Asian Social Science; Vol. 12, No. 4; 2016
ISSN 1911-2017 E-ISSN 1911-2025
Published by Canadian Center of Science and Education

The effectiveness of Mindfulness-Based Stress Reduction on Intolerance of Uncertainty and Anxiety Sensitivity among Individuals with Generalized Anxiety Disorder

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Received: December 20, 2015 Accepted: February 26, 2016 Online Published: March 18, 2016

doi:10.5539/ass.v12n4p179 URL: http://dx.doi.org/10.5539/ass.v12n4p179

Abstract

The Generalized Anxiety Disorder (GAD) is one of the most chronic and detrimental disorders and it is considered a common disorder in childhood and adolescence. Furthermore, this disorder is associated with many problems in the health domain. As such, this study attempted to gauge the impact of mindfulness-based stress reduction on intolerance of uncertainty and anxiety sensitivity among students with generalized anxiety disorder. Therefore, it was attempted to run a quasi-experimental research, including a pre-test, a post-test and a control group, among high schools of Robat Karim in Tehran province. Having used the purposive sampling method, 30 students diagnosed with generalized anxiety disorder, intolerance of uncertainty and high anxiety sensitivity were selected. Then, they were randomly assigned to experimental (15 students) and control groups (15 students). Consequently, the mindfulness program was introduced to the experimental group in 8 sessions and the control group received no treatment. It should be noted that groups were assessed before and after treatment with generalized anxiety scale, anxiety sensitivity and intolerance of uncertainty. The results of analysis of covariance showed that mindfulness-based stress reduction programs significantly reduced the symptoms of generalized anxiety disorder, anxiety sensitivity and intolerance of uncertainty. Since mindfulness reduces the levels of two key components of generalized anxiety disorder, namely intolerance of uncertainty and anxiety sensitivity, it seems appropriate to make use of this program in the treatment of generalized anxiety disorder.

Keywords: Mindfulness-based stress reduction, generalized anxiety, intolerance of uncertainty, anxiety sensitivity

1. Introduction

The generalized anxiety disorder is a chronic and detrimental disorder which is associated with psychological disorders (Grant, Hasin, & Stinson, 2005). This disorder is considered a common disorder in childhood and adolescence and it is associated with many problems in the health domain. Since this disorder is associated with age changes in adolescence, some tensions are generated thereof (Reuschel, 2011). The main symptoms of generalized anxiety disorder include excessive and extreme worry about a number of events or activities that occur more days than not for at least 6 months, impaired social and occupational functioning, and inability to control worry and increased intensity and duration of anxiety over threatening events. The notion of worry is one of cognitive and distinctive components of biological symptoms of anxiety. This component resorts to avoidance strategy to reduce temporary worry and preserve the anxiety (Andrews et al., 2010). Regarding the cognitive components of generalized anxiety, it seems that intolerance of uncertainty occupies a significant share in experiencing worry and other anxiety disorders, including obsessive compulsive disorder (Boelen, 2009; Agheli, Hasanzadeh & Ghasemian, 2013) and mood disorders (Buhr & Dugas, 2001; Dugas & Ladouceur, 2000). The concept of intolerance of uncertainty (IU) is a cognitive construct which refers to individulas' intolerance of ambiguous and unknown situations (Freeston et al., 1994). In other words, unwillingness to bear the possible occurrence of negative events in the future may be defined as intolerance of uncertainty (Holaway, Heimberg & Coles, 2006). Dugas, Buhr & Ladouceur (2004) believe that intolerance of uncertainty stems from a cognitive bias caused by perceptions, interpretations and reactions of a person across uncertain situation as well as

cognitive, emotional and behavioral levels. Regarding the generalized anxiety disorder, it may happen that worry along with intolerance of uncertainty plays a protective role against the occurrence of events with negative implications (Dugas et al., 2004). Some patients with generalized anxiety disorder report that they prefer enduring the negative consequences of problems to enduring the uncertainty. In general, clinical observations suggest that intolerance of uncertainty plays a major role in increased level of worry and generalized anxiety disorder (Heimberg, Turk, & Mennin, 2004). De Jong-Meyer, Beck & Riede (2009) found that individuals who had higher levels of intolerance of uncertainty were afflicted with higher levels of worry and mental rumination. In other words, intolerance of uncertainty, worry and mental rumination had a causal relationship with each other. In addition to intolerance of uncertainty, anxiety sensitivity is another cognitive structure that paves the way for the advent of anxiety disorders, especially panic attack disorder. However, other studies show that this construct is associated with several other anxiety disorders (Viana & Rabian, 2008).

