624
76	Troubles and problems caused by social injustice caused me to get the disease	0.564	0.724
20	Poor sleep caused me to be ill	0.542	0.632
75	My loved ones' griefs are the cause of my disease	0.487	0.308
49	Social responsibilities are the cause of my illness	0.483	0.523
18	Tiredness and excessive work hours has caused the disease	0.482	0.463
71	All my problems are due to my high intellect	0.462	0.382
55	I have gotten this disease because I thought of it so much	0.451	0.401
82	Loss of my loved ones has brought me the disease	0.422	0.487
72	All these misfortunes only happen for good people	0.421	0.419
21	Sexual dissatisfaction caused me to be ill	0.408	0.425
2	**Control**		
81	I get well by my power of will	0.702	0.682
80	Positive thoughts make me get well	0.691	0.621
65	I will get well if I detach myself from unpleasant emotions	0.615	0.725
52	The key to be healed is in my own hands	0.578	0.627
66	I will get well if I live in nature for some time	0.559	0.522
59	I will get well if I take a vacation	0.536	0.514
64	I can heal my illness through changing my thoughts	0.535	0.503
23	I encourage my body to confront with the disease	0.519	0.522
58	Moving to a more appropriate and healthier place to live makes me get well	0.495	0.474
63	I will be healed if I change my lifestyle fundamentally	0.487	0.465
70	I will be healed from my illness through art	0.487	0.448
15	I get well by exercising	0.484	0.388
74	I can win the fight with my disease	0.477	0.521
60	I will be healed if I win the heart of those I hurt before	0.472	0.452
73	I will not allow my disease to separate me from my loved ones	0.466	0.445
53	I will get well if I pray	0.458	0.494
12	I get well by natural therapies	0.455	0.434
16	I get well by energy healing	0.452	0.431
54	Others' prayers for me cause me to be healed	0.429	0.392
67	I will be healed if I participate in charity work	0.426	0.416
14	I will be healed by traditional therapies	0.425	0.407
57	Religious rituals cause me to be healed	0.418	0.412

2	Even if I do not get cured, I can get along with my illness	0.411	0.403
11	I get well by nutrition therapy	0.498	0.502
3	**Meaning**		
33	Magic and spell are casted on me so that I fell ill	0.649	0.584
10	This illness made me someone to be pitied for	0.627	0.509
32	I've been afflicted by the evil eye so that I fell ill	0.603	0.611
34	Someone's curse caused me to get this disease	0.587	0.574
8	This illness caused me to be rejected and isolated	0.554	0.531
28	This disease is the pathway to my personal development	0.554	0.521
9	This illness caused me to feel shame	0.544	0.510
5	(such as cancer patient,]your current disease[I am a ……. diabetic, hypertensive patient, …)	0.533	0.498
7	This disease is brought to me by myself	0.521	0.514
69	I feel god has abandoned me	0.511	0.502
25	My illness is an accidental senseless phenomenon	0.510	0.485
6	I feel like I am not myself anymore	0.493	0.472
36	I will be purged from my sins by my illness	0.490	0.425
68	If god had loved me, I would not have gotten this disease	0.475	0.445
30	This illness is the punishment for my sins	0.465	0.452
24	I blame my body for its disability	0.441	0.402
29	This disease is god's plan to test my faith	0.440	0.424
31	This illness is a painful experience for me	0.420	0.418
84	Spiritual poverty is the cause of my disease	0.414	0.414
13	My illness is due to negative energies	0.411	0.421
56	If I had been grateful for god's blessings, I would not have gotten this disease	0.410	0.402
37	My illness is caused by supernatural beings like ghosts and jinns	0.409	0.399
35	This illness makes me free of my inner conflicts and worries	0.408	0.392
1	I tell my disease to get out of my body	0.380	0.352
4	**Environmental cause**		
42	Unhealthy water is the cause of my illness	0.771	0.652
41	Air pollution is the cause of my disease	0.736	0.667
40	Inappropriate nutrition made me ill	0.659	0.645
39	Nonorganic foods and chemical additives caused me get this disease	0.631	0.612
43	My disease is due to electromagnetic pollutions such as radio and cell phone waves	0.582	0.532
38	Chemical medicines are the cause of my disease	0.557	0.524
5	**Consequence/timeline**		
79	To be in need of others annoys me	0.519	0.489
3	This illness has affected all aspects of my life	0.464	0.495
78	My disease is part of my life	0.455	0.435
83	This disease leads to my disability	0.450	0.432
27	This disease is my disability and destruction	0.420	0.414
4	This illness is merely a difficult situation for me	0.406	0.403
48	I have this illness for the rest of my life	0.370	0.348
61	This illness will kill me	0.352	0.327
62	This illness will end sometime in the future	0.321	0.332

