The Role of Metacognition and Intolerance of Uncertainty in Differentiating Illness Anxiety and Generalized Anxiety

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ABSTRACT

Objective: This study aimed to differentiate illness anxiety and generalized anxiety by the role of metacognition and intolerance of uncertainty.

Methods: This research was a descriptive-correlational study with an ex post facto design. The study population included all students of Yazd University, and the study sample comprised 400 healthy adult university students (Mean age=23.3 years, SD=4.9) who were selected using the convenience sampling method. Participants were asked to fill out 4 self-report measures: short health anxiety inventory, intolerance of uncertainty scale, metacognitions questionnaire, and Penn State Worry questionnaire. Finally, 338 questionnaires were statistically analyzed by SPSS 20, using ANOVA and discriminant function analysis.

Results: The results showed that there were significant differences between different groups with respect to most studied variables and that intolerance of uncertainty cannot discriminate between 2 disorders. We can argue that this factor is a significant risk factor in both illness anxiety and generalized anxiety disorders.

Conclusion: In general, transdiagnostic factors such as intolerance of uncertainty and cognitive beliefs have significant roles in emotional disorders, and can be considered as therapeutic targets.

1. Introduction

Illness anxiety is characterized by excessive worry, preoccupation with illness, avoidance behaviors, and seeking out reassurance; it can co-occur with other anxiety disorders such as generalized anxiety disorder (American Psychiatric Association, 2013). In general, illness anxiety and worry about health condition are common in patients with generalized anxiety disorder (Lee, Lam, Kwok, & Leung, 2014; Noyes, 1999). In a study, the comorbidity of these two disorders was estimated at 78%. Patients with both conditions (compared to patients with generalized anxiety but without illness anxiety) report more anxiety symptoms, major depressive episode, different areas of concern, irritable bowel syndrome, treatment seeking, and untreated generalized anxiety disorder (Lee, Lam, Kwok, & Leung, 2014; Lee, Ma, & Tsang, 2011).

In the cognitive-behavioral model, illness anxiety symptoms have different intensities in different people (Salkovskis & Warwick, 1986) and like other anxiety disorders the core symptom of illness anxiety disorder is an

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excessive and uncontrollable anxiety, so it can be regarded as an anxiety disorder (Olatunji, Deacon, & Abramowitz, 2009; Rachman, 2012).

The transdiagnostic approach explains the comorbidity between different disorders through the similar underling pathology of various disorders (Davidson & Frank, 2014; Harvey, 2004). There have been many studies on the underlying pathology and diagnostic and transdiagnostic characteristics of illness anxiety, but there have been few studies on the common mechanisms between this disorder and other disorders, especially anxiety disorders. In addition, it is likely that illness anxiety disorder co-occurs with other anxiety disorders, especially generalized anxiety disorder; however, it is not still clear which transdiagnostic factors discriminates them.

Of the common factors in the pathology of anxiety disorders, including generalized anxiety disorder and illness anxiety disorder are intolerance of uncertainty and metacognitive beliefs. Intolerance of uncertainty is a temperament characteristic which results from negative beliefs about uncertainty and its consequences. In this model (Dugas, Gagnon, Ladouceur, & Freeston, 1998), intolerance of uncertainty is characterized by an excessive tendency to consider uncertain situations as stressful and upsetting, believing that intolerable events are negative and should be avoided, and thinking about the unfairness uncertainty of the future (Dugas, Marchand, & Ladouceur, 2005). A person with problems of intolerance of uncertainty, experiences a series of worries, tries to avoid negative future events, follows no physical excitement, and his/her level of functioning decreases (Dugas & Robichaud, 2007). Regarding the role of intolerance of uncertainty in the prediction of illness anxiety, some studies have shown that this factor is positively related to illness anxiety and highly predicts it (Boelen & Carleton, 2012; Fergus, 2013; Fergus & Bardeen, 2013). However, its role in other disorders is not so significant compared to its role in generalized anxiety disorder. Furthermore, intolerance of uncertainty is considered as a specific component of generalized anxiety disorder (Ladouceur, Gosselin, & Dugas, 2000; Ladouceur, Talbot, & Dugas, 1997).

