

# The Relationships Between Anxiety Sensitivity, Irritability, Intrusive Thoughts and Sleep Problems in Patients With Generalized Anxiety Disorder



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## ABSTRACT

**Objective:** The present study aimed to investigate the relationships between anxiety sensitivity (AS), irritability and intrusive thoughts (IT) and sleep problems in patients diagnosed with generalized anxiety disorder (GAD).

**Methods:** The study population consisted of all patients with GAD who referred to counseling and psychological centers in Isfahan, Iran, in 2015. A total of 49 patients were selected out of the whole population as the study samples using convenience sampling method. To collect data, a questionnaire covering demographic and clinical information, the anxiety sensitivity index-revised, the thought control questionnaire, the irritability scale, and the sleep problems questionnaire were used. Using the SPSS22 software, the collected data were analyzed by multiple regression analysis and Pearson correlation test.

**Results:** Results of multiple regression analysis showed that problems of sleep onset, sleep continuity, and waking up could be anticipated by anxiety sensitivity, irritability and intrusive thoughts in patients with GAD. Results of Pearson correlation test indicated significant relationships between AS and sleep problems related to sleep onset, sleep continuity and waking up; also between irritability and sleep onset problems; and finally between IT and sleep waking up problems ( $P < 0.05$ ). However, no significant relationship was observed between irritability and sleep continuity and waking up problems or between IT and sleep onset and sleep continuity problems ( $P > 0.05$ ).

**Conclusion:** According to the results, the anxiety sensitivity has more relationship to sleep onset, sleep continuity, and waking up problems in patients with GAD.

## 1. Introduction

Generalized anxiety disorder (GAD) is a chronic anxiety disorder characterized by excessive, pervasive, and uncontrol-

lable worries. Approximately, 60% to 70% of patients with GAD complain of sleep problems (Breslau, Roth, Rosenthal, & Andreski, 1996; Monti & Monti, 2000). Compared to normal people, patients with GAD have a delayed sleep onset (Akisal, Lemmi, & Dickson, 1984),

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reduced sleep duration (Papadimitriou & Linkowski, 2005), low sleep quality (Saletu-Zyhlarz, et al. 2008), and frequent waking ups during sleep (Brenes, et al. 2009). Statistics have shown that 70% of people referring to psychiatric clinics complain of sleep disorders. These disorders can cause clinically significant distress or impairment in social and occupational functioning (Suzanne, O'Connell, Brenda, Janice, & Kerry, 2004). Sleep problems generally lead to fatigue, imbalance and incoordination, difficulty in concentration, and decreased quality of life (Harvey, 2000).

Intrusive thoughts are defined as distinct, unwanted, and recurrent cognitive events that can interrupt the flow of thoughts and prevent objective activities; these cognitive events are normally followed by negative emotions and difficulty in controlling thoughts (Segerstorm, Tsao, Alden, & Craske, 2000). Results of some studies have indicated that rumination and anxiety are highly associated with sleep problems (Pour Mohseni, 2014). Excessive rumination and high levels of anxiety cause arousal, emotional turmoil, biases, misperceptions, and finally sleep problems (Harvey, 2000). In a study, Buhr and Dugas (2002) concluded that most people with GAD have positive beliefs about their worries, frustration, hopelessness and inability to solve problems. Rumination plus worry correlates more with high levels of anxiety than rumination without worry (Patten, Choi, Gillin, & Pierce, 2000). Bahrami and Rezvan (2007) showed that anxious thoughts about physical or social issues and meta-anxiety have significant relationships with metacognitive beliefs about uncontrollability of anxiety in girls and boys.

McMahon, Broomfield and Espie (2006) showed that patients suffering from sleep problems are also more sensitive to sleep threatening symptoms, which can become symptoms of chronic sleep problems. Harvey (2000) believed that intrusive thoughts could cause arousal and emotional turmoil; they are followed by misperceptions about sleep and its duration and finally lead to the occurrence and continuation of sleep problems (Harvey, 2000). Furthermore, after a period of sleep, the activities of autonomous nervous system increase and lead to longer sleep latency in anxious people; they also have self-talks that cause cognitive arousal (Tang & Harvey, 2004). Sleeplessness can result in psychological diseases and psychological diseases may result in sleeplessness. Sleeplessness is a common problem, especially among anxious and neurotic patients. Sleep problems can also be explained in terms of stress-vulnerability model. Accordingly, vulnerability makes an individual prone to experience sleep problems. In other words, sleep problems may be initiated

because of a stressful event, such as anxiety-related problems (Meijer, Habekothé, & Wittenboer, 2000).