The construct of anxiety sensitivity refers to the fear of anxiety and anxiety-related symptoms. This concept is formed on the basis of the belief that these symptoms lead to potentially traumatic physical, psychological and social consequences (Deacon, Abramowitz, Woods & Tolin, 2003). Anxiety sensitivity is composed of three components of fear of bodily sensations, fear of lack of cognitive control and anxiety symptoms that are visible by others. Consequently, fear of lack of cognitive control is usually associated with generalized anxiety disorder (Olatunji et al., 2005). The results of some studies have highlighted the role of anxiety sensitivity in experiencing severe anxiety and anxiety disorders, including generalized anxiety disorder (Schmidt et al., 2010; Olatunji et al., 2009).

Knapp et al., (2015) examined the role of anxiety sensitivity on generalized anxiety among adolescents and found that there was a significant relationship among anxiety sensitivity, worry and experiencing the generalized anxiety symptoms so that adolescents with high levels of anxiety sensitivity were more worried and represented more severe anxiety symptoms. In this regard, the results of some studies show that anxiety sensitivity is subject to change in stressful situations as well as in response to treatment (Bernstein & Zolensky, 2007). As such, stressful events lead to more intense anxiety sensitivity and therapeutic interventions lead to reduced level of anxiety sensitivity (Marshall, Miles, & Stewart, 2010).

Nowadays, many treatments have been proposed to treat the generalized anxiety disorder. Given this, the mindfulness-based stress reduction program is considered the most common method and it is delivered in the form of stress reduction and relaxation training programs (Kabat-Zinn, 1989, 1990). The results of several studies have emphasized that mindfulness can last positive effects on anxiety disorders (Wells, 1999; Sugiura, 2004; Lovas & Barsky, 2010). Vollestad, Sivertsen & Nielsen (2011) found that the mindfulness-based stress reduction treatment program alleviated the symptoms of anxiety, worry and state-trait anxiety in patients with anxiety disorders. Similarly, Tanay, Lotan & Bernstein (2012) indicated that mindfulness training was effective in reducing mood and anxiety symptoms. However, very few studies have addressed the effectiveness of mindfulness in reducing the level of anxiety sensitivity and intolerance of uncertainty among individuals with generalized anxiety disorder. Accordingly, this study attempted to answer the following questions:

1) Does mindfulness affect the symptoms of generalized anxiety among adolescents?

2) Does behavioral mindfulness affect intolerance of uncertainty among adolescents with generalized anxiety disorder?

3) Does mindfulness affect anxiety sensitivity among adolescents with generalized anxiety disorder?

2. Methodology

It was a quasi-experimental research, including a pre-test, a post-test and a control group. The research population included all fourth-year high school students in the academic year 2015-2016 in the city of Robat Karim, Tehran. Initially, 487 students were selected using convenience sampling method. Then, 46 students were selected as research sample using purposive sampling method and criteria for inclusion in the study, including diagnosis of generalized anxiety disorder on the basis of generalized anxiety scale and clinical interviews, intolerance of uncertainty and anxiety sensitivity, willingness to participate in group meetings, tendency to continue meetings, lack of medication and written consent of parents and students. Then, 23 students were randomly assigned to experimental group and 23 students were randomly placed into control group.

Before the start of the meetings, 5 subjects did not participate in the experimental group and 7 subjects were reluctant to participate in control group and complete questionnaires. As such, 15 subjects were placed in the experimental group and 15 subjects were assigned to the control group. Consequently, the mindfulness program was introduced to the experimental group in 8 sessions (each week a meeting was held for 90 minutes). The

subjects were assessed via Generalized Anxiety Disorder Scale (GAD-7), Intolerance of Uncertainty Scale and Anxiety Sensitivity Index before and after the introduction of interventions. The GAD-7 was developed by Spitzer et al. (2006) to measure generalized anxiety disorder. The subjects would choose one of the following options: never, few days, more than half the days and nearly every day. Then, the options were scored 0, 1, 2 and 3, respectively, and 21 was determined as the highest score in the scale. The convergent validity of Generalized Anxiety Disorder Scale with Speilberger's State – Trait Anxiety Inventory was 0.71 (State Anxiety) and 0.52 (Trait Anxiety), respectively. The results of Cronbach's alpha for the first and second halves were 0.82 and 0.74, respectively. Then, the correlation between two halves was equal to 0.76. The results showed that the reliability level of the inventory was acceptable. As such, it might be argued that the inventory was able to distinguish patients with generalized anxiety from normal individuals (Naeinian et al., 2011).

