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Polyherbal Formulation for Treatment of Asthma: A Review

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ABSTRACT:

Herbal medicine is the use of herbs and medicinal plants as the first medicine is a universal phenomenon. They can provide a better quality of life. Herbs are just as effective as drugs but without the side effects or having lesser side effects. Herbs and medicines derived from them are nature's best gift to mankind and there is a lot still to be learned about them. Poly herbal combinations are effective as compared to the single herbs. In Ayurveda, most of the classical preparations are poly herbal preparations with a combination of three to thirty plants. These combinations are made for the accuracy and are combined in such a way that the formula is compatible and balanced one with each other. One or two plants in these combinations will be active and the others will be having a supporting role as synergist. The present study has been carried out to review the antiasthmatic potential of some medicinal plants.

Key words: Herbs, Ayurveda, Polyherbal, Antiasthmatic

INTRODUCTION:

Since the ancient period, herbal medicines used for their therapeutic applications cured several diseases. They were used in ancient Indian medicine for various therapies purposes. The Indian Ayurvedic Medicine system has included plants as one of its most powerful healing ingredients, which are recorded earlier in the literature such as Samhita's and Vedas [1].

After a long history in formulation of herbal drug emerge the desired effect in combined drug rather than single. The combination of two or more herbs regarded as polyherbalism and their formulation as Polyherbal formulation. The polyherbalism express the fundamental aspect of Ayurvedic / herbal drug formulation. The concept of synergism to polyherbal formulations entitle by Sharangdhar Samhita. The herbs in combination are chosen according to disease or disorder as shows the peculiar therapeutic activity by synergism. In such Polyherbal formulation may other herbs are used to prevent side effects arising from the principal herb. So as per the many evidences shows the various herbal formulation with different potency act by a unique mechanism. By which the Polyherbal formulation today make the choice for threatened disease or disorder rather than single one, to gain synergistic therapeutic application [2].

Many plants are used utterly for medicinal purposes useful to mankind. According to the World Health Organization (WHO), "A medicinal plant is a plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes, or which are precursors for chemo-pharmaceutical semi-synthesis" [3, 4]. Many Plants have been used in traditional medicines for the different ailment. And even today world's residents rely only on potential plants as their source of drug. India has sole wealth of medicinal plants and old traditional knowledge of utilization of herbal medicine. [3, 4].

Herb-herb combinations

Herb-herb combinations also known as polyherbal therapy have been used in Chinese medicine system for thousands of years, yet scientific evidence of their therapeutic benefits is lacking [5].

Drug combination often produces a promising effect in treatment of diseases over a single drug. The concept of drug combination has been well established in Western medicine and remarkable success has been achieved over the decades. In recent years, drug combination therapies in cancer and infectious diseases have offered new hope to patients [6]. Naturally occurring herbs and herbal ingredients organized into certain formula have been shown to have potential interaction effects. These include mutual enhancement, mutual assistance, mutual restraint and mutual antagonism. In the Ayurvedic system of medicine mainly polyherbal compounds are used for treatment of various infections [7].

Polyherbal Formulation

Formulations containing more than 2 herbs are called polyherbal formulation. In the Ayurvedic system of medicine mainly polyherbal compounds are used for treatment of various infections. The Unani system of medicine is also gaining global acceptance due to the amazing clinical efficiency of the formulations. Although Unani medicines have long been used, there is negligible documented evidence regarding their safety and effectiveness. The lack of evaluation has, in turn, slowed down the development of regulations and legislations.[8] Drug combination often produces a promising effect in treatment of diseases over a single drug. The concept of drug combination has been well established in Western medicine and remarkable success has been achieved over the decades. In recent years, drug combination therapies in cancer and infectious diseases have offered new hope to patients [8].

Advantages of polyherbal formulation

Ayurvedic and herbal medicinal products contain a combination of botanicals; each of these contains a number of chemical compounds that may give the anticipated activity in combination. Herbal medicines are in widespread use and although many believe herbal medicines are safe, they are often used in combination and are drawn from plant sources with their own variability in species, growing conditions, and biologically active constituents. A major hypothetical advantage of botanicals over conventional single-component drugs is the presence of multiple active compounds that together can provide a potentiating effect that may not be achievable by any single compound. Polyherbal formulations have plant-based pharmacological agents which may exert synergistic, potentiative, agonistic antagonistic actions by virtue of its associated diverse active principles themselves.

