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Review Article

Effectiveness of Therapeutic Education and Respiratory Rehabilitation Programs for the Patient with Asthma

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ABSTRACT

Asthma is a chronic complex and heterogeneous disease, with great variability and has a huge impact, not only on patients who suffer the disease but also their families and society in general. Educating asthmatic patients and their families is essential for therapeutic intervention. Through continuous, dynamic and adaptive education, changes in attitudes and behaviours of the patient and family can be achieved, and will undoubtedly lead to an improvement in their quality of life. Among other non-pharmacological interventions, respiratory rehabilitation is an alternative treatment, and is primarily aimed at patients with moderate to severe asthma. Although the latest clinical practice guidelines published in scientific literature recommend two strategies for treatment, the results of relevant publications are diverse. The objective of this study was to describe the effectiveness of therapeutic and educational programs in respiratory rehabilitation of the asthmatic patient.

Eficacia de los programas de educación terapéutica y de rehabilitación respiratoria en el paciente con asma

Palabras clave:
Asma bronquial
Educación terapéutica
Fisioterapia
Rehabilitación respiratoria
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RESUMEN

El asma es una enfermedad crónica compleja, heterogénea, con una gran variabilidad y que tiene un enorme impacto, no sólo en los pacientes que la padecen sino también en sus familias y en la sociedad en general. La educación del paciente asmático y su familia son el elemento esencial para la intervención terapéutica. A través de la educación, entendida como un proceso continuo, dinámico y adaptado, se van a poder conseguir cambios en las actitudes y conductas del paciente y su familia, que habrán de llevar, sin duda, a mejorar la calidad de vida de los mismos. Entre otras intervenciones no farmacológicas, la rehabilitación respiratoria representa una alternativa de tratamiento, y está dirigida fundamentalmente a los pacientes que padecen asma moderada y severa. Puesto que las últimas guías de práctica clínica publicadas en la literatura científica recomiendan ambas estrategias de tratamiento, pero los resultados de las publicaciones al respecto son diversos, el objetivo del presente trabajo fue describir la eficacia de los programas de educación terapéutica y el papel de la rehabilitación respiratoria en el tratamiento del paciente asmático..

Introduction

Asthma is defined by the Global Initiative for Asthma[1] as a "chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation causes an associated increase in airway hyperresponsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment."

It is a chronic disease which can occur at any stage of life. A significant proportion of people who suffer from asthma show their first symptoms at an early age. There is an intermediate prevalence

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of asthma in Spain, affecting 3%-4% of the adult population and 8% of infants. The occurrence of asthma has increased over the last 20 to 30 years and is not as marked in developing countries as in developed countries. One reason for this increase could be due to a possible disorder in the development of the immunological system in children in industrialised countries (hygiene theory). This is considered to be a consequence of insufficient exposure to infectious agents due to the advanced levels of health care in developed countries.[2-5]

Today, education is seen as a very important therapeutic practice for asthmatics. It is a difficult task and requires proper training for doctors and other health professionals before their skills can be transferred to the patient. The main difficulty stems from the fact that training these chronic patients is extremely different at all levels as the sufferer group is heterogeneous in age, socio-cultural background and needs, and because the motivation to learn will depend in large part on the sufferer's degree of acceptance of the illness and its management.[6] The educational process allows sufferers to take control of and make decisions about their illness and to adapt some aspects of the treatment as it develops, in accordance with an action plan developed and agreed upon in writing under doctor supervision.

Respiratory rehabilitation interventions are designed for the intercrisis phase. In other words, they focus on the consequences of over-response and bronchial obstruction when alterations are produced in the airway walls. When the smooth bronchial muscle contracts; the walls become inflamed and oedema forms and there is exaggerated mucous secretion and an increase in the viscoelasticity, adhesiveness and dehydration of the secretions, so making airflow difficult. The aim of this study is to describe the effectiveness of therapeutic educational programmes and the role of respiratory rehabilitation in treating asthmatic patients.

Effectiveness of Therapeutic Educational Programmes in Asthmatic Patients

Asthma is a chronic, complex, and heterogeneous disease with great variability and has a huge impact, not only on patients who suffer from the disease but also on their families and society in general.