The Intolerance of Uncertainty Scale was developed by Freeston et al. (1994) to measure the tolerance of individuals against uncertain and undecided situations. This scale consisted of 27 items and subjects would respond to questions based on a 5-point scale (1 = never to always = 5). Buhr and Dugas (2002) argued that the Cronbach's alpha coefficient for the scale was 0.94. Furthermore, the test-retest reliability coefficient within a five-week interval was determined as 0.78 thereof.

The Anxiety Sensitivity Index (ASI) is a self-report questionnaire. This index has 16 items and subjects should respond to questions based on a 5-point Likert scale (0 = very low to very high = 4). The experience of the fear of anxiety symptoms would be determined via higher scores. The scores are ranged from 0 to 64 (Floyd, Garfield & LaSota (2005). Having evaluated the psychometric properties of this scale, it was indicated that the scale had an excellent internal consistency (the alpha level was located between 0.80 and 0.90). Furthermore, the test-retest reliability coefficient was 0.75 within a two-week interval. It should be noted that the above-mentioned criterion was 0.71 for three years. This indicated that ASI was a stable personality construct (Reiss & McNally, 1985). The data were collected before and after the intervention and the analysis of covariance was conducted using the SPSS Software (Version 18).

2.1 Procedure

Firstly, the students were given necessary explanations, including time and location of meetings, which was located in the Counseling Center of the Education Department. Then, the necessary explanations were provided in accordance with the principles of confidentiality. It should be noted that the mindfulness-based stress reduction program was firstly developed and deployed by Kabat-Zinn (1992). This technique was a combination of awareness, relaxation and meditation training techniques, including instruction on breath control and attention, observation of feelings and bodily sensations, description of these senses, accepting them without judgment, adoption of compliant thoughts and showing up in the present time, especially in everyday activities. The sessions of mindfulness-based stress reduction program was run in accordance with the following steps:

Table 1. Topics and objectives of mindfulness interventions

First Session: Introduction and establishment of relationships, expression of expectations within the treatment process, emphasis on confidentiality of sessions and promotion of awareness on the symptoms of generalized anxiety disorder (GAD)
Second Session: Presentation of logic of mindfulness training and body inspection through meditation and release muscle tension associated with the stress
Third Session: Instruction on relaxation training through evoking groups of muscles that were previously summoned through muscle relieve-tension. Regarding this step, some indoor tasks should be undertaken, including body inspection, yoga, sejant meditation focusing on the breath, awareness of uninteresting events and awareness of a distinct normal event.
Fourth Session: Generalization of relaxation training across different situations and everyday activities. This included some recommended indoor tasks, including body inspection, yoga, walking meditation and sejant meditation.
Fifth Session: Exercitation of instruction on breath control and breadth meditation (generalized awareness through observing physical senses). During the meeting, halfway and exchange of views were addressed. Regarding the indoor tasks, it was attempted to encourage participants to start experiencing a combination of exercises that were previously introduced and those exercises that were commensurate with their needs, including body inspection, yoga, walking meditation and sejant meditation.

Sixth Session: Firstly, the homework was discussed and dealt with thereof. Then, the sejant meditation was deeply and lengthily practiced in this session. Finally, the session content was directed to conscious attention to environmental sounds.

Seventh Session: Generalization of instruction on breath control and meditation in daily activities. Thus, indoor tasks included body inspection, walking meditation, sejant meditation and mindfulness in everyday life. Then, participants were asked to apply these techniques, such as washing dishes, cleaning the house, eating and shopping, in their daily activities.

Eighth Session: This session was started with body inspection and it continued with sejant meditation. Then, the discussion was focused on a concise overview of the course and participants were encouraged to discuss their experiences in the entire course.

3. Findings

Descriptive components of groups (pre-test and post-test) are presented in Table 2.

