The Effectiveness of Self-Control and Anxiety Management Training to Reduce Anxiety and Improve Health-Related Quality of Life in Children with Asthma

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Abstract

The study aimed to identify the effect of using two behavioral intervention, self-control and anxiety management training AMT in reducing both the degree of anxiety, and recurrence of asthma attacks and it improve health-related quality of life HRQoL in a sample of asthma patients from school children. The study sample consisted of (10) children from asthma patients enrolled in primary and middle basic education in Egypt, the ages ranged between (10-13) years, were divided randomly into two groups are equal in number, age, and social level. Experimental group consists of (5) children received a program based on self-control and AMT, and a control group consists of (5) children did not receive any experimental procedure. The study included all of the tools: Anxiety scale for children and HRQoL questionnaire for asthmatic children, in addition to the intervention program based on self-control and AMT. The results showed the effectiveness of the behavioral intervention program in reducing both of the degree of anxiety, number of asthma attacks, and improve HRQoL in the experimental group, comparing to the two measurements pre and post then the follow up, as well as comparing to the control group in the post measurement.

Keywords: Asthma; Anxiety; Health-related quality of life; Self-control; Anxiety management training

Introduction

Asthma is one of the most important public health problems, according to WHO estimates that 235 million people currently suffer from asthma, it is the most common disease among children. Asthma is a public health problem not just for high-income countries; it occurs in all countries regardless of the level of development. Most asthma-related deaths occur in low- and lower-middle income countries [1].

Asthma is a chronic disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. Symptoms may occur several times in a day or week in affected individuals, and for some people become worse during physical activity or at night. During an asthma attack, the lining of the bronchial tubes swell, causing the airways to narrow and reducing the flow of air into and out of the lungs. Recurrent asthma symptoms frequently cause sleeplessness, daytime fatigue, reduced activity levels and school and work absenteeism. Asthma has a relatively low fatality rate compared to other chronic diseases [2].

As a chronic disease asthma is requires a multiple forms of restrictions on health, psychological and social life of the patient, it was natural that the quality of life for asthma patients affected by the disease [3].

The health-related quality of life HRQoL is a multi-dimensional self-concept, and one of quality of life domains, which deals with the patient's assessment of the effect of the disease and treatment on physical and mental condition, and social roles, as he perceives through his daily life.

There is a consensus of studies on asthma-related quality of life to an inverse correlation relationship between quality of life and the severity of the disease and recurrence of asthma attacks, added to this asthma patients are suffering from lower quality of life level comparing with healthy people [4-6]. Whereas severity of symptoms adversely affect the level of quality of life [7-9], as a good control of asthma is associated with a better quality of life among patients [10,11]. Studies also stressed the negative result for anxiety to quality of life in asthma patients [12-14].

As Kapoor [15] reported that asthma symptoms can be disturbed by feelings of anxiety and tension and one-third of children diagnosed with asthma may meet the criteria for a concurrent diagnosis of an anxiety disorder, and those who suffering from asthma and anxiety together express much poor quality of life as compared with those who are suffering from asthma only.

Although asthma is difficult to be cured, but it can be appropriate to the organization preparing for individuals to control the disease and enjoy a better quality of life, and become the treatment is to try to help patients to control symptoms, and maintain a normal level in patients activity, in addition to improve the quality of life [16].

The researcher in the current study will be tested the effectiveness of two behavioral intervention styles, self-control and anxiety management training AMT in reducing the recurrence of asthma attacks, by reducing the degree of anxiety, which is one of the triggers of asthma attacks, which in turn will be reflects in the improvement of HRQoL they have.

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Method

Design

The study was based on semi-experimental method, where the targeted test the efficacy of a therapeutic training program to reduce the degree of anxiety and improve HRQoL in children with asthma. The study sample has been divided into two homogeneous groups, the experimental group and the control group. The researcher has used two methods to find out the impact of the program:

Experimental design with one experimental group, and find out the differences between the pre and post and follow up measurements from that group in anxiety, number of asthma attacks and HRQoL.

Experimental design with two groups (experimental group, a control group), and find out the differences between pre and post and follow up measurements in the two groups in anxiety, number of asthma attacks and HRQoL.