Given that there is currently no cure for asthma, despite advances in pharmacological treatment, the main aim is to control the illness. Although measures for achieving a high level of control and for improving the quality of life for asthma sufferers exist, the reality is often different.[7-9] This phenomenon can probably be explained on the one hand, by the varied nature and complexity of the illness and, on the other, by non-adherence to treatment.

All recommendations, guides and protocols emphasize the role of education as a key component in the management and control of this disease.[10-17] The two most recent publications (Global Iniciative for Asthma and the British Guideline on the Management of Asthma) insist that establishing a partnership between the patient, the patient's family and the doctor should be a priority.[18,19]

According to the World Health Organisation (WHO), "therapeutic education is a continuous process that is integrated in terms of care and is focused on patients. It includes organised activities of sensitisation, information, learning and psychosocial follow-up related to the disease and the treatment prescribed. It aims to help patients and their close family members to understand the disease and the treatment, cooperate with educating professionals, live the healthiest lifestyle possible and to maintain or improve their quality of life. Education should make patients able to acquire and maintain the necessary resources for the optimal management of living with the disease (table 1). Therapeutic education is aimed at patients with chronic illnesses as opposed to health education for the healthy public and it helps the patients acquire or maintain the necessary skills for managing their lives better when living with a chronic illness."[20]

Table 1
Objectives of therapeutic education

Main Objectives
Decrease morbidity and mortality
Improve quality of life:
Lead a normal life including taking part in physical/sporting activities
Achieve a minimum level of or no absenteeism from school
Decrease the number of crises, visits to A&E or hospital admissions
Maintain the best possible lung function
Optimum control of inflammation (for example: FENO)
Minimum pharmacological therapy with minimum amount of secondary effects
Help the sufferer and his/her family maintain control over the illness
Recognise the signs and symptoms of lack of control
Early recognition of deterioration and subsequent treatment decided by the patient
Maintain adherence/compliance with the maintenance therapy and with suitable lifestyles
Specific objectives
Get to know and understand asthma:
Teach the child and their family about asthma and help them to accept it
Teach about the physiopathology, symptoms and possible development of asthma in a straightforward manner
Help to identify the triggers and how to avoid them as much as possible
Help to identify the early signs of an attack and the signs of severity
Teach the differences between available drugs: alleviators for attacks and controllers to manage the illness
Learn to dominate certain techniques and skills:
Master inhalation techniques and ~~the~~ PEF management
Master or control some daily situations such as sporting activities or stress (breathing control and avoiding some triggers)
Adopt a positive attitude, behaviour and lifestyle:
Express and learn from the experiences gained from the illness
Show patient guided self-management using a written action plan
Enable autonomous decision making (self-management): know when to ask for help
Manage the illness in harmony with the person's activities and projects
For risk situations, develop preventative behaviour for exacerbations
Increase personal satisfaction and confidence in health professionals and treatment
Decrease costs

Modified from An Pediatr (Barc). 2007;66:496-517.

Evidence of more attention being given to educating asthmatic patients is shown by the increasing number of articles that are published annually. In 1974, only one article was registered (*Medline)*, in 1990 there were 44 articles, and in 2009 more than 2000 articles were published.[6]

A review of the medical literature published over recent years allows us to confirm that educational programmes that comply with certain criteria (general information on asthma, the correct usage of peak expiratory flow [PEF], self-management plans, etc. are useful for decreasing morbidity and mortality and the need for assistance, both in adults and children (Evidence Level I) (table 2).[21-23]

Therefore, educating the asthmatic patient and their family is an essential component of therapeutic intervention. Through continuous, dynamic and adaptive education, changes in the attitude and behaviour of both patient and familyf can be achieved, leading to an improvement in their quality of life.