These pharmacological principles work together in a dynamic way to produce maximum therapeutic efficacy with minimum side effects Based on the nature of the interaction, there are two mechanisms on how synergism acts (i.e., pharmacodynamics and pharmacokinetic) [9]. In terms of pharmacokinetic synergism, the ability of herb to facilitate the absorption, distribution, metabolism and elimination of the other herbs is focused. Pharmacodynamics synergism on the other hand, studies the synergistic effect when active constituents with similar therapeutic activity are targeted to a similar receptor or physiological system [10]. Combination of herbals may act on multiple targets at the same time to provide a thorough relief. Due to synergism, polyherbalism offers some great benefits which lacks in single herbal formulation. It is evident that better therapeutic effect can be reached with a single multi-constituent formulation. For this, a lower dose of the herbal preparation would be needed to achieve desirable pharmacological action, thus reducing the risk of deleterious side-effects. Besides, PHFs bring to improved convenience for patients by eliminating the need of taking more than one different single herbal formulation at a time, which indirectly leads to better compliance and therapeutic effect. All these benefits have resulted in the popularity of PHF in the market when compared to single herbal formulation. Polyherbal formulation also having multiple types of molecules against a disease complication so different molecules cure a disease by different mechanism so provide a complete therapy against a disease condition [11].

Limitations of polyherbal formulation

When combinations of plants with these constituents are combined together it may show better activity when compared to the individual extract. But at the same time presence of many constituents may lead to chemical incompatibility which may result in instability [12].

Asthma

Asthma is a chronic disease characterized by acute exacerbation of coughing, dysponea, and wheezing and chest tightness [13]. The modern asthma therapy is the regular use of inhaled corticosteroids as bronchodilators. Inhaled bronchodialators and anti-inflammatory drugs are available and effective and they require long term use and are associated with side effects. There are no satisfactory and completely safe drugs in market [14]**.**

Many asthma attacks are triggered by allergens, such as dust, mould spores, mites, animal hair or feathers but the onset may equally be caused by cold air, or it may be preceded by an infection such as a cold. Certainly, stress and more specifically, acute anxiety is known to be the immediate trigger for many attacks, and this can sometimes give rise to a vicious circle of asthma - anxiety about asthma - further attacks. Thus a wide range of etiological factors can be involved in this all too common problem. Several different groupings can be applied [15].

Extrinsic Asthma: Caused by allergic responses to house dust, animal fur, or various foods. Such causes 10-20% of adult asthma.

Intrinsic Asthma: Caused by genetics, structural problems, infections, pollutants, and stress - both physiological and psychological. Such causes 30-50% of adult asthma.

In case of asthma the herbal drugs have exhibited remarkable results in various target specific biological activities such as bronchodilation, mast cell stabilization, anti-inflammatory, anti-spasmodic, anti-allergic, antianaphylactic, immunomodulatory and inhibition of mediators such as leukotrienes, lipoxygenase, cyclooxygenase, platelet activating, phosphodiesterase, histamine, bradykinin, endothelin and cytokines, in the treatment of asthma. The polyherbal formulations described in Ayurveda has been the basis of treatment of various human diseases including asthma **[16]**.

THERAPEUTIC POTENTIAL OF POLYHERBAL FORMULATIONS

Polyherbal formulation having Antiasthmatic activity:

1. A polyherbal formulation (PHF) was prepared by using ethanolic extract of *Adhatoda vasica*, *Clerodendrum serratum*, *Curcuma longa*, *Solanum xanthocarpum* and *Piper longum* in the proportion of 40%, 30%, 10%, 10% and 10%, respectively. The mast cell stabilizing and anti-anaphylactic property of this PHE was investigated against compound 48/80-induced mast cell degranulation as well as triple antigen-induced anaphylaxis in rats. The polyherbal formulation produced significant reduction in the mortality of rats subjected to triple antigen-induced anaphylactical shock. It also depicted marked protection of rat mesenteric mast cells from disruption by compound 48/80 in dose dependant manner. Their study suggested anti-anaphylactic and mast cell stabilizing properties of the polyherbal formulation [17].