Participants

The sample of current study consisted of (10) children with chronic asthma enrolled in primary and middle basic education, all asthmatic children who participated in this study were provided from the pediatric asthma clinic of a hospital in Egypt, they have ranged in age between (10-13) years, with an average age (11.2) and a standard deviation (1.13). It has been divided into (5) children (4 boys and one girl) as an experimental group, (5) children (boys) as a control group. The study sample was collected according to the following characteristics: **1)** Children with chronic moderate asthma (for more than 4 years). **2)** Hospitalized with an asthma diagnosis and one or more asthma medications. **3)** One or more emergency room or urgent care visits with an asthma diagnosis last year. **4)** Students of the primary and middle school of the basic education. 5) Who have a higher level of anxiety and reduced HRQoL level.

Measures

The study sample was split using couples similar way, then the researcher using the test "Mann-Whitney" for independent groups to verify that there are no differences among the middle ranks of the experimental and control groups in the variables (age - socio-economic level - anxiety - HRQoL). An anxiety scale for children prepared by Beblawi [17] was distributed to the sample of the study; also the researcher designed an instrument for measuring HRQoL for asthmatic children.

HRQoL questionnaire: The questionnaire prepared for the current study consists of (26) phrases on four dimensions of the term, are:

1. Symptoms (10 phrases) includes clinical signs of the disease cough, wheezing, difficulty of breathing, chest tightness, feeling of suffocation, and occurrence of troubles during sleep and waking up at night.

2. Activity limitation (5 phrases) includes the activities of various process by which an individual is unable or reported having difficulty in activities as a result of having asthma.

3. Emotional functions (8 phrases) include emotional problems that occur as a result of asthma such as anxiety, fear, anger, excessive nervousness, frustration and inefficiency.

4. Environmental stimuli (3 phrases) include environmental stimuli which aggravate asthma like acute smells, perfume, certain foods, dust, fumes, cold air and low temperatures.

The total score of the scale ranged between (26-130) degree, with a note that the first three terms in the activity limitation dimension, are individual phrases, where the patient is asked to identify three important activities for him and feels it is affected by asthma. As for the responses to the questionnaire phrases have gradually progressed on a scale of (1-5), in the following order: (always - a lot - sometimes-rarely - never). Here the (1) means highest level of deterioration or morbidity, and (5) means absence of deterioration. The total score of the questionnaire describes the impact on HRQoL in the asthmatic child. The high grades indicate to raise HRQoL in the asthmatic child, and the low grades indicate to reduce HRQoL in the asthmatic child.

Interventions

The researcher has prepared an intervention training program to help children with asthma in controlling asthma attacks, and reduce the frequency and severity by controlling the feelings of anxiety they have. The training program was based on an anxiety self-management strategy, depending on some of cognitive behavioral therapy techniques, self-control and AMT methods, because of what the researcher found of the effectiveness of cognitive behavioral therapy in reducing anxiety associated with asthma attacks and this is illustrated by the studies.

By reviewing the previous studies we find a quite number of psychological interventions carried out by researchers not only to treatment psychological and behavioral problems associated with asthma, or resulting from it, but also in order to bring about an improvement in the health status of the patients, whether in reducing the number of attacks they have and reduce the symptoms associated with the disease or even through increasing their responses to medication therapy.

Cognitive behavior therapy CBT one of the most important psychological interventions used with bronchial asthma patients. There are many studies on the impact of its effectiveness, for example: Grover et al. [18] used CBT in bringing about an improvement in patients control of the disease. Studies of Ross et al. [19] and Parry et al. [20] also used a CBT program to reduce the severity of the state of anxiety and fear in the patients from asthma attacks, which in turn was reflected in the increase in the flow of the breath rate and improve lung function they have.

The study of Hampel et al. [21] used CBT to control the stress in patients with asthma, which in turn led to an improvement in their coping with the disease. Dahl [22] has set up a program based on CBT to train children to control their asthma, and help the child and his parents in the identification of the exciting factors for asthma, and develop strategies to deal with it. In another study to Dahl et al. [23] they use of CBT for increasing patients response to the medication therapy and reduce their use of inhaler.

The researcher in the current study building the intervention training program on a blend of two behavioral styles, already proven the effectiveness of each of them in reducing anxiety in different categories.

The anxiety management training AMT is a behavioral therapy methods that developed to overcome some of the negatives associated with the desensitization used in the treatment of anxiety, through training patient to identify cognitive and physical internal signals that indicate the presence of anxiety and face it by relaxation feeling [24]. Appropriate AMT has been proven as a therapeutic strategy for generalized anxiety disorder, besides that it is appropriate in cases where the anxiety is the cause of physical symptoms [25].

In many intervention studies for patients with asthma, finds that most of them had been used relaxation either as an essential style or as an assistant style, with the comparisons between it and other methods to determine the most effective [26,27].