We have tried here to answer the following questions: Why educate? Who must we educate? Who should provide the education? Diverse studies show that the use of educational programmes significantly reduces the number of unscheduled visits to the doctor and A&E departments, hospitalisations, absenteeism from school while they also help towards improving the manner in which anti-inflammatory and bronchodilator medicines are prescribed and used. These results improve with the degree of asthma severity.[24]

A systematic review into the effectiveness of therapeutic education programmes, aimed at self-care for adult asthmatic patients was

Table 2
Evidence surrounding asthma education (level I)

Education is a fundamental therapeutic component for the self-management of asthma
Educational intervention for asthmatic patients which includes programmes that aim to achieve self-management and which are based on agreed goals, improves health results, the use of health resources and costs
The availability of a written action plan, together with the acquisition of knowledge, skills and the existence of a periodic review are the most effective forms of educational intervention
A key educational tool is written, personalised action plans, either based on symptoms or on PEF measurements
The most effective action plans are those which look at 4 elements: use of the best personal PEF value, allow modification of the dosage of IGC, allow the early intervention of oral corticosteroids, understand when to ask for medical assistance

IGC: Inhaled glucocorticoids; PEF: Peak Expiratory Flow.
Modified from An Pediatr (Barc). 2007;66:496-517.

carried out by the Cochrane group21 which analysed the results of 36 randomised clinical trials (RCT), concluding that these programmes were more effective in comparison with other types of intervention. The results of this review showed a significant reduction in hospitalisations (RR 0.64, CI 95% 0.50-0.82), absenteeism from work or school (RR 0.79, CI 95% 0.67-0.9) and nocturnal asthma (RR 0.67, CI 95% 0.56-0.79). These programmes are aimed at giving patients the skills to adjust their medication using a written action plan that includes monitoring their expiratory flow and their symptoms.

Another systematic review carried out by Wolf et al[22] determined the effectiveness of education for self-management of asthma in children. They identified 45 controlled and randomised clinical trials of educational programmes of self-management of asthma in children and adolescents aged between 2 and 18 years. Thirty two (32) of these were suitable and consisted of 3706 patients. The authors found an association between these programmes and improvements in the measurements of expiratory flow (CI 95% –0.49 to –0.08), degrees of self efficiency (CI 95% –0.49 to –0.07), reductions in the amount of absenteeism from school (CI 95% –0.23 to –0.04), reductions in the amount of days where activity is restricted (CI 95% –0.49 to –0.08), reductions in the number of visits to A&E (CI 95% CI –0,33 to –0,09) and reductions in the nights that are disturbed by asthma. These effects had a greater impact on cases of moderate to severe asthma and on the studies that used PEF, than on those that only used symptoms (**Evidence Level I).

According to Korta et al,[24] therapeutic education is effective and produces a reduction in the use of resources and health costs, as well as an improvement in the patient's quality of life. To be effective, programmes should include information on self-management, the use of a personalised, written action plan, and should include periodic reviews of the patient.

When considering who should provide the education, we should not only think about the patient. It is important to educate those in charge of health plans such as health professionals and non-healthcare staff (teachers, trainers, family members or carers), and even extend such education to the general population.

There are many people responsible for educating asthmatic patients: doctors or nurses who are either specialised or interested in asthma, physiotherapists, pharmacists, non-healthcare staff such as teachers and parents or experienced asthma suffers themselves. This last group is particularly important for asthmatic adolescents.

It is also necessary however to point out the increasing trend in asthma morbidity and mortality, despite scientific advances and new therapeutic methods. This demonstration of the relative ineffectiveness of medical management emphasizes the importance of non-pharmacological interventions such as respiratory rehabilitation programmes, the effects of changes in lifestyl and environmental factors in asthma management and compliance with medical prescriptions as co-assisting measures in treating asthmatic patients.[6]

Respiratory Rehabilitation Programmes for Asthmatic Patients

The American Thoracic Society (ATS) and the European Respiratory Society (ERS) define respiratory rehabilitation as "an evidence-based intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities. Integrated into the individualized treatment of the patient, pulmonary rehabilitation is designed to reduce symptoms, optimize functional status, increase participation, and reduce health care costs through stabilizing or reversing systemic manifestations of the disease".[25] In practice, respiratory rehabilitation refers to a group of physical techniques that are aimed at eliminating respiratory airway secretions and improving pulmonary ventilation. This is indicated in a multitude of chronic respiratory illnesses such as asthma or COPD.

There is currently a growing interesting in respiratory rehabilitation for asthma in Spain. However, there is a low level of implementation as according to the Spanish cardio-respiratory rehabilitation society (*Sociedad Española de Rehabilitación Cardiorrespiratoria* [SORECAR]), only 6% of these patients carry out respiratory rehabilitation exercises.