Metacognitive beliefs have also important roles in the pathology of anxiety disorders, including generalized anxiety disorder and illness anxiety disorder. This model is based on the self-regulatory executive function model, which is related to the pathology and maintenance of emotional problems (Wells, 2011). In this model, emotional disorders are related to the activation of a maladaptive thinking style, namely the cognitive attentional syndrome. Generally, the cognitive attentional syndrome causes the feeling of threat to continue in a person (Wells, 2011). Some studies have shown the effectiveness of individual and group metacognitive therapy in the reduction of generalized anxiety (Hjemdal, Hagen, Nordahl, & Wells, 2013; Normann, van Emmerik, & Morina, 2014; van der Heiden, Melchior, & de Stigter, 2013; Wells & King, 2006). These studies indicate that this method is effective in the reduction of metacognitive beliefs, worry, and generalized anxiety symptoms. Despite various studies on the role of metacognitive beliefs in generalized anxiety, according to the author's information, only 4 studies have investigated the role of metacognitive beliefs in illness anxiety, and just 1 study has examined the effectiveness of metacognitive therapy in the reduction of health anxiety symptoms. All of these studies have shown that metacognitive beliefs are positively related to illness anxiety and are able to predict both directly and indirectly illness anxiety (Bailey & Wells, 2013; Bailey & Wells, 2015; Bouman & Meijer, 1999; Kaur, Butow, & Thewes, 2011).

Overall, according to the previous findings, we can hypothesize that the comorbidity between these two disorders may be due to their similarity in having two factors, i.e. intolerance of uncertainty and metacognitive beliefs. However, it is not still clear that which one of these two factors better discriminate the two disorders. Using this information, and based on a person's unique characteristics, his/her specific symptoms, and the level of underlying pathology, we can conceptualize and design a treatment suitable for the underlying pathology of his/her comorbid disorders. Using therapeutic methods, which target these goals, can increase the effectiveness of therapeutic methods. Therefore, the main purpose of the present study is to answer the question that which one of the transdiagnostic factors better helps us to discriminate between these 2 disorders.

2. Methods

This was a descriptive-correlational study with an ex post facto design. Generalized anxiety and illness anxiety were criterion variables; intolerance of uncertainty, metacognitive beliefs, and their subscales were predictor variables. The study population included all students of Yazd University, and the study sample comprised 400 healthy adult university students who were selected using the convenience sampling method. After acquiring informed consents from the participants, they were given the questionnaires. After analyzing the data, the incomplete or distorted questionnaires were excluded, and finally 338 questionnaires were statistically analyzed. In order to distinguish the participants with a high diagnostic threshold from other participants, cut off points of 45 and 18 were

used for the Penn State Worry questionnaire (PSWQ) (Behar, Alcaine, Zuellig, & Borkovec, 2003), and the short form of health anxiety inventory (SHAI-18) (Salkovskis, Rimes, Warwick, & Clark, 2002), respectively.

The following questionnaires were used to collect data. The short health anxiety inventory (SHAI) is one of the most frequently-used measures of health anxiety symptoms. This inventory contains 18 items and each item consists of a group of four statements that are weighted 0-3 and are summed to obtain a total score. The Factor analysis has shown that this inventory assesses the possibility of having an illness, hypervigilance about bodily symptoms, and symptoms severity (Alberts, Hadjistavropoulos, Jones, & Sharpe, 2013; Salkovskis et al., 2002). The internal consistency of the scale has been reported to be excellent with the Cronbach α of 0.74 - 0.96. The test-retest reliability (3 weeks) of the scale was shown to be 0.87 (Alberts, Hadjistavropoulos, Jones, & Sharpe, 2013). The results of study on Iranian population have provided evidence indicative of good psychometric properties of the scale (Mehdi, Mehrdad, Kariem, & Fatemeh, 2013).