Relaxation come the best results after combined with other therapeutic approaches, for example study of Tien et al. [28] collected between relaxation and guided imagery, to reduce some of psychological symptoms such as anxiety, depression and panic attacks in asthma patients, which helped to reduce the amount of medication therapy and make improvement in their responses to it. Lahmann et al. [29] also used relaxation with guided imagery in reducing excretion of IgE in dust-mite allergic asthmatics. The study of Kapoor [15] has been used also relaxation and guided imagery to reducing the symptoms of anxiety associated with asthma, and make an improvement in lung function.

These findings reinforced researcher choosing of AMT, which depends on modify the behavior of anxiety on the use of guided imagery either to raising anxiety or to promote relaxation.

As well as the self-control style with its three basic operations of self-monitoring, self-evaluation, and self-reinforcement [30], is working to increase the individual's ability to restrict the problem behavior through internal control [31]. According to that the researcher expects that through the training of asthmatic children on these behavioral intervention will increase the children's ability and efficiency in controlling of asthma.

Self-control and AMT program: The intervention training program was included (18 sessions) divided into two stages:

The first stage: Consists of (7 sessions) include the definition of the program and its objectives, the training of participants on the muscular relaxation, as well as breathing exercises linked to asthma attacks. We mean training to work with the client in a manner where the model, the researcher with the client to perform training with continuous repetition even mastered the training.

The first stage sessions split to dating and configuration of the program session, and a session to explain the self-evaluation and self-reinforcement procedures, and a session for training on deep breathing, and four sessions of training on muscle relaxation in a systematic manner where include arms, hands, shoulders, the muscles of the face and eyes, jaw, teeth, lips, neck and upper back, abdomen, thighs, leg and feet.

The second stage: Consists of (11sessions) and was divided into three sessions, where training and exposure to cause of anxiety, followed by relaxation, in addition to training of members of the experimental group to identify the symptoms of anxiety. The fourth session is training of members of the experimental group to desensitization, and the fifth session until the eleventh session during which to complete the training of the experimental group to exercise restraint and control to raise anxiety.

Technicians: Researcher used number of techniques during the intervention program; relaxation technician was one of them. The aim of relaxation exercises during the intervention program was:

- Reduction of payments and physiological stimuli of anxiety or to reduce them.

- Acquisition relax cognitive behavioral skills, with a focus on exchange-minded about the causes of anxiety.

- Help the child to access the state of relaxation as soon as possible, to be used in a case of a possible sense of the asthma attack.

As well as relaxation training, the researcher used number of technician during the program sessions:

– Modeling: The researcher used modeling performance techniques to display the trainings for participants in the program.

– Self-Monitoring: Where participants were trained in the program on how to determine the cognitive and physical function of internal signals, to the presence of anxiety they have as well as the situations in which anxiety shows.

– Imagine Training: Where participants were trained in the program how to use imagination during therapy sessions, both to raise anxiety and to promote relaxation.

– Diaries: Where participants were trained in the program how to use daily notes to write the situations that cause anxiety.

– Homework: Where participants were asked to apply what has been learned during the sessions in real-life situations.

– Self-Evaluation: Where participants were trained in the program how to use self-evaluation form, where they can identify the extent of their success in the performance of exercise, as well as the extent of their success in reducing anxiety.

– Self-Reinforcement: Where participants were trained in the program to develop specific list of self-reinforcement that can provide them to carry themselves this desired behaviors.

Tools: The researcher prepared a disc CD include the steps of the behavioral intervention program and distributed on the experimental sample, as well as two forms of self-reinforcement and self-evaluation, and daily record of asthma.

Daily record of asthma: The daily record of asthma is designed to take the clauses from the dimensions of HRQoL questionnaire for asthmatic children. Where was the representation of specific aspects of frequency and severity of asthma attack, and symptoms associated with asthma, and sleep problems caused by asthma, in addition to the impact of child daily activity with asthma.

Procedures and data collection

The researcher apply the anxiety scale for children and HRQoL questionnaire for asthmatic children before applying the intervention program on the two groups of the study, the experimental group and the control group. Then she apply the behavioral intervention program on the experimental group for a period of (21) days on an average of six sessions a week till three weeks, and the time period for each session ranged from approximately (45) minutes. The program has been applied collectively sometimes and individually sometimes for the circumstances of some respondents.

Following the end of the program, the researcher apply the anxiety scale for children and HRQoL questionnaire for asthmatic children on the two groups of the study, the experimental group and the control group, and compared the post measurement results with the pre measurement and stand on the actual impact of the program.

