eISSN: 2645-7687. Journal of Clinical Care and Skills. 2020;1(2):95-101

Effect of Hypnosis on Pulmonary Function and Severity of the Disease in Asthmatic Patients: A Randomized Clinical Trial

Journal of Clinical Care and Skills

ARTICLE INFO

Article Type
Original Research

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How to cite this article
Mohebbi Z, Najafi Doulatabad Sh, Malekzadeh M, Nabavizadeh S.H, Marioryad H, Momeni E, Niazi M, Zoladl M. Effect of Hypnosis on Pulmonary Function and Severity of the Disease in Asthmatic Patients: A Randomized Clinical Trial. Journal of Clinical Care and Skills. 2020;1(2):95-101.

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Article History
Received: August 11, 2018
Accepted: : December 23, 2018
ePublished: June 20, 2020

ABSTRACT

Aims Asthma is one of the common, chronic respiratory diseases which psychological factors play an important role in it and comorbidities of several psychological disorders such as anxiety, depression, and panic attacks are common in asthmatic patients. The aim of this study was to determine the effect of hypnosis on pulmonary function and severity of the disease in asthmatic patients.

Materials and Methods This randomized clinical trial study, was carried out on 64 asthmatic patients, who referred to the clinic of Shahid Mofattah in Yasouj, Iran in 2010. The subjects were selected by purposeful sampling method, and randomly assigned into the tow group of the intervention (subjects were treated by solo hypnosis in a 90-minute session and conventional treatments) and control group (subjects were treated by conventional treatments, in addition, providing an explanation about requirement care point for improvement of asthma in 15 minutes) by use of balanced block randomization. In addition to completing demographic information at the beginning of the study, determination of pulmonary function and asthma severity were conducted respectively through measurement of FEV1 and NAEPP classification (EPR-3) at the starting point of the study and one month after the completion of the research intervention. Data were analyzed using SPSS 21 software, through independent sample t-test, paired sample t-test, Chi-square test, and marginal homogeneity test

Findings one month after completing the research intervention, the FEV1 in the intervention group increased than the control group and the severity of asthma in the intervention group decreased than the control group.

Conclusion Hypnosis as an adjuvant treatment is effective in the improvement of pulmonary function and reducing the disease severity in asthmatic patients.

Keywords Hypnosis; Asthma; Complementary Therapies; Forced Expiratory Volume; Severity of Illness Index

CITATION LINKS

[1] Clinical effects of yoga on asthmatic patients ... [2] Role and significance of markers of ... [3] Assessing effects of asthma on patients ... [4] Effect of a course of aerobic exercise and ... [5] The prevalence of asthma in an adult population ... [6] Prevalence of asthma and respiratory symptoms among ... [7] Setting the standard for routine asthma consultations ... [8] Expert Panel Report 3 (EPR-3): guidelines ... [9] Integrative medicine for respiratory conditions: asthma ... [10] Psychological interventions in ... [11] Users and practitioners of complementary ... [12] The use of complementary/alternative medicine ... [13] Use of complementary and alternative medicine ... [14] Establishing an integrative medicine program within an academic ... [15] Clinical hypnosis, mindfulness and spirituality ... [16] Standards of training in clinical hypnosis: ... [17] Advantages and safeguards in using the ... [18] Future developments in professional hypnosis training ... [19] Integrating pediatric hypnosis with ... [20] Memory, trauma treatment, and ... [21] Personality style and hypnotizability: the ... [22] Handbook of medical and psychological hypnosis ... [23] Literature review into the effectiveness of ... [24] Hypnotherapy increasing standard therapy responses in ... [25] Chronic asthma and improvement with relaxation ... [26] Hypnosis in pediatrics: applications at a pediatric ... [27] Hypnosis in paediatric respiratory ... [28] Hypnosis for ... [29] Hypnosis, relaxation and suggestion from a CBT ... [30] Education of induction and suggestions of ... [31] Hypnotism Part III: Induction tests ... [32] Improvement in bronchial hyper-responsiveness ... [33] Respiratory care anatomy and physiology ... [34] Effect of self-hypnosis on hay fever symptoms ... [35] Hypnotherapy in the management ... [36] Teamwork approach to clinical hypnosis at a ... [37] The treatment of asthmatic children ... [38] A survey on depression and its related factors ... [39] Nurses role in delivering the message: the... [40] Hypnosis: Theory, research and application ...

