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Review article

Asthmatic severe problems: Non-pharmacological remedies

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Abstract

Asthma is increasing in prevalence worldwide and results in significant use of healthcare resources. Although most patients with asthma can be adequately treated with inhaled corticosteroids, an important number of patients require additional therapy and an increasing number of options are available. A further minority of patients develop severe persistent asthma which remains difficult to manage despite current pharmacological therapies. This review discusses the various treatment options currently available with focus on non-pharmacological interventions.

Keywords: Asthma, Treatment, pharmacological tools, non pharmacological techniques, remedies

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1. Introduction

Asthma is an inflammatory chronic pulmonary disease in the lower airways. Bronchial hyper-reactivity and reversible airflow obstruction are the characteristics of the disease [1]. Asthmatic patients frequently suffer from symptoms such as recurrent coughing, dyspnea, chest tightness, shortness of breath and sporadic wheezing [2, 3]. According to the World Health Organization, 4.3% of adults around the globe are diagnosed with asthma [4]. The disease is not limited to adults and elderly but also in children. It has been observed that death rate among adults is higher compared to children in asthma [4]. Elderly people suffer more with the disease because of under-diagnosis and under-treatment of their asthma. [5]. It has also been observed that aging could be an important determinant in the disease as physiological changes especially fibrosis in asthma are comparable to aging lungs [6].

Asthma characteristics

Asthma varies in different types. Allergic asthma is characterized by type 2 helper T cell (Th2) cytokine-induced eosinophilic inflammations in the airway [7]. Previous studies have shown a strong link between early-onset of asthma and genetic predisposition [7]. Significance of chromosome 17q locus was demonstrated on childhood-onset asthma [8]. Allergic asthma normally starts at a young age and may either remit or recur in adulthood [9]. Allergic asthma is characterized by mast cell degranulation, amplified goblet cell hyperplasia, thickening of the sub-epithelial basement membrane, and epithelial damage [1]. On the contrary non-allergic asthma, is associated with elevated levels of serum and sputum neutrophils and is most commonly found in elderly patients with a late-onset of the disease [10]. Interestingly, in terms of lung function, non-atopic asthma may be even more detrimental than atopic asthma.

Therapeutic interventions in the patients with asthma

Medication is important in the treatment of asthma, to prevent asthma attacks and keep the condition under control. But many people would like to do more than just take medication. Some of the additional things that can be done have been scientifically proven to help, whereas others have not. A lot of people use special breathing techniques to try to cope better with asthma attacks. If someone reacts to certain asthma triggers, they can try to avoid them as best as possible. Regular exercise and appropriate levels of sport can help you keep fit and prevent asthma symptoms. One of the most important things you can do is stop smoking – or not start smoking in the first place.

Many people with asthma also try out "alternative" treatments like herbal medicine or acupuncture. But it is often not clear whether and how well, these approaches work and what side effects they might have.

Current therapeutic interventions to treat and manage asthma include inhaled corticosteroids, β-agonists, and anti-IgE antibodies [2]. Non-allergic asthma, which is more frequent in the elderly population, is less responsive to corticosteroids [10]. Earlier it was thought that total serum IgE measurement could be a reliable indicator of asthma [10]. However, it has been recognized that not all asthmatic patients are allergic. Since the activity of oxidants in the airway during asthma is prominent, non-invasive methods aimed at quantifying the stable end products of their reactive pathways have promising potential as indicators of airway oxidative stress [11]. Volatile organic compounds (VOCs) are biomarkers found in exhaled breath of asthmatic patients, can serve as indicators of asthma in children [12]. Continuous positive airway pressure (CPAP) and bi-level positive airway pressure (BiPAP) are the other methods for treating asthma [13].

Non-pharmacological interventions

Self management plans (personalized asthma action plans)

Self management plans including education programme have shown to improve patients' care. In combination with regular medical prescriptions, asthma self management plans, particularly those that include written advice for patients to follow should symptoms and/or peak flow readings deteriorate, have been shown to reduce hospital admissions for asthma and are recommended in current guidelines. Despite this, there have been some suggestions that neither patients nor primary health care professionals are convinced of their benefits and they may be particularly suited to those patients with poor symptom perception or recurrent asthma exacerbations [14-16].