Table 2. Descriptive components of scores in the experimental and control groups

Group	Variables	Number	Pre-test		Post-test	
			M	SD	M	SD
Experimental Group	Generalized anxiety	15	17.86	2.23	13.80	3.01
	Intolerance of uncertainty	15	91.86	11.58	83.46	28.99
	Anxiety sensitivity	15	58.20	12.08	48.26	22.19
	Fear of bodily sensations	15	18.86	2.19	14.06	4.40
	Fear of lack of cognitive control	15	10.20	1.97	7.80	2.10
	Fear of being seen by others	15	11.73	2.08	9.40	3.23
Control Group	Generalized anxiety	15	18.20	1.95	17.02	2.09
	Intolerance of uncertainty	15	89.73	15.11	85.40	20.87
	Anxiety sensitivity	15	61.60	24.62	60.93	23.87
	Fear of bodily sensations	15	15.60	4.96	12.26	6.32
	Fear of lack of cognitive control	15	8.13	2.82	7.40	4.53
	Fear of being seen by others	15	10.33	2.79	10.20	2.54

As seen in Table 2, the results showed that, compared to pre-test stage, the experimental group has changed in the post-test stage. Having reviewing and confirmed the assumption of equal variances and normal distribution of scores through Levine Test and analysis of covariance, it was attempted to examine the differences in the effectiveness of mindfulness-based stress reduction on the symptoms of generalized anxiety, anxiety sensitivity and intolerance of uncertainty.

Table 3. Summary of analysis of covariance on scores of generalized anxiety, intolerance of uncertainty and anxiety sensitivity

	SS	df	MS	F	Sig	Eta
Pre-test	47.865	1	47.865	8.186	0.008	0.23
Generalized anxiety Group	81.387	1	81.387	13.920	0.001	0.34
Error	157.868	27	5.847			
Pre-test	2428.621	1	2428.621	11.458	0.002	0.29
Intolerance of uncertainty Group	153.914	1	153.914	0.762	0.40	0.02
Error	5722.713	27	211.952			
Pre-test	8138.183	1	8138.183	34.17	0.001	0.83
Anxiety sensitivity Group	696.816	1	696.816	11.48	0.002	0.29
Error	1637.684	27	60.655			

As seen in Table 3, the post-test analysis of covariance on scores of generalized anxiety (after adjustment of pre-test) showed that the elimination of the pre-test scores have led to significant impact of intervention on post-test scores. According to the results ($F= 13.920$, $df=1.27$ and $p<0.001$) and taking into account the eta square, it might be argued that 34 percent of these changes was due to introduction of mindfulness-based stress reduction program. Thus, the first hypothesis was confirmed and it was concluded that mindfulness was effective in reducing symptoms of generalized anxiety.

The results depicted in Table 3 on the research variable, namely intolerance of uncertainty, indicated that the differences between pre-test and post-test scores of the two groups were statistically significant ($F=0.76$, $df=1.27$ and $p0>0.40$). Furthermore, it was found that mean scores on intolerance of uncertainty were not significantly different in the experimental and control groups. In this regard, the second hypothesis was rejected and it could be concluded that mindfulness was not effective in intolerance of uncertainty in patients with generalized anxiety.

The results depicted in Table 3 on the research variable, namely anxiety sensitivity, indicated that (after adjustment of pre-test) the elimination of the pre-test scores have led to significant impact of intervention on post-test scores. According to the results ($F= 11.48$, $df=1.27$ and $p<0.002$) and taking into account the eta square, it might be argued that 29 percent of these changes in anxiety sensitivity was due to introduction of mindfulness-based stress reduction program. Thus, the third hypothesis was confirmed and it was concluded that mindfulness was effective in reducing anxiety sensitivity in patients with generalized anxiety.