Introduction

Asthma is one of the most common chronic respiratory diseases, which due to inflammation and narrowing of the airway and contraction of the smooth muscle of the bronchioles can result in hypersensitivity of the airway and mucosal edema and is characterized by increasing inflammatory pathologies and various recurrent clinical manifestations, such as dyspnea, coughing, shortness of breath, tightness of the chest, chest pressure, wheeze and exhalation airflow restriction [1, 2].

Asthma can be seen at any age, gender, race, time and location. The prevalence of asthma worldwide and through Iran has been reported 3-35% and 1.4-15%, respectively, which indicates that the trend in increasing by time [3-6].

Asthma as a progressive disease is considered as an important reason for hospitalization and accounts for about 25% of emergency visits each year. Also, as one of the major causes for being absent in school and work worldwide, in addition to impose health care costs on individuals and healthcare providers, it also causes economic losses and indirect costs [1, 3, 7].

In addition, asthma now as one of the leading causes of global mortality, due to the challenging individual and family processes and functions, behavioral problems, psychosocial and social issues, disability of many involved patients and an increase in the number of the years lost due to disability (YLD), is considered as one of the most serious health threats through this century [3, 7, 8].

Asthma is now recognized as a multi-agent disease, according to the theory of Psycho-Neuro-Endocrine-Immunology (P.N.E.I.). In the etiology of asthma, genetic factors, inappropriate lifestyle, such as urbanization, using preservatives and food additives, obesity, environmental factors, such as allergens, respiratory infections, parasitic infections and vasculitis, taking antibiotics, aspirin and analgesics, psychological factors, etc., are known as the causes of asthma. In this regard, according to the integrated asthma management, drug therapy has been focused as the important aspect of care and in addition to an emphasis on lifestyle modification (smoking cessation, allergen avoidance, physical activity and proper nutrition, etc.), using self-care strategies, mental and emotional health-based interventions and body-mind-based therapies, using appropriate evidence-based approaches has been also considered [2, 3, 6, 9, 10].

Complementary medicine is based on easy, relatively inexpensive and with little side effects approaches, which is used in addition to conventional medicine to treat and prevent many physical and mental disorders.

Studies show that these methods are significantly used globally and more and more people are interested in using them every day [11, 12]. Among the various complementary therapies that are currently being considered and developed in many health care centers around the world, some healthcare types focused on nursing have developed, among which yoga, massage therapy, therapeutic reflection, scent therapy, acupuncture, spiritual medicine and hypnosis can be mentioned [13-15].

Hypnosis, medical literature has been recognized as one of the complementary therapies for medical and psychotherapy over the last two centuries that has many actual and potential applications. During this therapeutic process, the individual moved from conscious consciousness to a centralized subconscious and the appropriate therapeutic induction suggestions influenced the subject and finally, the positive changes resulting from these suggestions are used in the life of the patient [16-19].

Hypnosis is taken from Hypnotikos as artificial sleep, and as a multidimensional phenomenon, is composed of three main components, including parsing or abstraction, absorption, and induction. This interventional approach has been used for impassibility, addition and abnormal habits quit, treating behavioral, psychological and emotional disorders, post-traumatic stress disorder, irritable bowel syndrome, and, sleep problems, psychotic disorders and asthma [20-23].