2. HK-07 is a polyherbal formulation containing mainly the extracts of *Curcuma longa*, *Zingiber officinale*, *Piper longum*, *Emblica officinalis*, *Terminalia belerica*, *Ocimum sanctum*, *Adhatoda vasica* and *Cyperus rotundus* was prepared. The antianaphylactic activity of HK-07 was investigated in rats using the active anaphylaxis model. Treatment with HK-07 at different test concentrations showed significant reduction in signs and severity of symptoms (P<0.05), onset (P<0.001) and mortality rate (P<0.05) following anaphylactic shock-induced bronchospasm. HK-07 also significantly reduced the serum IgE levels (P<0.001) in animals compared to untreated controls [18].

3. Bharangyadi is a polyherbal compound having *Clerodendrum serratum*, *Hedychium spicatum* and *Inula racemosa* as an ingredient herbs. Evaluation of the anti-asthmatic activity of Bharangyadi through various *in-vitro* and *in-vivo* experimental models was carried out by Divya Kajaria *et al*. The results demonstrate that Bharangyadi has potent histamine antagonism property with significant mast cell stabilizing and spasmolytic activity in the experimental animals [19].

4. Thuthuvalayathy Chooranam is a polyherbal formulation contains *Solanum trilobatum*, *Aristolochia indica*, *Alpinia officinarum*, *Nigella sativa*, *Madhuca lonifolia*, *Zingiber officinale*, *Piper nigrum*, *Piper longum*, *Terminalia chebula*, *Ferula asafetida* and *Piper longum*. Evaluation of safety of the Thuthuvalayathy Chooranam through acute and sub-acute toxicity study was carried out. The study revealed that Thuthuvalayathy chooranam formulation at different doses of 270, 1350, 2700 mg/kg did not show toxic effects in the animal's tissues and it was safe when administered to bronchial asthma patients [20].

5. An herbal compound formulation Pentapala-04 prepared from five medicinal plants namely, *Adhatoda vasica*, *Ocimum sanctum*, *Coleus aromaticus*, *Glycyrrhiza glabra* and *Alpiania galangal*. The effect of "Pentapala-04" on ova albumin and aluminium hydroxide induced lung damage in albino wistar rats was investigated. The rats were divided into three groups of four animals each. Group I, II and III serves as control, toxic and post treatment group respectively. The results showed that there was increased level of lipid peroxidation and decreased level of antioxidants in toxic group animals. But the levels of antioxidant enzymes were restored in post treated groups of animals, which might be due to the ability of Pentapala-04 to scavenge the reactive oxygen species. Thus they demonstrated that 'pentapala-04' prevents ova albumin and aluminum hydroxide induced oxidative stress, lung injury and inflammatory changes and can be used as an antiasthmatic drug [21].

6. A polyherbal formulation prepared form ethanolic extract of the leaves of *Solanum xanthocarpum*, *Murraya koenigii*, *Aegle marmelos* and *Caesalpinia bonduc* and evaluated for antiasthamatic activity using animal models. The result reveals mast cell stabilization, antihistaminic and anticholinergic actions of polyherbal formulation [22].

CONCLUSION

The use of Ayurvedic PHFs has stood the test of time. Using the Ayurveda concept of *Panchamahabhutas* and *Tridoshas*, PHFs provide treatment of diseases in a holistic approach. The scientific advancement carries with it the improvement in Ayurvedic formulation of PHFs, through the study of various phytoconstituents and discovery of useful herbs combinations which work synergistically to produce desirable effect. Today, Ayurvedic PHFs has widely used world over, owing to its comparable efficacy, fewer side effects and better acceptability than allopathic drugs. Most of the time, they produce satisfactory effect and safety, making them one of the highly selected drugs of choice. By regulatory control and legislation as well as rational use reduces the hazardous risks of PHF's and can exert the best effect in human health.

A systematic approach should be made to find out the efficacy of polyherbal formulation against asthma to exploit them as herbal anti-asthmatic agents and to use medicinal plant resources could result in the development of satisfactory medicines to treat asthma. This review attempts to give a scientific account of the use of valuable medicinal plants for development of polyherbal formulation in treatment of asthma.

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Conflict of Interest Statement:
The authors have no conflicts of interest to declare.