Smoking cessation

Cigarette smoking in adults with asthma is associated with an accelerated decline in lung function, increased symptom severity and exacerbation frequency, and an impaired response to inhaled corticosteroids. Although studies confined to populations of patients with asthma have not been done, smoking cessation clearly has a number of important health benefits which are likely to be particularly important to patients with pre-existing respiratory disease. Appropriate advice should therefore be given to all patients with asthma who smoke, and pharmacological treatments such as nicotine replacement therapy or buproprion should also be considered [17].

Breathing retraining, Buteyko techniques, and physical training

There is increasing interest in breathing retraining techniques in asthma, particularly among patients and the lay press. The Buteyko technique, for example, which uses hypoventilation in an attempt to raise the partial pressure of carbon dioxide in the blood, has been advocated as a method to allow reductions in, or even withdrawal of, asthma medication. Unfortunately rigorous trials of these methods have not yet been published and they should therefore be viewed with caution. It has recently been recognized, however, that many patients treated for asthma in primary care also have symptoms suggestive of dysfunctional breathing patterns. Results of a physiotherapy based breathing retraining programme in such patients suggested significant improvements in health status in

the short term, and more work in this area is clearly needed [18]. It is likely that retraining techniques may improve symptoms and health status where there is dysfunctional breathing, either in the context of mild asthma or where asthma has been misdiagnosed. Physical training methods have been shown to improve cardiovascular fitness but not lung function in patients with asthma but effects on symptoms and quality of life have not been assessed [19]. Allergen avoidance is the exposure of patients with atopic asthma to the allergens that they are sensitized to has been shown to increase asthma symptoms and airway hyper-responsiveness and to cause bronchoconstriction [20]. Studies of measures that aim to control the exposure of house dust mite and pet allergens, however, have not conclusively been shown to improve asthma outcomes and larger trials have been advocated. Studies of allergen control measures in infancy have shown reductions in respiratory symptoms but it remains to be seen if such measures will prevent the development of atopy and asthma in later life [21, 23, 24]. [Fig No: 01]

Immunotherapy

Allergen specific immunotherapy, or desensitization, involves the administration of specific allergen extracts via subcutaneous injections of increasing concentration with the aim of inducing immunological tolerance. The process may work by generating interleukin-10 producing regulatory T-cells. Immunotherapy appears to be particularly useful in allergic rhinitis but has also been shown to improve symptoms and airway responsiveness in patients with allergic asthma. Overall the benefits appear to be modest, the technique is labour intensive, and major concerns about its safety remain since life threatening anaphylactic reactions can occur. Thus, while some patients may gain dramatic benefits immunotherapy for asthma is not recommended in the UK [22].

Breathing exercises

There are many different breathing exercises and techniques for people with asthma to choose from. They are meant to have a general relaxing effect, as well as help you breathe in a calm and controlled way during asthma attacks [25].

Relaxation and breathing techniques such as those practiced in yoga may help prevent asthma symptoms and improve your overall wellbeing. But there are only a small number of studies on the use of these techniques in people with asthma, and those studies are not of particularly good quality. Although they suggest that the techniques might help, these findings should be interpreted with caution [26].

Certain techniques are meant to help people breathe more easily during serious asthma attacks. These include techniques to help you breathe calmly and in a controlled way during an attack, or at the beginning of an attack. Panic and fear can lead to rapid and ineffective breathing (hyperventilation) in such situations. Most people can still inhale (breathe in) quite well during asthma attacks, even during more severe ones. Exhaling (breathing out) can be a problem, though. People with asthma can learn how to use breathing techniques such as “pursed-lip breathing,” and how to adopt certain postures. These aim to relax their breathing organs and help them breathe out more easily [27, 28].

Sports and exercise

Sports and physical activity are important for most people who have asthma. Regular physical activity helps improve your heart and lung capacity. It increases the uptake of oxygen and the amount of air that is exhaled when you breathe out.

Because physical exertion is a relatively common asthma trigger ("exercise-induced asthma"), many affected people think they ought to avoid exercise. But special asthma treatment can prevent problems due to physical activity. Research suggests that sports and exercise can actually reduce asthma symptoms in the long term. There is also some evidence that interval training can prevent exercise-induced asthma. In interval training, high-energy exercise is alternated with periods of rest.