Anxiety sensitivity (AS) is a construct related to individual differences. AS refers to the fear of physical symptoms related to the experience of anxiety (e.g. increased heart rate, shortness of breath, dizziness, etc.). This fear is primarily resulted from the belief that anxiety-related physical symptoms finally lead to traumatic social, cognitive and physical consequences (Deacon, Abramowitz, Woods, & Tolin, 2003). From the cognitive-behavioral perspective, GAD results from cognitive distortions. Patients with GAD get easily upset over minor problems. Should a problem occur, these patients become too much concerned about potential consequences and their attention shifts from the problem to its consequences, which make them suffer more. What is very harmful in such a situation is that these patients cannot trust themselves and their ability to control their emotions and life appropriately (Halgin & Whidborne, 2013). Some studies reported significant relationship between anxiety sensitivity with sleep onset problems (Bilsky, Feldner, Knapp, Babson, & Leen-Feldner, 2016; Weiner, Meredith, Pincus & Comer, 2015).

Irritability is an excessive response to a stimulus. The term 'irritability' is used for both physiological responses and abnormal/excessive sensitivity to a stimulus. Irritability may be a behavioral response to physiological or physical stimuli (e.g. sleep problems) (Maddock et al., 2004). Lack of balance in the process of sleep can make a person extremely irritable. Lack of sleep reduces the secretion of melatonin that results in irritability, low tolerance threshold, high levels of anxiety and anxiety-related physical symptoms (DeBartolo, Brown & Barlow, 1997). Significant relationship was observed between irritability with sleep apnea (Saraiva, Henriques & Mota, 2015; Franzen, Buysse, Rabinovitz, Pollock, & Lotrich, 2010).

Since sleep problems are very common among patients with GAD, investigating the effects of psychological factors on these problems is very important. Although many studies have been conducted on the prevalence of sleep problems, these problems have hardly been studied in relation to their possible psychological causes (Tang & Harvey, 2004). In some studies (e.g. Harvey, 2000), the role of intrusive thoughts in sleep problems has been studied. However, the effects of different psychological factors on subscales of sleep problems (sleep onset, sleep continuation and waking up) have been overlooked. Accordingly, the present study aimed to investigate the relationships between AS, irritability, IT with sleep problems in patients diagnosed with GAD.

## 2. Methods

This cross-sectional study has a correlational design. The study population in the present correlational study consisted of all patients with GAD who referred to counseling and psychological centers in the city of Isfahan in 2015. Using convenience sampling method and based on the following inclusion/exclusion criteria, 49 patients were recruited as the study sample according to the following criteria.

Inclusion criteria were having GAD based on psychiatrists' diagnosis and DSM-5 criteria, and being 20-67 years old. The exclusion criteria were suffering from severe psychiatric disorders, such as schizophrenia spectrum disorders, bipolar spectrum disorders, and serious neurological disorders affecting sleep like dementia, being under anti-anxiety medications with side effects such as drowsiness, and not answering more than 5% of the items.

The criterion variable included sleep problems (sleep onset, sleep continuity and waking up from sleep). The predictor variables are anxiety sensitivity, irritability and coping with intrusive thoughts. The demographic variables comprised age, gender, education level, marital status, socioeconomic status (SES), employment status, and birth order.

The anxiety sensitivity index-revised (ASI-R) is a 16-item self-report questionnaire, which is scored on a 5-point Likert-type scale (0 = very little to 4 = very much). Thus, its scores range between 0 and 64 (Floyd, Garfield & Marcus, 2005). Analysis of psychometric properties of this scale has indicated an excellent internal consistency ( $80\% < \alpha < 90\%$ ). Test-retest reliability of this scale have been reported as 75% after a 2-week interval and 71% after a 3-year interval indicating that the ASI-R is a stable personality measure (Reiss, Peterson, Gursky, McNally, 1986). Examined on Iranian samples, internal consistency, test-retest reliability and split-half reliability of this scale have been reported as 93%, 95%, and 97%, respectively. Validity of the ASI-R has been confirmed using concurrent validity (a significant correlation of 56% has been reported between the ASI-R and the symptom checklist-90), correlations between subscales and the entire scale (ranging between 74% and 88%) (Moezradi Manesh, Mir Jafari, Goodarzi & Mohammadi, 2007).