The intolerance of uncertainly scale (IUS) was developed by Freeston, Rheaume, Letarte, Dugas and Ladouceur (1994) in order to assess people's tolerance toward uncertain situations, or situations indicative of uncertainty (Freeston, Rhéaume, Letarte, Dugas, & Ladouceur, 1994). The IUS includes 27 items that are rated on a five-point likert scale ranging from 1='not at all characteristic of me' to 5='entirely characteristic of me'. A total score is obtained through summing the scores of all items. The psychometric properties of the main version of the scale are as follows: An internal consistency coefficient of 0.94 and a test-retest reliability (5 weeks) of 0.74 for this scale (Buhr & Dugas, 2002). The psychometric properties of the Persian version of this scale according to Hamidpoor, Andooz, and Akbary (2009) has a good internal reliability for (0.88) (Hamidpour, Dolatshahi, & Dadkhah, 2011).

The metacognitions questionnaire (MCQ-30) is a multidimensional measure for assessing metacognitions. This questionnaire is consisted of 30, with four-point likert response that are defined as follows: 1=do not agree to 5=agree very much. A total score is calculated through adding all items' scores. Also scores of each subscales' items are summed as the score of that subscale. It has 5 subscales, including 1) Positive beliefs about worry; 2) Beliefs about uncontrollability and danger of thoughts; 3) Beliefs about cognitive confidence; 4) Beliefs about necessity to control thoughts; and 5) Cognitive self-consciousness. Scores of each subscale is obtained through summing its items in addition to a total score that is obtained through adding scores of all items. The psychometric properties of the main version of this scale are as follows: the Cronbach α of 0.72 to 0.93 for the subscales; and the test retest reliabilities (22 to 118 days) of 0.75 for the total score; and 0.59 to 0.87 for the subscales (Wells & Cartwright-Hatton, 2004). The psychometric properties of the Persian version of this scale were reported by Shirinzadeh (2006) using Cronbach α as 0.91 for the total score; and 0.71 to 0.87 for the subscales (Shirinzadeh Dastgiri, Goodarzi, Ghanizadeh, & Taghavi, 2008).

The Penn State Worry questionnaire (PSWQ) is 16-item self-report questionnaire developed by Meyer, Miller, Metzger, and Borkovec (1990), assessing severe, excessive, and uncontrollable worry Participants rate items on a five-point likert scale ranging from 1='not at all typical' to 5='very typical'. The PSWQ is a unifactorial measure and total score ranges 16 to 80. This questionnaire is also used for screening generalized anxiety disorder. Extensive research on the validity and reliability of the PSWQ has indicated accurate psychometric properties of this scale. In Iran, Dehshiri, Golzari, Borjali, and Sohrabi (2010) reported good validity and reliability of this scale. The internal consistency of this scale using Cranach α coefficient was reported as 0.88 (Borjali, Sohrabi, Dehshiri, & Golzari, 2010).

The data were analyzed using SPSS-22 and statistical method, included mean, standard division, ANOVA and discriminant functional analysis (DFA).

3. Results

The participants were between 18 and 49 years old. The mean and standard deviation of participants' age were 23.3 and 4.9 years, respectively. Table 1 shows the other demographic information of the participants. The sample groups were homogenous in terms of education and marital status; but there was significant differences between the groups in terms of sex ($P<0.001$). As stated before, different groups were determined according to the cut off points of 45 and 18 for the PSWQ and SHAI-18, respectively. In the end, 80, 26, 154, and 78 participants were put in the severe illness anxiety, severe generalized anxiety, comorbidity, and non-clinical groups, respectively.

The means of all the predictor variables in the comorbidity group were higher than the other groups, and the means of most of the variables were lower in the non-clinical group compared to the clinical groups (Table 2). The multiple comparisons of dependent variables in the groups and the significance level of the differences are shown in Table 3.