Several causes and mechanisms have been introduced for the effectiveness of hypnosis in the treatment of asthma. According to the P.N.E.I. theory, emotional stresses and psychological comorbidities common in these patients, such as anxiety, depression, and panic attacks are known as reasons for airway obstruction enhancers and the effect of hypnosis on asthma are considered as the ability of this intervention to control these conditions. Another group has been emphasized the inhibitor and reducer effect of hypnosis in the inflammatory process of the bronchi and its ability to correct hyperactivity and reduce the rate of allergic reactions in patients with asthma. Hypnosis also affects the non-adrenergic and non-cholinergic nervous system in the smooth muscle of the airway, and makes the bronchi dilated in long periods. However, the mechanism of hypnosis has not yet been fully described in the treatment of asthma [10, 24].

In studies on the effects of hypnosis on asthma, various outcomes such as duration of hospitalization, number of hospitalization, reduced drug intake, and improved air circulation based on self-reported [25], symptoms of persistent asthma, normal cough, chest pain or chest tightness, shortness of breath and disruption of vocal folds [26], daily symptoms, nighttime symptoms/awakening, need for palliative/rescue therapy, activity limitation and forced expiratory volume in the first seconds (FEV1) [24], and so on. In most of these studies, mental outcomes have been studied, and objective indicators, such as pulmonary function

tests have been less relevant [6].

All these considerations into account, and since hypnosis is an effective, but obscure treatment [27], which is still not well developed as a standard treatment for asthma due to a small number of clinical trials and a variety of outcomes [10, 24], and due to the fact that previous studies have emphasized the necessity of accurate design and further studies in this field [23, 27], this study was conducted to determine the effect of hypnosis on pulmonary function and severity of asthma.

Material and methods

This randomized clinical trial study, was carried out on asthmatic patients, who referred to the clinic of Shahid Mofattah in Yasuj, Iran in 2010. At the beginning of the study, using p_1=0.59 and p_2=0.43 reported in the Citron *et al.* study [28], the alpha of 0.1 (90% confidence level), a beta of 20% (test power of 80%), the effect size of 0.3 between the ratios of the two groups and also the possible falling of 10%, the required sample size in each of the study groups was calculated 36 subjects (a total of 72 subjects). Therefore, using purposeful sampling method those patients who met inclusion and exclusion criteria were selected. Inclusion criteria included the age of 12 to 60 years, history of asthma for at least one year and full consciousness, and exclusion criteria also included pregnancy, long-term medication administration, intermittent asthma or mild asthma based on the National Asthma Education and Prevention Program (NAEPP) (EPR-3) [8], other confirmed physical or psychiatric disorders based on records from patients and their companions smoking, alcohol, narcotics and excessive caffeine use (more than 6 cups of coffee or 16 glasses of tea daily) and taking sedative and sedative medications.

Then, using the quadratic randomized block allocation, a number from one to 72 was assigned to each group the randomized allocation block list was prepared. The researcher explained the objectives and the research procedure and after answering their questions and ambiguities and reminding them that they are randomly assigned to one of the intervention or control groups, the written informed consent was also obtained from the patients. After completing the written informed consent form, according to the time of referral and observance of the priority of entry, a number was assigned to each patient, which was matched with the number randomized block allocation list, each number was allocated to the intervention or control group.

At first, demographic and background characteristics of patient, including age, sex, marital status, occupation, educational level, monthly income and body mass index were recorded in the research checklist. The pulmonary function was measured by forced expiratory volume-one second (FEV1) using the Spiroanalyzer St-95 (Fukuda Sangyo, Philippines) and the severity of asthma was assessed by NAEPP classification (EPR-3) by a trained nurse and a fixed physician blind to the intervention or control group, respectively.

For each patient in the control group was explained about the healthcare for asthma for 15 min, and these patients received routine care and treatment, however in the intervention group, in addition to receiving usual care and treatments, each patient received a 90-min session of individual hypnosis. In this session, after induction of hypnosis by eye stabilization and deepening using progressive muscle relaxation technique, conditional conjecture, mental imaging and downward movement, with the Freudianism approach, age retreat was induced and subjects were taken to the time with the most negative experiences. Then, using Adlerian approach, by reviewing the past memories and confronting them, inculcation of emotional evacuation and the embodiment of the emotional burden of memories were eliminated, their negative factors were corrected. After storytelling containing implications and Erickson metaphors for relaxation, anxiety control and behavioral management, finally, the conditioning was done to strengthen the ego, confidence and relaxation and induction of a pseudo-hypnosis suggestion based on the ability to control respiratory problems caused by asthma such as shortness of breath, short breath, wheezing, coughing, etc. [29-31].