It is important to choose physical activities that match your level of fitness, though. This may mean, for example, taking a break or doing something less strenuous if you notice signs of breathing difficulties. Warming up before doing sports, and gradually increasing the intensity of exercise, helps too. It is also important to have reliever medication on you so you can react quickly if you do have an asthma attack. Sometimes using reliever medication before physical exertion can help as well.

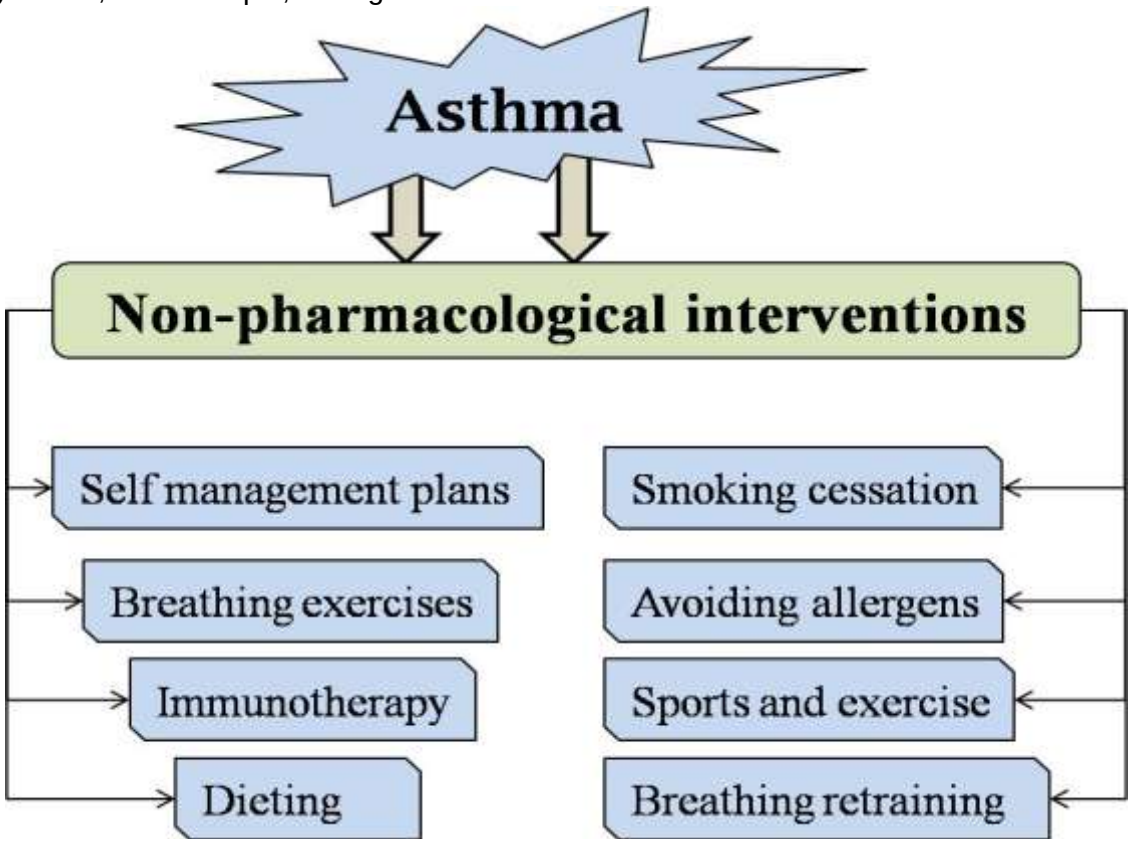

Fig 01: Non-pharmacological interventions to control and prevent the attack of asthma

Avoiding allergens

If children have a higher risk of developing asthma because it runs in their family, you can try to prevent them coming into contact with as many allergy triggers and other risk factors as possible right from the

start. Allergy triggers include animal fur, dust mites and allergy-causing foods (like cow's milk or nuts). Cigarette smoke increases the risk of asthma too.