Scientific evidence on the effectiveness of such programmes in some respiratory illnesses such as asthma is insufficient, due to such inherent limitations in these studies as not being able to maintain patient and therapist blinding and the lack of action protocols. Furthermore, there is a lack of consensus on standard techniques which could be used to compare new emerging techniques and a lack of objectivity in the variables measured.[26]

A general integrated respiratory rehabilitation programme consists of pharmacological treatment, health education and respiratory rehabilitation. Respiratory rehabilitation in asthmatic patients is fundamentally directed at those who suffer from moderate to severe asthma. The objectives of these programmes are outlined in table 3.[27,28]

In asthmatic patients, respiratory physiotherapy is designed for the intercrisis phase and aims to decrease the consequences of over-response and bronchial obstruction.[29] Physiotherapists are specialised health professionals who carry out respiratory rehabilitation techniques under the supervision of a rehabilitation doctor and/or a pneumologist, and they provide the patients with self-drainage techniques and ventilation patterns, as well as recommending therapeutic exercises. The systematic reviews carried out by the Cochrane group show that the respiratory techniques most used in the treatment of asthma are: exercises to re-teach the respiratory pattern, physical training for the respiratory and peripheral muscles, exhalation techniques and instrumental aids for mucociliary clearance, aerobic exercise and complementary techniques. The quality levels of the scientific evidence which is used in this study are shown in table 4.

Re-learning the Respiratory Pattern

Alterations in the respiratory behaviour of asthmatic patients translate into bronchoconstriction, an increase in residual pulmonary volume and alterations in abdomino-diaphragmatic breathing which cause increased involvement of the intercostal muscles instead of the diaphragm.[30] During exhalation, the inspiratory muscles continue to be used, meaning that abdominal pressure is unable to increase at the end of exhalation. This therefore puts the diaphragm at a mechanical advantage for action, thereby producing pulmonary hyperinflation.

The aim of re-learning the respiratory pattern is to develop a more effective model for respiration, and consequently reduce breathlessness. This is generally achieved by decreasing the volume of respiration and activating abdomino-diaphragmatic respiration. It

has also been suggested that upon decreasing hyperventilation and hyperinflation, carbon dioxide is increased thereby decreasing the effects of hypocapnea and asthma-related symptoms.[31]

It is important to develop respiratory exercises that are aimed at controlling the respiratory pattern, increasing awareness of nasal respiration and decreasing ventilation in order to re-establish a slower pattern of movement. Practicing respiratory exercises in patients with asthma has shown benefits regarding their perceived quality of life.[31]

With the aim of assessing the effectiveness of these exercises, the study carried out by Thomas et al[32] saw[33] asthmatic patients undergo respiratory physiotherapy treatment and therapeutic education as opposed to just a therapeutic education programme on its own, with a follow-up period of 6 months after the end of the study. The authors concluded that the physiotherapy programmes centred on re-learning the respiratory pattern obtained greater benefits in the Nijmegen Questionnaire and in the Asthma Quality of Life Questionnaire (AQLQ) with regard to symptoms, activities, emotions and environment, in comparison with the education programme on its own (Evidence Level III).

Table 3
Objectives of asthma respiratory rehabilitation programmes

Design a personalised action plan depending on severity, age and physical ability of the patient
Reduce airway obstruction and prevent and treat complications arising from such obstructions
Administer management guidelines for patients and families to control and identify symptoms
Re-teach the respiratory pattern, optimising its function during the intercrisis phase
Increase exhalation with instrumental aids
Carry out the correct inhalation techniques
Practice relaxation techniques for controlling anxiety during attacks
Treat soft tissue to achieve suitable ventilation mechanisms
Introduce physical exercise and improve nutritional conditions and quality of life of the patient.

There are studies with similar methodological designs in which the practice of techniques for improving respiratory awareness are analysed, such as in the case of yoga, as this involves respiratory exercises as its main component.l[33-35] The study carried out by Vedanthan et al33 took 17 asthmatic patients between the ages of 17 and 52 and randomly assigned them to a treatment group that practiced yoga for 16 weeks and a control group. On a daily basis all participants recorded any symptoms that occurred and the medicine they were using and on a weekly basis each participant performed a spirometry test. The results showed that the group that were receiving yoga treatment (mainly respiratory exercises designed to reduce the respiratory pattern) decreased their intake of beta-2 agonists (95% CI 2.94-8.70) although no differences in pulmonary function were seen in comparison with the control group (Evidence Level III).