During the data collection process, 5 patients were excluded from the study due to a lack of referral after one month and 3 patients due to pneumonia at the beginning of the study (a total of 8; 4 subjects from the control group and 4 subjects from the intervention group). . So, one month after the intervention, FEV1 as an indicator of pulmonary function and the severity of asthma based on the NAEPP classification (EPR-3) were re-measured for 64 remaining patients in the study by the same trained nurse and the physician and the results were recorded in a checklist.

In this double-blind study, the number of each patient in the block random allocation list that indicated that he belonged to the intervention or control group, and no one except for the researcher responsible for collecting the data was aware of that was recorded as an identification code in the research checklist in the baseline and one month after the intervention. Accordingly, the nurse and physician of the research team, in addition to being unaware of the patient's belonging to the intervention or control group, did not have access to the information recorded in the previous stages and only completed research checklist including identification codes and provided it to the researcher responsible for collecting the data. The statistician was also blind to the code assigned to the intervention and control groups until the end of the analysis.

In this research, all ethical considerations, such as the informed consent of patients participating in the research and possibility of withdrawal from the study, confidentiality of the collected information and their use in general and for the study objectives, no changes in the drugs used, no deprivation from standard treatment and care and no additional costs on contributors and insurance organizations in the research. Considering the positive effects of hypnosis on pulmonary function and severity of asthma in the intervention group, after completing the final report of the research project, a 90-min session of individual hypnosis was also held for the control group.

The collected data from 64 patients were analyzed using SPSS 21 software at 95% confidence level. The intergroup comparison of the quantitative variables, including age, and body mass index and dependent variable of FEV1, which had normal distribution, was done by Independent t-test. Chi-square test was used to compare the qualitative variables, including demographic variables and gender, marital status, employment status, education level and income status and asthma as a dependent variable. Also, in order to compare intra-group dependent variables, including FEV1 and asthma severity, paired t-test and marginal homogeneity test were used.

Findings

The mean age and body mass index of the patients were 39.64±11.85 years and 27.23±5.06 kg/m^2, respectively. The mean age of the intervention and control groups was 37.91±9.89 and 41.38±13.46 years and the mean BMI of the intervention and control groups was 27.22±3.93 and 27.25±6.06 kg/m^2, which was not significantly different between the two groups (p>0.05). In terms of qualitative demographic variables, including gender, marital status, occupation, education level and income status, there was no significant difference between groups (p>0.05; table 1).

At the baseline, FEV1 levels were not significantly different in the intervention and control groups (p>0.05), but one month after the intervention, this level increased significantly in the intervention group compared with the control group (p<0.05). Also, in intragroup comparison, FEV1 increased significantly in the intervention group at one month after the end of the intervention compared with the baseline (p<0.05); meanwhile, there was no significant difference between FEV1 levels in the control group at one month after the intervention (p<0.05), compared with the baseline (Table 2).

The severity of asthma in the intervention and control group was similar at the baseline (p>0.05). However, one month after the intervention, the severity of asthma in the intervention group was significantly reduced compared with the control group (p<0.05). Also, in the intragroup comparison, the severity of asthma in patients in the intervention group one month after the end of the intervention was significantly decreased compared with the baseline (p<0.05); however, the severity of asthma in the control group was not statistically significant one month after the intervention, compared with the baseline (p>0.05; Table 3).