The Thought Control Questionnaire (TCQ) was developed by Wells (2006). The 29-item TCQ assesses the effectiveness of strategies used to control unpleasant or unwanted thoughts (distraction, social, worry, punishment and re-appraisal). TCQ is scored on a 4-point Likert-type scale ranging from 1 (never) to 4 (almost always). Fata, Motaei, Moloudi, and Ziaei (2010) assessed convergent and discriminant validity of the TCQ using the Beck anxiety in-

ventory, the Beck depression inventory-II, and the general health questionnaire-28. They confirmed the questionnaire validity to be used among Iranian participants. The following internal consistencies have been reported for the TCQ subscales: distraction (71%), worry (72%), social (76%), punishment (68%) and re-appraisal (74%). Moreover, a test-retest reliability of 83% has been reported for the total scale.

Carver and Scheier designed the Irritability Scale (IS) based on the EAS (Emotionality, Activity & Shyness) scale. The 15-item IS is scored on a 5-point Likert-type scale (1 = it is not like you at all, 5 = it is much like you). Helplessness, fear, and anger are the three subscales of irritability. The IS actually assesses inherited personality characteristics (Carver & Shier, 1990).

The Sleep Problems Questionnaire (SPQ) is a 17-item scale designed by Mohammadi and colleagues (2009) to be used in Iranian population. This questionnaire assesses sleep problems in terms of three subscales of sleep onset (5 items), sleep continuity (7 items), and waking up (5 items). The items are answered and scored on a Yes-No basis (Yes = 2, No = 0). Thus, the minimum and maximum scores are 0 and 10 for items related to sleep onset and waking up and 0 and 14 for items related to sleep continuity, respectively. According to Waltz and Bussel content validity index, content validity of the SPQ has been reported 3.5. Test-retest reliability of the SPQ has been reported as 0.86 (Zeighami Mohammadi & Shahparian, 2012).

The data collection process started in May 2015 and finished in July 2015. In accordance with DSM-5 criteria and psychiatrist' diagnosis, 49 patients with GAD were enrolled in the study. After visiting the cooperative counseling and psychological centers and identification of cases with GAD, the participants were introduced to the study's objectives. The participants were also assured that their information would remain confidential and no name would be mentioned in the study. The questionnaires were distributed among the participants in the form of a booklet to be visually interesting. An instruction was written for each individual questionnaire. After scoring the questionnaires based on their scoring procedures, the collected data were analyzed by SPSS-22.

Using SPSS-22, the data were analyzed through descriptive statistics such as mean and standard deviation and inferential statistics, including multiple regression analysis and Pearson correlation test.

## 3. Results

The average age of the study participants was 44.65 years (an age range of 24 to 67 years). Demographic characteristics of the participants are presented in Table 1.

Table 2 presents descriptive statistics of the study variables. In order to use linear regression analysis, two assumptions should be met; first, no curved relationship between independent and dependent variables and second no or little multicollinearity.

Lack of curved relationships: in order to ensure the absence of curved relationship between linear combination of predictor variables and criterion variable, remaining values were calculated. The results indicated no curved relationship between linear combination of predictor variables and criterion variable.

Lack of multicollinearity: given that all obtained values were less than cut-off points for the indices of tolerance (0.4) and VIF (2.5), there was no high multicollinearity between the predictor variables. Thus, the present study

allows using linear regression analysis to assess the effects of predictor variables on criterion variable.

### Inferential statistics

Tables 3, 4, and 5 present results of multiple regression analysis. As shown in Table 3, the relationships between AS and irritability with the subscale of sleep onset were significant ( $P < 0.05$ ). Moreover, variables entered the regression equation (AS, irritability and IT) could explain 38% of variance in subscale of sleep onset.

According to Table 4, the relationships between AS and irritability and subscale of sleep continuity were significant ( $P < 0.05$ ). Moreover, variables entered the regression equation (AS, irritability and IT) could explain 17% of variance in subscale of sleep continuity.

Table 1. Demographic characteristics of the study participants

Group	Variable	No.	%
Gender	Male	23	46.9
	Female	26	53.1
Marital status	Single	10	20.4
	Married	38	77.5
	Divorced	1	2
Education level	Elementary school	2	4.1
	Guidance school	1	2
	High school	13	26.5
	BA/BS	21	42.9
	MA/MSc./ PhD	12	24.5
Employment status	Employed	24	49
	Unemployed	25	51
Birth order	First-born	15	30.6
	Middle child	32	65.3
	Last-born	2	4.1
Social-economic status	High	11	22.4
	Middle	29	59.5
	Low	9	18.4

**Table 2.** Descriptive statistics of the study variables

Variable	Mean	SD	Variance	Minimum	Maximum
Sleep problems	22.4	3.76	14.16	16	32
Sleep onset	5.87	1.60	2.56	4	14
Sleep continuity	9.83	1.62	2.63	6	14
Waking up	6.69	1.71	2.92	4	10
Anxiety sensitivity	34.69	10.02	100.50	12	53
Irritability	33.04	6.39	40.95	21	45
Intrusive thoughts	67.75	9.88	97.64	54	95

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As shown in Table 5, the relationships between AS and irritability with subscale of waking up were significant ( $P < 0.05$ ). Moreover, variables, which entered the regression equation (AS, irritability and IT) could explain 36% of variance in subscale of waking up.