Nagarathna and Nagendra[34] also found differences regarding the intake of beta-2 agonists and the number of asthma attacks by using a group of 53 patients who practiced yoga for two weeks, with respiratory exercises designed to reduce the respiratory pattern, in comparison with 53 patients who formed the control group, grouped according to age, sex, type and severity of asthma (Evidence Level III).

There seems to be a consensus that for respiratory strategies to be effective they must be practiced regularly by the patient. Whilst learning the techniques, emphasis should be put on suitable ventilation mechanisms and not on the depth of respiration as this latter aspect could exacerbate bronchial spasms.[36]

The instructions given to a patient involve identifying and differentiating the movement of the diaphragm and the rib cage during inhalation and exhalation (elastic retreat of the abdominal musculature), then learning to synchronise them. At the same time, patients are shown how to expel air, prolonging the expiratory time, by controlling the exit of air through pursed lips or by supracostal respiration while inhaling.[37] The deflating techniques include pursed-lip breathing, timed exhalation and abbreviated inhalation. Re-learning tends to be practiced sitting down to begin with, in front of

Table 4
Quality levels of the scientific evidence from the Catalan Agency for Health Information, Assessment and Quality (*Agència d'Avaluació de Tecnologia Mèdica*, AATM)

Level	Strength of evidence	Type of design	Conditions of scientific rigor
I	Appropriate	Meta-analysis of RCT	Analysis of individual patient data No heterogeneity Different analysis techniques Meta-regression Mega-analysis Quality of the studies
II	Appropriate	Large RCT sample	Assessment of statistical power Multicentre Quality of study
III	Good to regular	Small RCT sample	Evaluation of statistical power Quality of study
IV	Good to regular	Prospective, non-randomised controlled trial	Controls that coincide in time Multicentre Quality of study
V	Regular	Retrospective, non-randomised controlled trial	Historical controls Quality of study
VI	Regular	Cohort studies	Multicentre Matching Quality of study
VII	Regular	Case studies and controls	Multicentre Quality of study
VIII	Poor	Non-controlled clinical series Descriptive studies: Epidemiological vigilance Questionnaires Registers Databases Expert committees Consensus conferences	Multicentre
IX	Poor	Anecdotes or specific cases	

Modified from: Jovell AJ, Navarro-Rubio MD. Evaluación de la evidencia científica. Med Clin (Barc) 1995;105:740-743.

a mirror with detailed descriptions of the respiratory system from the physiotherapist. The patients place their hands on the appropriate places to feel the movement and to direct the air (or facilitate its exit if it accompanies the abdominal musculature during exhalation), until they can carry out abdomino-diaphragmatic breathing in any position or situation.

With the aim of showing which exercises have the most beneficial results, there are publications which compare diaphragmatic technique with other therapeutic models such as the study carried out by Girodo et al.[38] This took 67 patients who were randomly assigned them to the two treatment groups for a period of 16 weeks, and compared them to a group that was on a waiting list and was not receiving any type of treatment (control group). The patients that used the diaphragmatic technique showed a reduction in the intensity of asthmatic symptoms and reduced their use of medication. However, these improvements were not maintained over time, as after a period of two months the sample was reassessed and the majority of patients had returned to their sedentary lifestyles and stopped practicing the exercise patterns they had learnt (Evidence Level III). This suggests that it is important to combine these respiratory rehabilitation programmes with educational measures with the aim of increasing adherence to treatment.

It would seem that there is a certain level of consensus in not recommending the re-learning of the respiratory pattern for all types of asthma. In a systematic review in which 6 RCT were analysed on the effectiveness of these exercises, it was concluded that they did not seem to be effective in severe asthma, but that they did have benefits for moderate asthma sufferers.[39] (Evidence Level I).

Training the Respiratory Muscles

The second category of exercises are those that are aimed at training the respiratory muscles - however there is some controversy surrounding this. As with any skeletal muscle, the inspiratory and expiratory respiratory musculature can be trained using the principals of overloading and specificity to produce adaptations that help to improve strength and resistance. The controversy arises over whether there is any clinical or functional value in this training for asthmatic patients.