People with asthma that is caused by an allergy can generally prevent asthma attacks by avoiding allergy triggers. But this is not always possible. For instance, it is easier to avoid animal fur and certain foods than it is to avoid things like pollen. People who are allergic to dust mites might be able to prevent allergic reactions by making various changes in their home. These include wiping the floor with a damp cloth, using mite-proof mattress and bed covers, regularly washing their bedding at temperatures above 55° C (130°F), and removing "dust traps" such as upholstered furniture and carpets from their home.

Individual interventions like using special mite-proof mattress covers or dust mite sprays have not been proven to prevent asthma symptoms, though. There is also not enough research on whether the type of bedcovers you use (filled with feathers or something else) makes a difference. And it is not known whether things like special air filters can help prevent asthma problems due to animal-related allergies.

Dieting

Being very overweight (having a body mass index, also called “BMI,” over 30) can make asthma worse in some people. But only a few studies have looked at how losing weight affects asthma symptoms. Their findings suggest that losing a lot of weight can help keep asthma under control.

In the studies that came to this positive conclusion, people followed a low-calorie diet under the guidance of experts. Other studies also looked at the effects of exercise programs or appetite-suppressing medication. The people in the studies lost at least about ten kilos on average. Unfortunately there were some problems with the quality of the studies, and side effects were not considered enough. This means that it is currently not possible to draw reliable conclusions about the advantages and disadvantages of these measures, or about how long their effects last [29,30].

Complementary medicine

Many people with asthma use complementary medicine. Common approaches include homeopathy, herbal products and traditional Chinese medicine (TCM) treatments like acupuncture. There is a lack of evidence that complementary medicine approaches work. Some have not been tested yet. Here are the findings of studies on the other approaches:

Acupuncture: Several studies looked into whether acupuncture can relieve asthma symptoms. Further it is noted that, the supplements with acupressure improves the quality of life in asthma patient [31,32].

Herbal medicine: Some studies looked at whether herbal medicines (mostly from Asia) can relieve asthma. None of the tested products were found to help, though. And herbal medicine can have side effects too. Which, some study promise of attenuating asthmatic problem [33].

Salt cave therapy: This involves repeatedly spending several hours in caves or mines that are believed to have a positive effect on asthma due to special conditions like clean air, mineral content, air pressure or the climate. Recently study reveals the role of salt caves become places that help to support a proper lifestyle [34].

Alexander technique: This technique aims to help you improve your breathing by learning to be more aware of your body, as well as by correcting postures and movements that are considered to be unfavorable. The well-designed randomised controlled trials noted that Alexander technique has positive effect on the symptoms of chronic asthma and thereby help people with asthma to reduce medication [35, 36].

Manual therapy: Here special hands-on manipulation of parts of the body is believed to release tension in the rib cage area, making it easier to breathe. There is not enough research to say whether this approach actually helps. It is not clear whether massages are effective either.

Homeopathy: A number of studies on homeopathic medicines for the treatment of asthma found that they found effect to control the asthma symptoms but not promising [37, 38].

Future perspectives:

Under the category of non-pharmacological techniques to prevent and attenuate the problems associate asthma the steam inhalation could be better and logical option. Further, the Pursed lip breathing (PLB) is the breathing technique that consists of exhaling through tightly pressed (pursed lips) and inhaling through nose with mouth closed. The study reveals that the PLB is very useful in COPD by increasing end-inspiratory volume [43]. Dyspnea very common and notable factor is asthma and PLB was noted to the amelioration of dyspnea in asthma patient [44].

As impairment of mucociliary clearance is very common in asthma [39]. Thus study reveals that the steam inhalation improved mucociliary activity [40]. Further, pediatric sinusitis is problem related to upper respiratory track and noted as a viral infection. The steam inhalation in viral pediatric sinusitis found suitable to control over infection and relief [41]. Importantly,

recent finding explore steam inhalation is an complementary and alternative medicine (CAM) therapy provide a more holistic approach to asthma [42].

about the rational use of Thus, stem inhalation could be possible new target to control asthma and give relief from asthmatic attack

Conclusion

There is currently a range of effective non-pharmacologic treatments available for asthma patients. These interventions will also not have adverse effects unlike pharmacological therapies. The future management of asthma will depend upon understanding physiology of the patients and treat them with right therapy. Thus, non-pharmacological tools can be effective and qualitative to improve quality of life in asthmatic patients.

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