Two months later, after the end of the program, the researcher reapply the anxiety scale for children, and HRQoL questionnaire for asthmatic children on the experimental group, where it was compared between the post and the follow up measurement results on the

experimental group, in order to see how the continuity effectiveness of the program used in the current study.

Data analysis

All data were analyzed using SPSS (20.0) for windows. The researcher calculated the averages of the two measurements pre and post to the experimental group in anxiety, number of asthma attacks during the week, and HRQoL variables using the "Wilcoxon test" (Table 1). Also calculated the difference between the averages of the post measurement with the control and experimental groups in anxiety, number of asthma attacks during the week, and HRQoL variables using the "Mann-Whitney test" (Table 2). And to learn about the continued effectiveness of the program in the follow-up period the researcher calculated the averages of the two measurements post and follow up to the experimental group in anxiety, number of asthma attacks during the week, and HRQoL variables using the "Wilcoxon test" (Table 3). Finally to verify that the impact of the program substantially and not

randomly or temporarily the researcher calculated the impact of the program's effectiveness through finding "Eta-square" value (Table 4), to evaluate the effect of the independent variable (self-control and AMT program) to the dependent variable (anxiety, number of asthma attacks, and HRQoL).

Results

Anxiety

The results of data analysis showed that there is a statistically significant difference at the level of significance (0.05) between the averages of the two measurements pre and post to the experimental group in anxiety variable, in favor of post measurement. There is also a statistically significant difference at the level of significance (0.01) between the averages of the post measurement with the control and experimental groups in anxiety variable, in favor of the control group. While there is no statistically significant difference between the

Variables	Negative Ranks		Positive Ranks		Positive Ranks	Sig
	Mean Ranks	Sum of Ranks	Mean Ranks	Sum of Ranks		
Anxiety	3.00	15.00	0.00	0.00	-2.032	0.042*
Number of Asthma Attacks	3.00	15.00	0.00	0.00	-2.023	0.043*
HRQoL	0.00	0.00	3.00	15.00	-2.032	0.042*
Symptoms	0.00	0.00	3.00	15.00	-2.023	0.043*
Activity Limitation	0.00	0.00	3.00	15.00	-2.023	0.043*
Emotional functions	0.00	0.00	3.00	15.00	-2.023	0.043*
Environmental stimuli	0.00	0.00	3.00	15.00	-2.032	0.042*

* Correlation is significant at the 0.05 level

Table 1: Wilcoxon signed ranks test between the averages of the two measurements pre and post in the variables at the experimental group.

Variables	Group	N	Mean Ranks	Sum of Ranks	Mann Whitney U	Z	Sig
Anxiety	Control	5	8.00	40.00	0.000	-2.627	0.009**
	experimental	5	3.00	15.00			
Number of Asthma Attacks	Control	5	7.70	38.50	1.500	-2.378	0.017*
	experimental	5	3.30	16.50			
HRQoL	Control	5	3.00	15.00	0.000	-2.627	0.009**
	experimental	5	8.00	40.00			
Symptoms	Control	5	3.00	15.00	0.000	-2.611	0.009**
	experimental	5	8.00	40.00			
Activity Limitation	Control	5	3.30	16.50	1.500	-2.305	0.021*
	experimental	5	7.70	38.50			
Emotional functions	Control	5	3.00	15.00	0.000	-2.619	0.009**
	experimental	5	8.00	40.00			
Environmental stimuli	Control	5	3.50	17.50	2.500	-2.108	0.035*
	experimental	5	7.50	37.50			

** Correlation is significant at the 0.01 level, * Correlation is significant at the 0.05 level

Table 2: The difference between the averages of the post measurement with the control and experimental groups.

Variables	Negative Ranks		Positive Ranks		Z	Sig
	Mean Ranks	Sum of Ranks	Mean Ranks	Sum of Ranks		
Anxiety	3.00	9.00	9.00	6.00	-0.412	0.680
Number of Asthma Attacks	2.00	6.00	6.00	0.00	-1.732	0.083
HRQoL	5.00	5.00	5.00	10.00	-0.674	0.500
Symptoms	2.75	11.00	11.00	4.00	-0.948	0.343
Activity Limitation	2.75	5.50	5.50	4.50	-0.184	0.854
Emotional functions	1.00	1.00	1.00	14.00	-1.753	0.080
Environmental stimuli	3.67	11.00	11.00	4.00	-0.966	0.334

Table 3: Wilcoxon signed ranks test between the averages of the two measurements post and follow up in the variables at the experimental group.