Table 1) The absolute and relative frequency of demographic characteristics of patients with asthma in the intervention (32 patients) and control (32 patients) groups

Variables	Intervention group	Control group	P value
Gender			
Male	15 (46.9)	11 (34.4)	0.31
Female	17 (53.1)	21 (65.6)	
Marital status			
Single	12 (37.5)	7 (21.9)	0.17
Married	20 (62.5)	25 (78.1)	
Occupation			
Employee	5 (15.6)	7 (21.9)	0.23
Manual worker	6 (18.8)	6 (18.8)	
Non-governmental	12 (37.5)	5 (15.6)	
Housewife	9 (28.1)	14 (43.7)	
Educational level			
Illiterate	8 (25.0)	14 (43.7)	0.12
Diploma and diploma	11 (34.4)	12 (37.5)	
University	13 (40.6)	6 (18.8)	
Income			
Poor	11 (34.4)	15 (46.8)	0.59
Moderate	14 (43.7)	11 (34.4)	
Good	7 (21.9)	6 (18.8)	

Table 2) Comparing the mean of FEV1 (%) at the baseline and one month after the end of the intervention in the intervention and control groups

Stage	Intervention group	Control group	Intergroup P value
Baseline	55.81±14.53	60.84±11.49	0.13
One month after intervention	56.88±15.46	67.97±11.51	0.002
Intragroup P value	0.48	0.0001	-

Table 3) Comparison of the absolute and relative frequency of asthma severity in the intervention and control group at the baseline and one month after the research intervention

Severity of asthma	Intervention group	Control group	Intergroup P value
Baseline			
Moderate Persistent	17 (53.1)	16 (50.0)	0.81
Sever Persistent	15 (46.9)	16 (50.0)	
One month after the intervention			
Mild Persistent	5 (15.6)	9 (28.1)	0.2
Moderate Persistent	10 (31.3)	17 (53.1)	
Sever Persistent	17 (53.1)	6 (18.8)	
Intragroup P value	0.15	0.001	-

Discussion

The findings of this study showed that one month after the intervention, the FEV1 level of the intervention group was significantly increased compared with the control group. Therefore, it can be concluded that hypnosis as a research intervention could lead to a difference between the intervention group and the control group and significantly increased the FEV1 in patients with asthma in the intervention group, based on which the effect of hypnosis to improve the pulmonary function of people with asthma was approved.

The results of the research by Sutanto *et al.* [24], Citron *et al.* [28] and Ewer & Stewart [32] are consistent with the findings of the present study to increase the FEV1 significantly in patients with asthma by hypnosis as an independent variable of the study. Also, the findings of the present study on changes in FEV1 based on theoretical knowledge basis are reasonable and justifiable. Ventilation is the mechanical action of the active air movement into the lung (inhale) by the activity of the respiratory muscles and exiting it (exhale) due to the lung and chest elasticity. Since exhale is a passive action, in which the intracranial pressure is more positive and the air is expelled, it is more important in pulmonary function tests. The FEV1 refers to the expiratory volume of forced vital capacity, which is released in the first seconds from the lungs and is one of the most common pulmonary function tests. The pathophysiologic processes of asthma cause FEV1 to fall in involved individuals, which is 80% in normal subjects. Although the mechanism of hypnosis effectiveness in the treatment of asthma is not described comprehensively, however, a significant increase in FEV1 in patients with asthma in the intervention group can be attributed to the effect of hypnosis on non-adrenergic and non-cholinergic nervous systems in the airway smooth muscle and the inhibiting and reducer effect of hypnosis in the inflammatory process of bronchitis [10, 24, 33].

Another finding of the present study was that one month after the intervention, the severity of asthma in the intervention group was significantly reduced compared with the control group. Therefore, it can be concluded that hypnosis as a research intervention was able to cause differences between the intervention group and the control group and significantly reduce the severity of asthma in the intervention group. Accordingly, the impact of hypnosis on asthma severity was confirmed.

