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Evaluation of the Effectiveness of Positive Psychotherapy on Anxiety, Perceived Stress, and Medication Adherence in Patients with Asthma

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Quantitative Study

Abstract

Background: Asthma is considered to be a psychosomatic disease with different physical and mental dimensions, each of which can exacerbate the other, and suitable treatment of this disease requires appropriate medical and psychological measures. The present study was an attempt to evaluate the effectiveness of positive psychotherapy on anxiety, perceived stress, and medication adherence in patients with asthma.

Methods: The present quasi-experimental study was conducted with a pretest-posttest, 2-group design and follow-up. The statistical population included all patients with asthma referred to the specialized and sub-specialized center of Milad Hospital in Tehran, Iran, in 2019. To form 2 groups, first, 30 people were selected using purposeful sampling method (considering the inclusion and exclusion criteria). Then, 15 people were randomly assigned to the experimental group and 15 people were assigned to the control group. The study research tools included the Beck Anxiety Inventory (BAI; 1990), Perceived Stress Questionnaire Scale (PSS; Cohen et al., 1983), and Morisky Medication Adherence Scale (MMAS; 2010). The collected data were analyzed using the analysis of covariance (ANCOVA) in SPSS software.

Results: The results showed that positive psychotherapy had a significant effect on the components of anxiety, perceived stress, and medication treatment in patients with asthma ($P < 0.05$). Furthermore, the effectiveness of positive psychotherapy was significant on the components of anxiety and medication adherence over time ($P < 0.05$).

Conclusion: It can be concluded that positive psychotherapy was effective in reducing anxiety and increasing medication adherence.

Keywords: Positive psychotherapy; Anxiety; Perceived stress; Medication adherence; Asthma

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Introduction

Asthma is considered to be a psychosomatic disease with different physical and mental dimensions, each of which can exacerbate the other, and the suitable treatment of this disease requires appropriate medical and psychological measures (Murdock, Adams, Pears, & Ellis, 2012). Studies have indicated that people with asthma are twice as likely as people without this disease to experience psychological problems (Wood & Joseph, 2010). Several studies have reported a high prevalence of psychiatric disorders, especially anxiety and depression, among patients with asthma (Rohan, Drotar, Perry, McDowell, Malkin, & Kercsmar, 2013). Today, this disorder is highly prevalent and is recognized as the most common chronic disease in the world due to many etiologic factors such as social status, abnormal living conditions, economic status, environmental stress, and chronic diseases (Tobin et al., 2015). Anxiety is a very unpleasant and often vague feeling that is associated with 1 or more physical symptoms, like a feeling of tightness in the chest, palpitations, and restlessness.

Based on the studies conducted in this regard, the degree of overlap between asthma and anxiety is high, and some psychological disorders such as anxiety have been recognized as effective factors in the development of asthma (Pateraki & Morris, 2018). Thus, due to the overlap of asthma and anxiety, people with asthma have negative thoughts about their abilities and mentally feel powerless over the asthma symptoms and attacks, and these negative thoughts and cognitive distortions exacerbate the symptoms of this disease (Fidler et al., 2019). Another condition associated with asthma is perceived stress (Kimura, Yokoyama, Kohno, Nakamura, & Eboshida, 2009). Stress is a serious threat that can result in mental or physical disease or may have significant negative effects on patients' recovery (Chai & Low, 2015). According to Lazarus and Folkman (1984), perceived stress is one's cognitive assessment of negative life events. Perceived stress is defined as the degree to which situations in one's life are assessed as stressful (Baker, Nguyen-Feng, Nilakanta, & Frazier, 2020). Given the problems of patients with obstructive pulmonary disease, psychological interventions will be useful in reducing their perceived anxiety and stress (McGovern, Arcoleo, & Melnyk, 2019). Positive CBT increases the existing interpretive schemas and creates a wider range of treatment options when using therapeutic interventions with clients and their families (Bannink, 2013). By increasing the intrinsic motivation of the clients and through positive emphases, it is possible to apply CBT in a shorter period of time. Positive CBT also provides clients with more autonomy and makes the conversations more pleasurable, which in turn reduces stress, depression, and fatigue in the clients (Bannink, 2013). The results of a study conducted by Kord Mirzanikouzadeh (2016) showed that positive psychotherapy was effective in promoting the resilience of drug addicts. Moreover, the results of a study conducted by Jabbari, Shahidi, and Mootabi (2014) showed that positive trainings were more effective than CBT in reducing depression symptoms, reducing dysfunctional attitudes, and increasing life satisfaction and happiness; however, both training methods were effective in reducing anxiety symptoms. Regarding the effectiveness of positive psychotherapy, the results of the study by Nikmanesh and Zandvakili (2015) showed that positivity education was effective on quality of life (QOL), depression, anxiety, and stress in adolescent offenders.