Table 1. Demographic information of the participants.

Variables		None	Comorbid	Generalized anxiety	Illness anxiety
Sex	Male	43	69	6	50
	Female	34	81	20	28
Education	BD	50	126	22	61
	MA	25	27	3	15
	PhD	1	1	0	1
Marital state	Single	58	121	20	63
	Married	19	31	6	15
	Divorced	0	1	0	0

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Discriminant function analysis (stepwise methods) was used to discriminate the two clinical groups from each other. The assumption of equal covariances was tested using Box's M test, and because the significance level was higher than 0.05, this assumption was met (Box's M=2.2). According to the results of the Wilks' Lambda test and its significance level (P=<0.05), the present variables do not have optimal discriminant power to differentiate the groups, and just positive beliefs about worry, cognitive self-consciousness, and beliefs about cognitive confidence variables are able to discriminate the 2 groups of health anxiety and severe generalized anxiety (Table 4).

According to the stepwise discriminant function analysis, among predictor variables, only negative beliefs about worry and cognitive confidence had good discriminant powers in differentiating the dependent variables. The other variables were excluded from the model.

An eigenvalue shows the accuracy of discriminant function. The discriminant function analysis resulted in just one function with an eigenvalue of 0.15. The standard correlation coefficient between the independent variables and the variables for group membership in the function was calculated as 0.36. According to the values of the Wilks' Lambda test (0.86), Chi-squared test (14.79), and degree of freedom (2), the function has a significant discriminant power to differentiate between the health anxiety and generalized anxiety groups. Because the significance level is less than 0.001, the null hypothesis which indicates that the value of the function is equal for the people with health anxiety, generalized anxiety, and comorbidity is rejected. Therefore, the function has a good discriminant power and is significant. The standard and structure coefficients both indicate that negative beliefs about worry and cognitive self-consciousness have the most significant roles in differentiating the 2 groups.

Table 2. The mean (standard deviation) of the predictor variables' scores based on groups.

Predictive variables	None	Comorbid	Generalized anxiety	Illness anxiety	F	Sig.
IU- Factor1	28.6 (8.5)	36 (7)	31.9 (8.5)	30.9 (5.9)	20.17	0.0001
IU-Factor2	36.2 (10.1)	45.3 (9.4)	40.8 (9.7)	40.4 (9.2)	26.37	0.0001
Positive beliefs about worry	9.2 (2.4)	11.3 (3.6)	9.6 (3.1)	9.9 (3.3)	7.72	0.0001
Negative beliefs about uncontrollability of thoughts and danger	9.7 (2.4)	15.1 (3.4)	13.6 (3.9)	11.5 (3.3)	53.57	0.0001
Cognitive confidence	9.8 (3.8)	13.3 (3.9)	11.6 (4.3)	9.7 (3.2)	22.25	0.0001
Need to control thoughts	98.8 (2.5)	12.6 (2.8)	11.1 (3.2)	11.4 (2.6)	17.37	0.0001
Cognitive self- consciousness	12.9 (3.1)	15.3 (3.2)	12.9 (3.2)	14.5 (3.5)	11	0.0001

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Table 3. Results of the post-hoc analysis and pairwise comparisons for dependent variables among the 4 groups.

Predictive variables	Both-none	Gad2-none	Gad-both	Had1-none	Had-both	Had-gad
IU- Factor 1	7.36*	3.32	-4.03*	2.3	-5.05*	-1.01
IU-Factor 2	9.12*	4.62	-4.49	4.26*	-4.85*	-0.35
Positive beliefs about worry	2.02*	0.36	-1.66	0.67	-1.35*	0.3
Negative beliefs about uncontrollability of thoughts and danger	5.42*	3.89*	-1.53	1.79*	-3.63*	-2.1*
Cognitive confidence	3.41*	1.77	-1.63	-0.18	-3.59*	-1.96
Need to control thoughts	2.77*	1.3	-146	1.59*	-1.18*	0.28
Cognitive self- consciousness	2.39*	0	-1.68	1.68*	-0.71	1.68