Table 2. Convergent Validity Evaluated by Pearson's Correlation Coefficients between the Illness Belief Network Questionnaire Domains and Illness Perception Questionnaire Domains

IPQ-R domains IBN domain	Timeline	Consequences	Personal control	Treatment control	Illness coherence	Timeline cyclical	Emotional figuration
Psychosocial cause	0.004	-0.185	0.088	0.077	0.293*	0.277*	0.209**
Control	0.032	-0.045	0.400*	0.431**	-0.037	0.233*	-0.287*
Meaning	0.147	0.331**	0.134	0.069	-0.541**	0.277*	-0.572**
Environmental cause	0.049	-0.095	-0.102	0.153	-0.157	0.298*	-0.232
Consequence/timeline	0.408**	0.300*	-0.008	-0.061	0.102	0.113	0.105

* p<0.01, ** p<0.001

Table 3. Internal Consistency and Test-Retest Reliability of the Illness Belief Network Questionnaire

Domain	Cronbach α	Cronbach α if item deleted	Intraclass correlation (95%CI for ICC)*
Psychosocial cause	0.89	0.88-0.89	0.89 (0.87-0.91)
Control	0.88	0.87-0.89	0.86 (0.83-0.88)
Meaning	0.86	0.84-0.85	0.83 (0.80-0.85)
Environmental cause	0.83	0.79-0.84	0.81 (0.79-0.83)
Consequence/timeline	0.79	0.73-0.80	0.72 (0.70-0.76)
Total scale	0.93	0.93-0.93	0.84 (0.80-0.85)

*All ICC are significant at P<0.001

Discussion

The aim of the study was to develop and validate a questionnaire measuring individuals' beliefs about their illness, including irrational and faith-based components. Results indicated good reliability and validity of the scale. The factor analysis results revealed that IBN items can be described by 5 factors: psychosocial causes, control, meaning, environmental causes, and consequences/timeline. Thus, the IBN can be a useful tool for investigating patients' causal models and expectancies about their illness .

Our formal knowledge about illnesses has been formed around categorizations of observations of body as an object and third person experiences. The categorical knowledge is economic and effective for emergency and acute conditions, but it is not sufficient for long-lasting course of living with distress, illnesses, and handicaps (33-35).

Many self-talks, interpretations, feelings, desires, obsessions, and relations and of course discourses are constructed around illness experience. All of these subjective factors can affect patients' treatment compliance (36, 37), illness behavior (38, 39), quality of life (40, 41), and even neuroimmune responses (42, 43). Thus, we need to find a way to the phenomenal world of patients and their experience.

Therefore, we aimed to develop a questionnaire reflecting similar domains like the towel-established IPQ, but assessing more specifically irrational and faith-based beliefs of the patients. Moreover, there are 4 further differences between the IBN and the IPQ. The first difference is that the items of IBN are in the form of self-statements and first person experience – similar to what patients rehear in their minds. In contrast, items of IPQ are expressed in abstract, passive, or third person form. For a questionnaire which is constructed to reflect phenomenal worlds, such an analytic language may be inappropriate. The second difference refers to response options. While the response options for the IPQ range from "strongly disagree" to "strongly agree", response options of the IBN range from "I always think so" and "I never think so". This enables us to more precisely assess how often patients have certain beliefs, including irrational and faith-based beliefs, which patients rationally do not believe in.

This is important because irrational or faith-based beliefs may enable accessibility to the phenomenological world of the patients in case that evidence-based beliefs cannot draw a clear picture of patients' experiences and explanations.

Therefore, there may be a conflict between what the patient believes and the self-talks; "… I know that my illness cannot be due to the evil eye … It's ridiculous … but it comes to my mind frequently that I got ill due to an evil eye…". When the patients were asked if they believed in supernatural forces, they often answered instantly no and sometimes gave rational explanations to prove their lack of belief. However, when we probed their answers and specifically asked them if such thoughts crossed their minds, their responses were completely different. Most of the times, they responded yes but they were reluctant and embarrassed; "I have

such thoughts most often", and again they emphasized they knew such thoughts were not reasonable.

Thus, the Likert scale options of IBN show the existence and intensity of the beliefs without any value judgments. It can clearly show the cathexis pattern and how the subject distributes his or her energy between internal and external objects.