Considering the effective role of psychological factors involved in asthma and its high prevalence, as well as the effects of positive psychotherapy on anxiety and follow-up treatment, it is evident that asthma patients are prone to a very high risk

of exposure to stress and anxiety conditions, resulting in inability to control stress and anxiety conditions, acute asthma attacks, and frequent hospitalizations. Considering the high medical costs of asthmatic patients and the resulting socioeconomic injuries, it is necessary to provide some solutions in this regard in order to improve the conditions and life of asthmatic patients, and reduce the frequency of hospitalization in these patients. The aim of this study was to investigate the effectiveness of positive psychotherapy on anxiety and adherence to treatment in asthmatic patients.

Methods

The present quasi-experimental study was conducted with a pretest-posttest design, follow-up, and a control group. The statistical population of this study included all asthmatic patients referred to the specialized and subspecialty center of Milad Hospital in Tehran, Iran, in 2019, from among which 45 eligible individuals (based on the inclusion and exclusion criteria) volunteered to participate by available sampling method and were randomly assigned to 2 groups of positive psychotherapy training and 1 control group. The number of subjects was calculated based on similar studies considering the effect size of 0.40, the confidence interval (CI) of 0.95, the test power of 0.80, and a loss rate of 10% in each group of 15 people. The inclusion criteria were minimum education of diploma, minimum age of 25 years and maximum age of 55 years, and an informed consent to participation in the study. The exclusion criteria included mental disorders requiring immediate treatment (such as psychotic symptoms) and drug dependence. After identifying asthmatic patients based on the patient's records, 45 patients with the inclusion criteria were identified and randomly assigned to the 2 experimental groups and 1 control group. All subjects received written information about the research and only participated in the research if they wished. The participants were assured that all information would remain confidential and would be used for research purposes only. In order to respect their privacy, the participants' names and surnames were not registered. Moreover, after the end of the study, more effective treatment was performed for the patients in the control group. Participants were included in the study regardless of whether they had anxiety or not. This research was approved by the ethics committee of Hormozgan University of Medical Sciences, Iran, with the code IR.HUMS.REC.1399.083.

Beck Anxiety Inventory: The Beck Anxiety Inventory (BAI) is a 21-item scale used to assess the severity of restlessness and anxiety in subjects. The total BAI score ranges between 0 and 63. A score lower than 9, 10-20, 21-30, and 31 or above, respectively, indicates lack of anxiety, mild anxiety, moderate anxiety, and severe anxiety (Beck & Steer, 1991). The results of the study by Kaviani and Mousavi (2008) showed that the BAI had good validity ($P < 0.001$; $r = 0.72$), reliability ($P < 0.001$; $r = 0.83$), and internal consistency (alpha = 0.92).

Perceived Stress Scale: The Perceived Stress Scale (PSS) was developed in 1983 by Cohen et al. and includes the 4-item, 10-item, and 14-item versions, which are used to assess perceived general stress over the past month. In the present study, the 10-item version of this questionnaire was used. Cohen, Kamarck, and Mermelstein (1983) stated that high scores on the PSS indicate high psychological stress. Khalili, Sirati, Ebadi, Tavallai, and Habibi (2017) reported the Cronbach's alpha coefficient of this scale at 81%, which is an acceptable level. Furthermore, the content validity of the questionnaire was at an acceptable level in the present study.