According to Table 6, the discriminant function has correctly predicted 52 individuals (65%) from the health anxiety group and 18 individuals (69.2%) from the generalized anxiety group. Also this Table shows that the discriminant function equation obtained based on the non-standardized coefficients of the predictor variables is presented here:

Function=0.13+0.25 (negative beliefs about worry)-0.22 (cognitive self-consciousness)

Based on the level of correlation with the discriminant function, the variables of negative beliefs about worry, believing in the unfairness of the uncertainty, cognitive self-consciousness, and cognitive confidence were the most important variables in differentiation of the groups, respectively. Also according to the standardized coefficients, the variables of negative beliefs about worry, cognitive confidence, and believing in the unfairness of the uncertainty were the most important variables in differentiation of the groups, respectively. Cognitive self-consciousness was negatively correlated to the function. As the table 7 shows, and according to the analysis and these two factors, 66 percent of persons with GAD and health anxiety are discriminated correctly.

4. Discussion

The purpose of the present study was to compare 4 groups of participants with severe illness anxiety, severe generalized anxiety, comorbidity, and non-clinical to discriminate between the illness anxiety and generalized anxiety groups based on metacognitive beliefs and intolerance of uncertainty. The results showed that there were significant differences between groups with respect to most of the variables, so that the participants in the comorbidity group scored higher in independent variables than the participants in the other groups. The results of discriminant function analysis also showed that less negative beliefs about worry discriminates the illness anxiety group from the generalized anxiety and comorbidity groups. However, cognitive self-consciousness is higher

Table 4. The test for equality of means of the Illness anxiety, generalized anxiety, and comorbidity groups (df=1, 2).

Predictive variables	F	Wilks' lambda	Sig.
Intolerance of uncertainty	0.17	0.99	0.67
Positive beliefs about worry	0.17	0.99	0.68
Negative beliefs about uncontrollability of thoughts and danger	7.1	0.93	0.009
Cognitive confidence	6.09	0.94	0.015
Need to control thoughts	0.20	0.99	0.65
Cognitive self- consciousness	4.62	0.95	0.034

Table 5. The predictive variables in stepwise discriminant analysis.

Steps	Predictive variables	Exact F	Wilks' Lambda
1	Negative beliefs about uncontrollability of thoughts and danger	7.13	0.93
2	Cognitive self- consciousness	7.95	0.86

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Table 6. The correlations of predictive variables with the discriminant functions (the matrix structure of the functions) and discriminant function standardized coefficients.

Predictive variables	Structural matrix	Standardized coefficients	Unstandardized coefficients
Negative beliefs about uncontrollability of thoughts and danger	0.66	0.87	0.25
Cognitive self-consciousness	0.53	-0.77	-0.22
Constant			0.13

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Table 7. Classification analysis of the membership in clinical groups.

Groups	Predicted group membership				
	Generalized anxiety		Illness anxiety		
	%	n	%	N	
Illness anxiety	35	28	65	52	80
Generalized anxiety	69.2	18	30.8	8	26

* The overall percentage of correctly classified items is 66%.

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than generalized anxiety in the illness anxiety group. The results of the present study showed that intolerance of uncertainty cannot discriminate between the two conditions. However, this factor was significantly less in the non-clinical group compared to the clinical groups, and we can argue that it is a significant risk factor in both illness anxiety and generalized anxiety disorders. Therefore, it is an underlying factor which could be considered as a therapeutic target, and it can help reduce the severity of both disorders.

However, this factor is known as an important symptom of generalized anxiety rather than other disorders (Carleton, Collimore, & Asmundson, 2010). Intolerance of uncertainty along with some other components, i.e. positive beliefs about worry, cognitive avoidance, and negative problem orientation constitute the cognitive-behavioral model of generalized anxiety. Intolerance of uncertainty with regard to health condition, negative orientation, positive beliefs about health worries, and avoidance from threatening thoughts about illness may increase the severity of the illness anxiety symptoms. Targeting these factors can be the main goal of the therapies. Further studies are needed to investigate the theoretical basis of this model and the effectiveness of the therapy based on this model.