Variable	Variance	Sum of Squares	df	Mean Square	F	Sig	Eta	Eta Squared
Anxiety	Between Groups	640.000	1	640.000	250.980	0.000**	0.984	0.969
	Within Groups	20.400	8	2.550				
	Total	660.400	9					
Number of Asthma Attacks	Between Groups	40.000	1	40.000	6.349	0.036*	0.665	0.442
	Within Groups	50.400	8	6.300				
	Total	90.400	9					
HRQoL	Between Groups	3802.500	1	3802.500	74.123	0.000**	0.950	0.903
	Within Groups	410.400	8	51.300				
	Total	4212.900	9					
Symptoms	Between Groups	462.400	1	462.400	29.359	0.001**	0.886	0.786
	Within Groups	126.000	8	15.750				
	Total	588.400	9					
Activity Limitation	Between Groups	48.400	1	48.400	8.566	0.019*	0.719	0.517
	Within Groups	45.200	8	5.650				
	Total	93.600	9					
Emotional functions	Between Groups	688.900	1	688.900	119.809	0.000**	0.968	0.937
	Within Groups	46.000	8	5.750				
	Total	734.900	9					
Environmental stimuli	Between Groups	48.400	1	48.400	9.398	0.015*	0.735	0.540
	Within Groups	41.200	8	5.150				
	Total	89.600	9					

** Correlation is significant at the 0.01 level, * Correlation is significant at the 0.05 level

Table 4: Eta-square value to indicate the impact of the program on the variables of the study.

averages of the two measurements post and follow up measurement to the experimental group in anxiety variable.

Asthma attacks

The results showed that there is a statistically significant difference at the level of significance (0.05) between the averages of the two measurements pre and post to the experimental group in number of asthma attacks during the week variable, in favor of post measurement. Also the results indicated that there is a statistically significant difference at the level of significance (0.05) between the averages of the post measurement with the control and experimental groups in number of asthma attacks during the week variable, in favor of the control group. While there is no statistically significant difference between the averages of the two measurements post and follow up measurement to the experimental group in number of asthma attacks during the week variable.

HRQoL

The results showed that there is a statistically significant difference at the level of significance (0.05) between the averages of the two measurements pre and post to the experimental group in HRQoL variable and its dimensions, in favor of post measurement. There is also a statistically significant difference at the level of significance (0.01) between the averages of the post measurement with the control and experimental groups in the total score of HRQoL variable, and dimensions (symptoms - emotional functions) in favor of the experimental group, and there is a statistically significant difference at the level of significance (0.05) between the averages of the post measurement with the control and experimental groups in dimensions (activity - environmental stimuli) for the HRQoL, in favor of the experimental group. The results also indicated that there is no statistically significant difference between the averages of the two measurements post and follow up measurement to the experimental group in the HRQoL variable and its dimensions.

Intervention program evaluation

The above results showed the effectiveness of the impact of both of two behavioral intervention, self-control and AMT at all of anxiety, number of asthma attacks and HRQoL, as the value of "Eta-square" was greater than (0.15). When evaluating the impact of the independent variable on the dependent variable, the impact that explains about (15%) or more of the total variation is a significant impact.

Conclusion

The results of the current study demonstrated through statistical analysis, the effectiveness of the behavioral intervention program based on self-control and AMT in reducing both the degree of anxiety, and recurrence of asthma attacks, and improves of HRQoL in asthmatic children.

Intervention program effectiveness has been proved by the presence of statistically significant differences between the averages of control and experimental groups in anxiety, number of asthma attacks during the week, and HRQoL after applying the intervention program, in favor of the control group in the variables of anxiety and number of asthma attacks during the week (average of the control group higher), and in favor of the experimental group in HRQoL variable (the average of the experimental group higher).

The effectiveness of the behavioral intervention program is also explained by the presence of statistically significant differences between the averages of the two measurements pre and post at the experimental group in anxiety, number of asthma attacks during the week and HRQoL after applying the intervention program, in favor of the post measurement.

The results also confirmed the continuity of the effectiveness of the behavioral intervention program in reducing both the degree of anxiety and number of asthma attacks, and improve HRQoL until after the follow-up, which showed a statistical analysis of the results there is no statistically significant differences between the averages of the two

measurements post and follow up at the experimental group in anxiety, number of asthma attacks during the week, and HRQoL.

Recommendations

The results suggest that a combination of self-control and AMT can positively affect the physiological and psychological health of children with moderate asthma, which in turn reflects in improvement of HRQoL they have.

Relaxation muscles and breathing training is a simple intervention that parents, school teachers or other caretakers can implement independently, so they need to be involved in the training to improve chances of success.

Acknowledgement

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