Table 1. Positive Psychotherapy Sessions

Sessions	Content
1	Lack of positive resources perpetuates depression: The role of absence of positive emotions, The positive psychotherapy framework, therapist's role, and clients' responsibilities are discussed. Assignments: Clients are asked to write a positive introduction about an objective story of their own character abilities in about 300 words.
2	Determine specific capabilities: Clients determine their own abilities from a positive introduction and discuss the situations in which these particular abilities have helped them in the past. The 3 paths leading to happiness (pleasure, commitment, and meaning) are discussed. Assignments: Clients are asked to complete the VIA Inventory of Strengths (VIA-IS), which determines their specific abilities.
3	Nurturing specific abilities and positive emotions: The growth of specific abilities is discussed. Clients are prepared to form specific, objective, and achievable behaviors in order to develop specific capabilities. The role of positive emotions in well-being is discussed. Assignment: Clients begin to record 3 good things (large or small) that occurred during the day.
4	Good memories versus bad memories: The role of good and bad memories is discussed in terms of their role in maintaining symptoms of depression. Clients are encouraged to express feelings of anger and bitterness. The effects of staying in a state of anger and bitterness on depression and well-being are explained. Assignments: Clients are asked to discuss 3 bad memories, their related anger, and the pressure it causes.
5	Forgiveness: Forgiveness is introduced as a powerful tool that can turn anger and bitterness into neutral emotions and even positive emotions for some people. Assignments: Clients are asked to write a letter of forgiveness, and obligation to forgive the wrong person (if necessary), but it cannot be delivered.
6	Appreciation: Gratitude is discussed as durable thanks, and good and bad memories are reaffirmed with an emphasis on gratitude. Assignments: Clients are asked to write and present a letter expressing their gratitude toward a person they have never properly appreciated.
7	Midterm treatment review: Homework, forgiveness, and gratitude are both followed up. This requires more than 1 session. The importance of positive emotions is discussed. Clients are encouraged to bring in their gift journals and participate in discussions about them. Objectives related to specific abilities are reviewed. Process and progress are discussed in part. Feedback is presented on the benefits of treatment and is discussed.
8	Contentment achieving contentment through maximization is discussed in the context of pleasurable labor. Contentment is encouraged by commitment to maximization. Assignments: Clients are asked to write ways to increase contentment and write an operational plan for contentment.
9	Optimism and hope: Clients are directed to think about when they fail in an important task, when a big program is resolved, and when they are not accepted by a person. Clients are asked to pay attention to what other doors open when one door closes. Assignments: Clients are asked to determine 3 doors that closed and 3 doors that then opened in their lives.
10	Love and attachment: Active, constructive response is discussed. Clients are invited to identify the special abilities of other people. Assignments: Active-constructive feedback; Clients prepare to respond actively and constructively to positive events reported by others. Clients arrange an appointment to celebrate their own and their favorite person's special abilities.
11	Family tree of abilities: The importance of identifying family members' abilities is discussed. Assignments: Clients are asked to have their family members complete the VIA-IS and then draw a tree that includes the abilities of their family members and children. Then, the family gathers and discusses the capabilities of each member.
12	Sense of taste: Taste is introduced as awareness of pleasure and its intentional creation in the past. The painstakingly enjoyable work stipulated as a possible threat and protection against it is a sense of taste. Assignments: Clients are asked to design and execute enjoyable activities.
13	Gift of Time: Regardless of the financial situation, appreciative clients bring one of the greatest gifts, the gift of time. Ways to use certain abilities to offer the gift of time in service to someone else are discussed. Assignments: Clients are asked to gift the gift of time by doing something that requires beautiful moments of time and special abilities, such as child coaching and social services.
14	Full life: The concept of a perfect life that incorporates pleasure, commitment, and meaning is discussed. Clients are asked to complete the tests before the end of the session. Reviewed progress and persistence of capabilities are discussed, and the posttest is implemented.

Morisky Medication Adherence Scale: The Morisky Medication Adherence Scale (MMAS) is a self-report questionnaire designed by a group of researchers in 2010 and consists of 8 items. In this scale, high, moderate, and low medication adherence is indicated by a score of 8 out of 8, 6 out of 8, and less than 6, respectively (Al-Qazaz et al., 2010). In a study conducted by Moharamzad et al. (2015), the validity of the Persian version of this questionnaire was reviewed and confirmed using factor analysis. Moreover, the reliability coefficient of the Persian version was reported at 0.89.

Positive psychotherapy was performed in 14 90-minute sessions twice a week for 2 months based on the educational package presented by Seligman (2002). The validity of this protocol has been approved by its creators, and it has high face and content validity. Furthermore, the content validity of this educational package was confirmed by 5 psychologists of Allameh Tabataba'i University, Iran, before being used in this study. A summary of the positive psychotherapy sessions is presented in table 1.

In order to describe the data, central indices and dispersions such as mean and standard deviation (SD) were used. For data analysis, with repeated measures analysis of variance (ANOVA) and Tukey and Bonferroni follow-up tests were used. It is worth noting that to investigate the interventions, test assumptions, Levene's test (to investigate the homogeneity of variances), Kolmogorov-Smirnov test (for normalization of data distribution), Box's M test, and Mauchly's test of sphericity were used. To compare the 3 groups in terms of gender and age, Chi-Square test and ANOVA were used, respectively. The statistical analysis was performed using SPSS software (version 22; IBM Corp., Armonk, NY, USA). The significance level of the tests was considered to be 0.05.