The third distinction is that IBN is an explanatory and transdiagnostic tool without any negative/positive items. IBN as a systemic and clinical analysis tool differs with IPQ in its questioning and analysis method, which is in not based on value judgment, as beliefs are often determined based on their belief network .

From a biosemiotic viewpoint, using a reductionist and objectified approach to treat chronic diseases and tackle with one's beliefs regardless of systemic interactions to define their functions blocks our therapeutic efficacy and patients' compliance (11, 25, 44, 45) and placebo response (25, 46-48). In contrast, being attuned and attentive with patients' web of beliefs at least provides an opportunity for the therapist to enter patient's life-world and narrative and create more sustainable and effective changes.

The fourth difference refers to the domain of "meaning" of the IBN. Meaningfulness of life experiences, including illness, is one dimension of the well-established construct "sense of coherence" (SOC) (49). This dimension includes evidence-based beliefs:" this illness is a painful experiment for me" and faith-based ones: "I feel God has abandoned me ".

Some of these faith-based beliefs are related to the suggested cause of the disease (eg, "Someone's curse caused me to get this disease."), its consequences (eg, "The disease is the pathway to my personal development"), or change in identity (eg, "I feel like I am not myself anymore"). Of note, the IBN comprises 2 domains of possible causes (environmental and psychosocial causes), while the IPQ does not distinguish between different categories of causes. This specific assessment of patients' faith-based beliefs is a unique feature of the IBN compared to the IPQ or other measurements in the field of behavioral medicine.

In illness conditions, our identity may change to a case of a disease or somebody who is rejected from life or God's blessing. In such an experience, we may feel depersonalized and/or believe in a social or an existential conspiracy theory. All these meaning making activities can change our behavioral and physiological coping with illness and other stressors.

In addition to these 4 principal differences, there is another distinction between the 2 questionnaires. In contrast to IPQ which has one domain of cause, IBN contains 2 domains of causes, environmental and psychosocial, due to the observed high correlations of some domains.

Clinical Implications

Considering all of the above-mentioned properties, the IBN can be a good clinical and research tool to give voice to patient's inner world, which can alter the phenomenological and even the biomedical aspects of illness.

As a clinical tool, IBN represents patients' model of his/her illness, the main concerns (each belief and also domains), which directs patients' cathexis and his/her healing expectancies, which can be used in treatment plan, case selection, and clinical setting for cultural or clinical groups.

Therefore, IBN can help therapists to establish a model for the patients' illness, which is close to the patients' own language and way of thinking. It is a bridge to explore dysfunctional and paradoxical beliefs and to find a way to change, reframe, and integrate them.

With the help of IBN, therapists can speculate which explanatory model patients prefer: naturalistic (eg, difficult situation [item 4], accidental senseless phenomenon [item 25], air pollution [item 41]), mystical (eg, someone's curse [item 34], other's prayers [item 54], religious rituals [item 57]), or psychological (eg, feel shame [item 9], unpleasant emotions [item 65], and pathway to my personal development [item 28]). Recognizing concerns of explanatory model and cathexis patterns, and in short, giving voice to patient's life worlds can facilitate doctor-patient communication resulting in a trustful relationship, which may lead to higher placebo responses (3, 50).

IBN, as a research tool, can explore common illness beliefs in a society and its correlations with sociocultural variables. In addition, for both clinical and research purposes, it can be used to lead cognitive and narrative therapeutic strategies.

Limitation

Factorial validity of the scale is claimed by using PCA instead of CFA and there is no measure of any clinical variables, such as disability, quality of life etc. Therefore, the content validity of the scale can hardly be examined. Also, the cross sectional design does not allow examining the course of patients' illness beliefs and symptoms. Moreover, the sample is not described sufficiently, eg, it remains unclear how many people suffered from different medical conditions.

Conclusion

The IBN questionnaire can be a clinical tool to determine patients' beliefs about the illness. Moreover, the tool may help clinicians identify the conflicting and dysfunctional beliefs that require intervention. It can be used to lead cognitive and narrative therapeutic strategies. The tool can also enhance the patients' self-awareness about their conceptual world and reassures them that their concerns have been observed and understood. The questionnaire can be useful for recognition of culture-bound beliefs and psychosocial interventions. Phenomenological study of the illness and expressing what is going on in the life of the patient would be helpful in achieving patients' satisfaction and

assisting the health systems to provide more consistent and successful services. Moreover, it demonstrates which fields require psychocultural interventions. Thus, conducting cross cultural studies in this field could be of great help in recognition of the global and cultural aspects of the belief network and optimization of psychosomatic programs or interventions and clinical settings.

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Conflict of Interest

None.

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