According to Table 6, significant direct relationships exist between AS and sleep onset, sleep continuity, and waking up ( $P < 0.05$ ). In addition, there are significant

relationships between irritability with sleep onset and intrusive thoughts with waking up ( $P < 0.05$ ).

#### 4. Discussion

We aimed to investigate the relationships among anxiety sensitivity, irritability, and intrusive thoughts, with sleep problems in patients diagnosed with GAD. In this section, results of the research are studied.

**Table 3.** Regression results of the relationships of AS, irritability, and IT with the subscale of sleep onset

Model						
Model	R	R <sup>2</sup>	R <sup>2</sup> (Adjusted)	SE		
	0.61	0.38	0.33	1.30		
Analysis of Variance (ANOVA)						
Model	Sum of Squares	df	Mean Square	F	P-Value	
Regression	46.81	3	15.60			
Remaining	76.45	45	1.69	9.18	0.001*	
Total	123.26	48	-			
Coefficients						
Model	Non-Standardized Coefficients		Standardized Coefficients		T	P-Value
	$\alpha$	B	SE	Beta		
Anxiety sensitivity		0.05	0.02	0.34	2.33	0.024*
Irritability	1	0.09	0.03	0.38	2.78	0.008*
Intrusive thoughts		-0.003	0.02	-0.01	-0.12	0.902

\* $P < 0.05$ .

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**Table 4.** Regression results of the relationships of AS, irritability and IT with the subscale of sleep continuity

Model						
Model	R	R <sup>2</sup>	R <sup>2</sup> (Adjusted)	SE		
Model	0.42	0.17	0.12	1.52		
Analysis of Variance (ANOVA)						
Model	Sum of Squares	df	Mean Square	F	P-Value	
Regression	22.32	3	7.44			
Remaining	104.37	45	2.31	3.20	0.032*	
Total	126.36	48	-			
Coefficients						
Model	Non-Standardized Coefficients		Standardized Coefficients		T	P-Value
	α	B	SE	Beta		
Anxiety sensitivity		0.07	0.02	0.45	2.71	0.009*
Irritability	8.17	-0.01	0.04	-0.05	-0.35	0.727
Intrusive thoughts		-0.006	0.02	-0.03	-0.26	0.796

\*P < 0.05.

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According to results (Tables 3, 4, 5, and 6) variables of AS, irritability, and IT had a different effect on subscales of sleep problems. AS and irritability had direct relationships with sleep onset. In other words, people with higher levels of AS and irritability experienced longer sleep onset latency. In those people, controlling the levels of AS and irritability could affect their awakening, too. Therefore, based on the study results, there is a significant relationship between AS and sleep problems in patients with GAD. This finding was consistent with results of a study conducted by [McMahon, Broomfield and](#)

[Espie \(2006\)](#). They stated that in a group of patients with GAD, those who suffered from sleep problems were also more sensitive to sleep threatening symptoms and those symptoms could become symptoms of chronic sleep problems. The results of this study indicated a significant relationship between irritability and sleep problems, especially sleep onset problems.

Accordingly, people with higher levels of irritability also suffered from sleep problems. When people overreact to specific situations, they experience irritability. When irritability increases, daily activities cannot con-

**Table 5.** Regression results of the relationships of AS, irritability and IT with the subscale of waking up

Model						
Model	R	R <sup>2</sup>	R <sup>2</sup> (Adjusted)	SE		
Model	0.60	0.36	0.31	1.41		
Analysis of Variance (ANOVA)						
Model	Sum of Squares	df	Mean Square	F	P-Value	
Regression	50.79	3	16.63			
Remaining	89.61	45	1.99	8.50	0.001*	
Total	104.40	48	-			
Coefficients						
Model	Non-Standardized Coefficients		Standardized Coefficients		T	P-Value
	α	B	Std. error	Beta		
Anxiety sensitivity		0.09	0.02	0.56	3.80	0.001*
Irritability	9.77	-0.01	0.03	-0.04	-0.31	0.756
Intrusive thoughts		-0.08	0.02	-0.51	-3.90	0.001*

\*P < 0.05.