Results

The mean ± SD of age was 42.11 ± 7.80 years in the positive psychotherapy group and 41.80 ± 7.81 years in the control group. There was no significant difference between the 2 groups in terms of age (P = 0.377). The minimum and maximum ages were 33 and 56 years in the positive psychotherapy group, and 30 and 48 years in the control group, respectively. Descriptive indices (mean and SD) of the pretest, posttest, and follow-up scores of anxiety and medication adherence in the experimental groups (positive therapy and immunization against stress) and the control group are presented in table 2.

As shown, the mean posttest scores of both anxiety and perceived stress scales in the positive therapy group show a decrease compared to the pretest. Based on the results presented in this table, it can be stated that positive therapy and immunization against stress have reduced the components of anxiety and perceived stress in patients with asthma.

Table 2. Mean and standard deviation of components of anxiety and medication adherence in the study stages in the experimental and control groups

Group	Variables	Index	Pretest	Posttest	Follow-up
Positive Psychotherapy	Anxiety	Mean ± SD	25.33 ± 4.58	20.40 ± 3.07	22.00 ± 3.16
Control		Mean ± SD	26.07 ± 4.61	25.60 ± 3.89	25.93 ± 3.59
Medication adherence	Medication adherence	Mean ± SD	37.67 ± 4.45	47.27 ± 5.12	46.07 ± 5.23
Control		Mean ± SD	38.73 ± 5.01	38.33 ± 7.39	40.07 ± 7.52
Positive Psychotherapy	Perceived stress	Mean ± SD	21.87 ± 4.81	15.87 ± 4.56	17.13 ± 3.36
Control		Mean ± SD	22.13 ± 3.83	21.73 ± 4.01	21.93 ± 4.65

SD: Standard deviation

Table 3. One-way analysis of variance test of differential scores in the factor in research variables

Variable	Statistical index Source of variations	SS	df	MS	F	P
Posttest anxiety	Inter-group variance	161.73	2.00	80.87	8.82	0.001
	Intra-group variance	385.07	42.00	9.17		
	Total	546.80	44.00			
Follow-up anxiety	Inter-group variance	15.24	2.00	7.62	3.39	0.04
	Intra-group variance	94.53	42.00	2.25		
	Total	109.78	44.00			
Posttest perceived stress	Inter-group variance	235.24	2.00	117.62	11.16	0.001
	Intra-group variance	442.53	42.00	10.54		
	Total	677.78	44.00			
Follow-up perceived stress	Inter-group variance	8.53	2.00	4.27	0.50	0.61
	Intra-group variance	356.27	42.00	8.48		
	Total	364.80	44.00			
Posttest medication adherence	Inter-group variance	44.93	2.00	22.47	11.47	0.001
	Intra-group variance	82.27	42.00	1.96		
	Total	127.20	44.00			
Follow-up medication adherence	Inter-group variance	3.24	2.00	1.62	3.56	0.03
	Intra-group variance	26.67	42.00	0.64		
	Total	29.91	44.00			

SS: Sum of Squares; df: Degree of Fredom; MS: Mean of Squares

The assumption of normality was checked and confirmed before reporting the statistical test. Table 3 shows the ANOVA related to differential scores.

As can be seen in table 3, since the F coefficients calculated for the posttest stage in the anxiety, perceived stress, and medication adherence variables were greater than the critical value ($P < 0.05$) and the difference between the means was greater than 5 out of 100 cases, the null hypothesis is rejected and the opposite hypothesis is accepted. Moreover, for the follow-up stage, this difference in anxiety and medication adherence variables was significant ($P < 0.05$).

The results presented in table 4 show that the scores of the anxiety variable in the positive psychology group in the posttest stage were lower than the pretest ($P < 0.001$). The results show that anxiety in the follow-up stage significantly differed with that in the pretest stage ($P < 0.001$). Furthermore, the perceived stress scores in the psychology group were positive and were lower in the posttest stage compared to the pretest stage ($P < 0.001$).