Based on theoretical knowledge, although the mechanism of hypnosis therapy in asthma management is ambiguous, it is possible to improve the symptoms and reduce the severity of the disease in patients with asthma under hypnosis according to the theory of P.N.E.I. and the ability of hypnosis to control emotional stress and psychological comorbidities commonly in people with asthma. Also, the improved hypersensitivity of airway, the reduced rate of allergic reactions and the inhibitory and reducer effect of hypnosis on the inflammatory process of bronchi are other possible reasons for effectiveness of hypnosis in improving the symptoms and severity of asthma [10, 24, 29].

The findings of this study on the effect of hypnosis on the improvement of symptoms and severity of asthma patients are consistent with the results of studies by Sutanto *et al.* [24], Anbar [26], Citron *et al.* [28], Ewer & Stewart [32], Langewitz *et al.* [34], Collison [35], and Anbar & Hummell [36].

Unlike previous consistent studies, 25 asthmatic children in Smith and Berns study were subjected to 4 sessions of hypnotherapy. The results of their study that did not support the results of this study showed that immediately and one month after hypnotherapy, not only no changes were observed in the pulmonary function test, but also its symptoms have not been improved [37]. This may be due to the age difference of the participants in the research. Also, the proper design of implications and metaphors, the conditioning and optimal post-hypnotic suggestion, which are among the strengths of the present study, can justify the above difference.

Although positive effects of hypnosis on pulmonary function and severity of asthma have been reported, but this study faced limitations, such as the possible use of herbal medicines, foods or caffeinated drinks during the study, and climate change, temperature and humidity during the study, which may affect the results of the study.

In addition to the positive effects of hypnosis on pulmonary function and severity of asthma in this study, availability, cost-effective, cost-effectiveness, speed of impact and little side effects of this intervention, if the results are confirmed in other similar studies, the synergistic effects of this complementary medicine approach with drug therapy can be used for treatment of patients with asthma.

Nurses are the largest and most important professional care providers, who are active in three levels of prevention providing treatment, health care, support and education and are at the forefront of coping with the negative effects of asthma [38, 39].

Therefore, the researchers suggest that training hypnosis induction and deepening techniques, implications and Erickson metaphors, conditioning and appropriate post-hypnotic suggestion for asthma patients should be considered in the curriculum and continuous nursing education courses.

Due to the hypnosis process (the transformation of the therapist's suggestion to the autosuggestion by the subject), the efficacy of self-hypnosis is also scientifically expected [40], therefore, the researchers recommend that in later studies, the effect of self-

hypnosis on pulmonary function and severity of asthma in patients should be investigated.

Conclusion

Hypnosis as an adjuvant treatment is effective in the improvement of pulmonary function and reducing the disease severity in asthmatic patients.

Acknowledgements: This study is a research project approved by the Research Council of Yasuj University of Medical Sciences. We would like to thank the efforts of the staff of the Faculty of Nursing and Vice-Chancellor of Research and Technology of Yasuj University of Medical Sciences, staff of the clinic of Shahid Mofattah in Yasuj affiliated to Yasuj University of Medical Sciences, the patients participating in the research and all those who have somehow contributed to the implementation of this study.

Ethical permission: This study was approval by the Research Ethics Committee (Ethics code: 6865) and was registered on the Iranian registry of clinical trials (IRCT20100919004775N10).

Conflicts of interests: none declared.

Authors' contribution: Zinat Mohebbi (First author), writing introduction/main researcher/writing discussion (30%); Shahla Najafi Doulatabad (second author), writing introduction/assistant researcher/writing discussion (10%); Mohammad Malekzadeh (third author), writing introduction/assistant researcher (8%); Seyed Hesamoddin Nabavizadeh (fourth author), writing introduction/assistant researcher (7%); Hossein Marioryad (fifth author), writing introduction/methodologist/assistant researcher (5%); Ibrahim Momeni (sixth author), writing introduction/assistant researcher (5%); Maryam Niazi (seventh author), writing introduction/assistant researcher (5%); Mohammad Zoladl (eighth author), writing introduction/main researcher/statistical analyst (30%);

Funding/Support: this research was funded by the Vice-Chancellor of Research and Technology of Yasuj University of Medical Sciences.

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