Breathlessness and low tolerance to exertion increase as a consequence of weak muscles that are found in patients with chronic respiratory pathologies. Training the main inspiratory musculature (diaphragm) has been a common recommendation, stemming from the belief that the inspiratory musculature is weakened in asthmatic patients. However, more recent studies show that the inspiratory musculature adapts to over-exertion, in the form of hypertrophy of the accessory muscles, due to periods of bronchial spasm and deficit of eccentric contraction during exhalation.

In patients with asthma, weakness of the respiratory musculature can be a consequence of the prolonged use of steroids, the inflammatory process or a reduced ability to exercise. In contrast, there are studies that have shown better inspiratory musculature in asthmatics in comparison with the healthy population.[40]

In a systematic review carried out by the Cochrane group[41] which included 5 RCT, the effect of training the inspiratory musculature in moderately and severely asthmatic patients was tested using external, resistant, inspiratory muscular training devices. The details of 76 patients were included and the results showed that there was a significant effect in the maximum inspiratory pressure reached, compared with the control group that did not receive any additional treatment (23.07cmH_2O; 95% CI 15.65-30.50) (Evidence Level I). None of the studies produced improvements in the PEF. In another study of 22 women with moderate asthma who underwent a 4 week programme of inspiratory musculature training, using the same devices mentioned above, a decrease in the perception of dyspnoea was produced, according to the Borg scale (P<.05), along with an increase in the maximum inspiratory pressure (P<.005) and a decrease in the intake of Beta-2 agonists from 3.4 (0.6) to 2.1 (0.5) puffs per day (P<.001). Furthermore, a percentage increase was seen in forced vital capacity (FVC) compared with the control group (15.6%).[42]

Although it would seem that there are potential improvements to be made from training the inspiratory musculature, little is known about its clinical relevance. Musculature training strategies should be recommended when muscular weakness is observed. In addition, it is necessary to look at the repercussions of dyspnoea, quality of life and tolerance to physical exertion, as well as carrying out long-term follow-ups to observe the repercussion of administering medicines or the duration of intercrisis periods.

Respiratory Techniques and Instrumental Aids

Expiratory techniques are not advisable during the crisis period due to the bronchial obstruction that is produced. However, practicing these techniques improves bronchial health, drainage of secretions and contributes to the re-learning of the respiratory pattern to decrease hyperinflation.

Instrumental aids favour the clearance of the airways via vibration, positive pressure, or both. However, there is controversy over the results obtained in the studies that compare positive pressure and vibration (Acapella-Choice and Flutter, respectively). Tsai[43] found that the devices for positive pressure improved the bronchodilation achieved, via nebulisation of beta-2 agonists, if it was applied to a group of 54 patients with asthma, reflecting increases in PEF and FVC (Evidence Level IV).

Girard y Terki[44] used a combined positive expiratory device and a vibration device (Flutter VRP1®) to eliminate secretions in 20 patients with asthma, 5 times daily, for 5 minutes over a period of 30-45 days of treatment. The FEV_1, FVC and the PEF were assessed before and after the treatment cycle. The results of the study showed an improvement in the three parameters studied, as well as a subjective improvement in18 of the 20 patients included in the study (Evidence Level IV). However, these findings were not compared with a control group, no measurements were carried out in the medium or long term and adherence to treatment was also not assessed.

Swift et al[45] obtained benefits in expectoration after the application of Flutter during a 2 week period, but in neither he pulmonary function nor medical dosage (Evidence Level VI). In a more recent study carried out on 45 acutely asthmatic children between the ages of 6 and 16, it was concluded that therapy with Flutter combined with conventional treatment significantly improved vital capacity and FEV_1, in comparison with conventional treatment on its own[46] (Evidence Level VII).

Both the expiratory techniques and the instrumental aids aimed at eliminating secretions should be accompanied by cough-reduction manoeuvres. With the aim of avoiding irritating coughs, the patient should learn productive cough techniques so as to be able to eject the secretions in an efficient manner and so also reducing fatigue.