The results showed that perceived stress in the follow-up stage significantly differed with that in the pretest stage ($P < 0.001$). The results showed that the scores of treatment adherence in the psychology group were positive and were higher in the posttest stage compared to the pretest stage ($P < 0.001$). There was a significant difference in adherence to treatment between the follow-up and pretest stages ($P < 0.001$). The results indicated that the effectiveness of positive psychological therapy persisted in follow-up stage in both anxiety and treatment adherence variables.

Table 4. The results of Bonferroni's follow-up test for paired comparison of the mean time of measuring the research variables

Variables	Steps		MD	SE	P-value
Anxiety	Pretest	Posttest	-4.46	1.11	0.001
		Follow-up	-3.33	1.11	0.001
	Posttest	Follow-up	1.13	0.59	0.105
Perceived stress	Pretest	Posttest	-2.26	0.51	0.001
		Follow-up	-1.93	0.51	0.001
	Posttest	Follow-up	0.33	0.53	0.804
Medication adherence	Pretest	Posttest	6.00	0.49	0.001
		Follow-up	4.74	0.49	0.001
	Posttest	Follow-up	-1.26	0.49	0.001

MD: Mean difference; SE: Standard error

Discussion

The results of data analysis revealed that positive psychotherapy in the participants of the experimental groups compared to the control group had a significant effect on the components of anxiety, perceived stress, and medication adherence in patients with asthma. The significant effect of positive psychotherapy on perceived anxiety and stress is in line with the main assumption of a positive psychotherapy approach. In this approach, it is assumed that creating positive emotions, having meaning in life, and improving people's abilities will eliminate and reduce emotional and psychological problems (Datu, 2016). In explaining the results, it can be stated that learning positive principles can be effective in the observed changes. Based on the theory of positive psychotherapy, lack of meaning in life is not only one of the symptoms of psychological problems, but also one of the causes of depression and other psychological problems. By learning the first principle of this package (the principle of meaning and purpose), patients in the experimental group could to some extent determine the meaning of their lives and future goals.

Moreover, members of the positive psychotherapy group learned about optimism by learning about the second principle of the positive psychotherapy package. Pessimistic attributional style is one of the most important factors involved in the development of anxiety. Based on the theory of learned helplessness, pessimistic attributional style is one of the most important predictors of anxiety and depression. Hence, learning the principle of optimism can be effective in changing pessimistic attributional styles, and thus, reducing the symptoms of anxiety (Hart, Vella, & Mohr, 2008). Additionally, based on the theory of positive psychotherapy, increasing social communication and expanding friendship networks through increasing social support are effective in increasing happiness and promoting mental health (Meyer, Johnson, Parks, Iwanski, & Penn, 2012). Oral reports of positive group members also showed that efforts to expand friendship networks outside the group and deep friendships with group members resulted in experiencing and increasing positive emotions. The experimental group also performed exercises in the area of appreciation and gratitude. Appreciation is one of the principles emphasized by positive psychologists and its effectiveness in increasing a positive mood has been investigated in several studies (Lee Duckworth, Steen, & Seligman, 2005). In addition, it should be stated that positive psychotherapy intervention is effective in promoting people's commitment. The results of the present study are in line with those of the research carried out by Seligman, Ernst, Gillham, Reivich, and Linkins (2009), indicating the effectiveness of positive psychotherapy in increasing positive emotions, commitment, sense of purpose, and reducing depression. The concept of commitment in Seligman's theory overlaps with the flexibility concept.

In Seligman's (2002) theory on happiness, flexibility or a committed life can be achieved through the identification and regular use of outstanding abilities and traits. In positive psychotherapy, commitment is developed by using the core competencies of clients (Rashid, 2015). Thus, identifying the abilities of the experimental group during the positive treatment sessions and teaching them how to use these abilities in challenging activities has been effective in increasing the sense of commitment of this group as one of the outcomes of treatment.

Conclusion

It can be concluded that positive psychotherapy was effective on reducing anxiety

and increasing medication adherence. The present study was conducted using a self-report measurement tool, since the questionnaire was used only for data collection, and due to executive limitations, the interview method was not used to collect the research data. Since the present study was conducted in Tehran, and since different environmental conditions and cultural-economic contexts affect the disease, it is difficult to generalize the findings to other areas with other cultural-economic contexts, because some areas of the disease depend on environmental conditions. Moreover, considering the problems of asthmatic patients in the community, it is suggested that health institutions use workshops and training courses based on the positive psychotherapy approach for asthmatic patients. It is suggested that similar studies be conducted at a wider level considering socioeconomic variables and lifestyle in patients with chronic diseases.

Conflict of Interests

Authors have no conflict of interests.

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