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**Table 6.** Pearson coefficients among the study variables

Variable	Number	Sleep Onset		Sleep Continuity		Waking Up	
		Pearson Coefficient	P-Value	Pearson Coefficient	P-Value	Pearson Coefficient	P-Value
Anxiety sensitivity	49	0.51	0.001*	0.41	0.001*	0.37	0.001*
Irritability	49	0.54	0.001*	0.15	0.282	0.25	0.080
Intrusive thoughts	49	0.06	0.637*	0.06	0.637	-0.32	0.024*

\*P < 0.05.

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tinue effectively and issues related to daily problems may affect sleep patterns as well. Therefore, based on the study results, there is a significant relationship between irritability and sleep problems in patients with GAD. The study results also showed no significant relationship between IT and sleep problems, especially subscales of sleep onset and sleep continuity. These findings were not in line with results of studies conducted by Pour Mohseni (2014), Mansouri, Farnam, Bakhshipour, & Mahmood, (2010), Harvey (2000) and Paten, Choi, Gillin, & Pierce, (2000). In these studies, rumination and intrusive thoughts significantly affect people’s sleep patterns. Because no research was found specifically related to this topic, only studies related to rumination and its effects on anxiety disorders were reviewed for this study. Lack of a significant relationship between IT and sleep onset problems does not rule out the effect of intrusive thoughts on sleep patterns, because when people try to control and cope with their intrusive thoughts, they actually try to weaken the relationship between intrusive thoughts and sleep problems.

The results of this study revealed a significant direct relationship between SA and sleep continuity indicating that higher levels of AS could lead to more significant problems related to sleep continuity and vice versa. Sleep continuity problem is a subscale of sleep problems in patients with GAD. In other words, negative cognitive evaluations are a risk factor in the creation and continuation of anxiety problems. The occurrence of problems in everyday life and too much worry about them (negative evaluations) increase AS (Halgin & Whidborne, 2013). Therefore, AS and catastrophic interpretations of daily issues can disrupt sleep continuity. The results showed no significant relationship between the two other subscales of sleep problems (Irritability & IT) with sleep continuity indicating that those variables cannot significantly affect sleep continuity. Nonetheless, these findings could be due to sampling errors and other circumstances could reveal other results.

According to the study results, each variable affects waking up subscale differently. The findings indicated a direct and significant relationship between AS and waking up and an indirect significant relationship between IT and waking up. These findings indicated that people with higher levels of AS have more significant waking up problems and vice versa. On the other hand, people who can adequately control their intrusive thoughts suffer less from waking up problems. These results were consistent with results of a study (Harvey, 2000) which reported that intrusive thoughts could cause arousal and emotional distress during sleep and lead to sleep continuity problems. Results of the present study indicated no significant relationship between irritability and waking up subscale indicating that levels of irritability cannot significantly affect waking up patterns. Helplessness, fear, and anger are subscales of irritability and temperamental tendencies are inherited (Carver & Scheier, 1990). Absence of relationship between irritability and waking up problems can be explained by considering that people’s helplessness, fear, and anger are normally manifested more in their conscious behaviors; therefore, they do not significantly affect the people’s waking up patterns.

As mentioned earlier, 5 questionnaires were used to collect data for the present study. However, problems such as uncooperative samples or lack of access to them resulted in a small sample size. Furthermore, many participants were reluctant to properly share their personal and clinical information with the researcher. Since the identification of gender-based differences in patients with GDA may lead to find better patterns of treatment of sleep problems, analysis of patients with GAD in terms of gender seems an interesting topic for future studies. Another limitation of the study was related to the samples who were selected from the patients referring to psychiatric clinics, counseling and psychological services. Despite the lack of hypnotic drugs as the inclusion criterion for the selection, use of some medications prescribed by a psychiatrist may have affected their sleep. We suggest

that this topic be studied in a population of patients with GAD who have not received any medical intervention.

In conclusion, the role of anxiety sensitivity in the three stages of sleep onset, sleep continuity, and awakening in patients with generalized anxiety disorder diagnosis is obvious. In other words, the concern about anxiety symptoms in these patients becomes a new source of anxiety, which negatively affects all three stages of sleep. Increased irritability at the sleep onset and more intrusive thoughts within awakening from sleep affect these patients. Sleep improvement in these patients not only needs intrusive thoughts control, but also controlling the level of excitement and particularly their anxiety sensitivity.

### Ethical considerations

The participants were fully aware of the study objectives and willing to participate in it. In addition, they may leave the project at any time.

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### Conflict of Interest

The authors declared no conflict of interests.

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