Aerobic Exercise

Physical exercise is an important part of the respiratory rehabilitation programmes and a suitable physical condition should be maintained. However, it used to be the case that exercise was seen as a potential risk for the asthmatic patient. Scientific evidence has since shown that regularly taking part in physical exercise such as swimming, far from posing a risk, actually improves the intake of oxygen, fatigue levels and cardiac frequency, although these improvements do not seem to be accompanied by changes in the spirometric pattern.[47] Furthermore, in the case of bronchial spasms produced by exercise, significant improvements to the quality of life can be made if the patient takes the necessary precautions via therapeutic education programmes.

Particularly in asthmatic children, regular swimming is recommended due to the high level of humidity in the air preventing the loss of heat and water in the respiratory airways. In some cases adapted activities can be designed where the therapeutic objectives require the development of a progressive exercise programme to increase tolerance to exercise, postural control and good respiratory control via monitoring PEF.

Another beneficial aspect produced by physical exercise is psychological strength due to a decrease of fear of an attack and an increase in confidence. In a review by Cochrane[48] on the benefits of exercise for asthma sufferers which looked at 13 RCT in which the patients did physical exercise for at least 20 minutes for 4 weeks, the authors concluded that physical training improved the cardiopulmonary condition, measured via an increase in maximum oxygen intake of 5.4ml/kg/min (95% CI 4.2-6.6) and the maximum expiratory ventilation of 6.0l/min (95% CI 1.5-10.4) (Evidence Level I). However, there was no available data with regard to measuring the quality of life. It is important to point out that detrimental effects to asthma symptoms were not found following exercise.

Alternative Therapies

In successive systematic reviews that have been published on the use of alternative therapies such as supplementary respiratory rehabilitation treatments in asthmatic patients, the general conclusion has been that there is a lack of scientific evidence to support their use.

Acupuncture is the most studied alternative therapy. One review by Cochrane[49] identified 7 quality RCT with a total of 174 patients who received acupuncture treatment as a supplementary measure for treating asthma. The review concluded that no clinical benefits were found with regard to pulmonary function following the intervention. A later systematic review[50] that included 11 RCT also found no scientific evidence of a decrease in the severity of asthma (Evidence Level I). These results were corroborated in two RCT published later still.[51,52]

These respiratory rehabilitation programmes for asthma tend to include relaxation techniques, as emotional factors such as anxiety, can increase bronchial spasms. A systematic review[53] identified 5 RCT in which relaxation techniques were applied as supplementary treatments, of which only two showed any benefits in pulmonary function due to muscular relaxation.

According to another review carried out by Cochrane,[54] manual therapies including massage and osteopathic manipulation showed no evidence of being effective treatments for asthma. The conclusions of this systematic review were obtained from 4 RCT in which the authors highlighted the lack of scientific studies and the need for more rigorous methodologies for extracting definitive conclusions regarding this therapeutic proposition.

Another type of treatment that tends to be applied in respiratory physiotherapy programmes is corrections to postural alterations caused by asthma, using postural re-education techniques such as the Alexander technique or the Global Postural Re-education method (RPG®). Currently there are a lack of studies providing scientific evidence regarding the application of these techniques. However, at an experimental level, both professionals and patients have reported subjective benefits[55] (Evidence Level IX).

Conclusions

Educating asthmatic patients and their families is essential for therapeutic intervention. Through continuous, dynamic and adaptive education, positive changesin the attitudes and behaviour of the patient and the patient's family can be achieved, which will undoubtedly lead to an improvement in the quality of life.

Respiratory rehabilitation seems to be an effective treatment for chronic obstructive respiratory illnesses, and is based on the application of techniques for improving patient's ventilation, muscular strength, secretion drainage and quality of life.

An integrated respiratory rehabilitation programme for asthmatic patients should be personalised and be based on drug treatment, health education and treatment with respiratory physiotherapy. In asthmatic patients who have received rehabilitative treatment, the evidence seems to show positive benefits with regarding pulmonary function and clearance of secretions in the airways, as well as improvements to the quality of life for adults and children with moderate asthma. However, better quality methodological studies are needed, as well as studies with a higher sample base and with a longer follow-up period so that respiratory rehabilitation techniques that are more effective in the treatment of asthma can be identified.

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