4. Discussion and Conclusion

This study attempted to gauge the impact of mindfulness-based stress reduction on intolerance of uncertainty and anxiety sensitivity among students with generalized anxiety disorder. Regarding the first hypothesis, it was attempted to examine the effectiveness of mindfulness-based stress reduction on reducing the symptoms of generalized anxiety disorder. Consequently, the results indicated that mindfulness-based stress reduction was effective in reducing the symptoms of generalized anxiety disorder. This finding was consistent with the findings of such studies as Wells (1999), Sugiura (2004) and Lovas & Barsky (2010). Nowadays, many treatments have been proposed to treat the generalized anxiety disorder. Given this, the mindfulness-based stress reduction program was considered the most common method and it was delivered in the form of stress reduction and relaxation training programs (Kabat-Zinn, 1989, 1990). Vollestad, Sivertsen & Nielsen (2011) found that the mindfulness-based stress reduction treatment program alleviated the symptoms of anxiety, worry and state-trait anxiety in patients with anxiety disorders. Similarly, Tanay, Lotan & Bernstein (2012) indicated that mindfulness training was effective in reducing mood and anxiety symptoms. Furthermore, it was argued that although mindfulness was positively correlated with peace of mind, psychological composure and mental health, self-awareness was linked to low levels of psychological composure (De More & Cohen, 2005). In addition, mindfulness facilitated the positive evaluation process and reduced the detrimental consequences of stressful situations. Actually, this concept made difference in resorting to unsuitable coping strategies to reduce the problems related to stressful situations. Ineffective coping styles, such as catastrophizing, were directly related to mood disorders (Garnefski & Kraaij, 2006).

The results of this study showed that mindfulness reduced the anxiety sensitivity. Furthermore, awareness paid an in-depth attention to deep cognitive and emotional processes and played a major role in mental functions (Garnefski & Kraaij, 2005). The anxiety sensitivity was an underlying factor that paved the way for advent of anxiety disorders, especially panic attack disorder. However, other studies showed that this construct was associated with several other anxiety disorders (Viana & Rabian, 2008). Knapp et al. (2015) examined the role of anxiety sensitivity on generalized anxiety among adolescents and found that there was a significant relationship among anxiety sensitivity, worry and experiencing the generalized anxiety symptoms so that adolescents with high levels of anxiety sensitivity were more worried and represented more server anxiety symptoms. In this regard, the results of some studies show that anxiety sensitivity is subject to change in stressful situations as well as in response to treatment (Bernstein & Zolensky, 2007). As such, stressful events lead to more intense anxiety sensitivity and therapeutic interventions lead to reduced level of anxiety sensitivity (Marshall, Miles, & Stewart, 2010).

Hamill and Pickett (2015) conducted a research titled “investigating the effectiveness of mindfulness-based cognitive therapy on behavioral inhibition and psychological stress” and found that this intervention was effective in reducing the behavioral inhibition system sensitivity, reducing the avoidance and evasive behaviors and increasing the ability to control psychological distress. It should be noted that mindfulness-based stress reduction interventions have always been considered as effective complementary therapies in reducing the levels

of anxiety sensitivity and ultimately generalized anxiety. Fundamental mindfulness, which is based on the acceptance of unpleasant thoughts and different emotional states, dramatically boosts individuals' ability to control their thoughts and emotions. This factor allows individuals to experience the whole range of thoughts and emotions without experiencing emotional distress in mind. Furthermore, fundamental mindfulness can dramatically reduce anxiety and stress and increase concentration for those who use this method. This factor causes individuals to keep their emotional stability in the face of automatic thoughts, which may have emotional burden and turn into meta-worry. Consequently, they do not care about annoying thoughts and they allow thoughts to pass through their minds.

Furthermore, this research concludes that mindfulness-based stress reduction program can have effective and positive impacts on reducing the intolerance of uncertainty. The results show that mindfulness does not affect intolerance of uncertainty in patients with generalized anxiety. Some patients with generalized anxiety disorder report that they prefer enduring the negative consequences of problems to enduring the uncertainty. In general, clinical observations suggest that intolerance of uncertainty plays a major role in increased level of worry and generalized anxiety disorder (Heimberg, Turk, & Mennin, 2004). De Jong-Meyer, Beck and Riede (2009) found that individuals who had higher levels of intolerance of uncertainty were afflicted with higher levels of worry and mental rumination. In other words, intolerance of uncertainty, worry and mental rumination had a causal relationship with each other. Gosselin, Ladouceur, Morin, Dugas and Baillargeon (2006) conducted a study to address concurrent medical treatment of intolerance of uncertainty in patients with generalized anxiety and found that if intolerance of uncertainty received due attention, the consumption of benzodiazepines would be reduced or terminated during a one-year period. Conversely, the present study concludes that mindfulness intervention does not indicate any effectiveness in relation to reduction of intolerance of uncertainty in patients with generalized anxiety. Thus, further studies should be undertaken so that different results may be obtained. In this regard, it is suggested that further studies consider the effectiveness of other therapeutic protocols as well as the impact of intolerance of uncertainty and anxiety sensitivity on other anxiety disorders.

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