Cognitive self-consciousness refers to a tendency toward awareness, and monitoring thoughts and cognitive processes (Janeck, Calamari, Riemann, & Heffelfinger, 2003; Kikul, Vetter, Lincoln, & Exner, 2011). Many studies have shown that cognitive self-consciousness is a risk factor for obsessive compulsive disorder (OCD) (Cohen & Calamari, 2004; Hermans, Martens, De Cort, Pieters, & Eelen, 2003; Marker, Calamari, Woodard, & Riemann, 2006; Wells & Papageorgiou, 1998); This factor also distinguishes OCD from generalized anxiety disorder (Cartwright-Hatton & Wells, 1997; Janeck et al., 2003).

The metacognitive model of OCD indicates that the conceptual component of the cognitive-attentional syndrome emerges as worry, anxiousness, and analytical thinking in response to the thoughts or doubts of the

patient. In this situation, the patient becomes excessively concerned about his/her thoughts. Threat monitoring includes monitoring particular unwanted feelings or thoughts, or paying attention to the possibility of dangers in the environment. In this situation, the person uses coping strategies, like thought suppression, hidden or clear trying to nullify thoughts, and ritual behaviors (Wells, 2011). In general, negative evaluations about thoughts and beliefs, and putting too much importance on thoughts are considered as the main mechanisms involved in this disorder (Janeck et al., 2003). With regard to the importance of this factor in illness anxiety, we can argue that cognitive self-consciousness is an important mechanism in both OCD and illness anxiety disorder, and this may be one of the reasons for the comorbidity between these disorders. However, the question still remains whether this factor is related to thought control and believing in thoughts or not. In fact, do thought control, thought suppression, and dysfunctional beliefs about thoughts have the same important role in illness anxiety as they do in OCD? This needs to be examined further by the future studies.

In addition, the study results showed that negative beliefs about uncontrollability of thoughts and danger had a more significant role in generalized anxiety than in illness anxiety. Because one of the important characteristics of generalized anxiety is severe and persistence worry, worried person in this condition finds worry as an uncontrollable cognitive action that results in negative consequences. The main difference between generalized anxiety and illness anxiety disorders lies in the range and domains of worry (American Psychiatric Association, 2013). In other words, in illness anxiety the severity and persistence of worry is less than in generalized anxiety.

In general, based on the literature and theoretical frameworks, transdiagnostic factors such as intolerance of uncertainty and cognitive beliefs have significant roles in emotional disorders, and can be considered as therapeutic targets. According to the study findings, clinical groups showed high levels of these harmful factors more than the non-clinical group, and also the comorbid group showed high levels of these harmful factors more than the other 3 groups. This finding is consistent with the previous studies (Carleton et al., 2010; Mennin, McLaughlin, & Flanagan, 2009). For example, Mennin, McLaughlin, and Flanagan (2009) showed that despite some differences, the role of emotional dysregulation is significant in both generalized anxiety disorder and social anxiety disorder. This issue is consistent with the transdiagnostic theory which indicates similar constructs are involved in the formation of different disorders, and therefore, we cannot consider distinct roles for each of these factors in a particular disorder. As it was also shown in the present study, only two factors, i.e. cognitive confidence and cognitive self-consciousness are comparable in terms of these two conditions, but in general, no significant difference is observed.

However, regarding the limitations of the study, such as questionnaires for collecting information, future studies need to examine clinical samples and use the diagnostic interview in their investigations. We also suggest that the differences and similarities between these two conditions (illness anxiety and generalized anxiety) be examined from different aspects. In addition, effectiveness studies can show the effects of these differences and similarities in their treatments.

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