

Honey in Bronchial Asthma: From Folk Tales to Scientific Facts

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Abstract

Background

Bronchial asthma is one of the most common chronic inflammatory diseases with recurrent episodes of wheezing, chest tightness, breathlessness, and coughing. Complementary and alternative medicine (CAM) is growing lately in treatment of many persistent diseases.

Objective

The current study aims to investigate the efficacy of honey in the treatment of bronchial asthma, improvement of lung function and respiratory muscle power.

Study design

Descriptive cross-sectional study

Place and duration of study

Department of Pulmonology, Nishtar Hospital Multan. The duration of the study was January 01, 2017 to March 31, 2017.

Method

The study was comprised of 76 patients. All the patients presenting with suspected diagnosis of bronchial asthma were included in our study. The patients who were critically ill or immune compromised were not included in the study. The cases who did not give informed consent were also excluded. All these cases were evaluated by detailed histories, thorough physical examination and the necessary investigations. All the demographic data and other variables related to clinico-epidemiological features were measured and recorded using a specifically designed proforma. The data were analyzed by using computer program SPSS 21 version.

Result

Of the 76 patients included in the final analysis 32 were females and 44 males. The age of study population ranged from 4-50 years with mean age of 43.91± 5.8. The use of bee's honey showed significant improvement in all pulmonary functions including FEV1, FVC, PEFR in both moderate and severe uncontrolled persistent asthma compared to baseline.

Conclusion

Use of honey in the management of bronchial asthma patients shows different grade of efficacy on clinical and pathological aspects. However, more robust evidence is needed before further implementation into practice.

Keywords: Asthma, Asthma control test, Bee's honey, pulmonary function test, Respiratory muscle

Introduction

Bronchial asthma is one of the most common chronic inflammatory diseases affecting around 334 million people worldwide (1). Prevalence of the disease varies widely between countries ranging from 1%-18% and more common in developed countries (2). It accounts for approximately 250,000 deaths per year with low and middle income countries having more than 80% of the mortality (2,3). Although asthma is two-times more common in boys than girls, adult women have higher rates than men with severe asthma attacks occurring at an equal rate (2,4).

Asthmatic patients present with recurrent episodes of wheezing, chest tightness, breathlessness, and coughing with worsening at night and early in the morning (5). The disease is characterized by chronic inflammation of the airway with associated remodeling (6). It is also associated with goblet cell hyperplasia and metaplasia, bronchial gland enlargement, increased smooth muscle mass, angiogenesis, and alteration of the extracellular matrix components leading to airway mucus hypersecretion and obstruction (7,8).

Drug therapy has become the most common treatment to manage asthma mainly; β-agonists and inhaled corticosteroids (9). These drugs relieve asthmatic attacks by acting on the airway smooth muscles causing relaxation (9). Unfortunately, asthma attacks and exacerbations can still happen, as the underlying pathology still present (10). Additionally, prolonged use of these drugs can cause local and systemic side effects, including dysphonia, growth failure, elevated intraocular pressure, accelerated loss of bone mass, oral candidiasis, and

mild tachyphylaxis (9). These problems raised the need to find alternative treatments for asthma with fewer side effects hence; the use of natural products is a promising approach.

In this study, we aimed to examine the use of honey (alone or combined) as anti-asthmatic remedy regarding aspects of both efficacy and safety.

Methods

This descriptive cross sectional study was conducted at Department of Pulmonology, Nishtar Hospital Multan, Pakistan. The duration of the study was January 01, 2017 to March 31, 2017.

The study population was comprised of all the cases who presented with suspected diagnosis of bronchial asthma. A total of 279 patients were examined during the course of the study, but only 76 patients fulfilled the inclusion criteria.

Inclusion criteria were:

- Presence of at least 2 of the following symptoms: wheeze, breathlessness, chest tightness or cough with or without sputum.
- History of atopic disorder
- Findings of widespread wheeze on auscultation
- Decreased FEV_1 or peak expiratory flow
- Eosinophilia on peripheral blood film

Exclusion criteria were as following:

- dizziness, light-headedness in the absence of wheeze
- Chronic productive cough in the absence of breathlessness
- Normal physical examination of the chest
- Change in the voice
- Significant smoking history (more than 20 pack-years)
- Past history of cardiac disease

After approval of study protocol by the research ethics committee of the Nishter Medical University Multan, the current study was started. An informed consent was obtained from all the subjects included in the study. The baseline characteristics of the study recorded in a specifically designed proforma. Honey was purchased from local market of Multan, Pakistan. The doses were prepared for every subject. An oral dose 7.5 ml bee's honey was administered twice a day for three months. The lung function tests (FEV1, FVC and PEFR) were measured by digital Spiro meter. The respiratory muscle power indictors were measured by respiratory pressure meter. All the patients were followed up after 3 months with the measurements of the all the above mentioned parameters. The baseline score for asthma control test (ACT) was also calculated for all patients and repeated after three months. Continuous variables were summarized by calculating the mean and the standard deviation. The categorical variables were summarized by calculating the number and percentage. The association between the use of bee's honey and the different categorical variables was assessed by using the Chi-squared test. The t-test was used for the determination of association with continuous variables by using SPSS program 21 version.

Results

A total of 279 consecutive patients were interviewed. Out of these, seventy six asthmatic patients met the inclusion criteria. The study population was consisted of 32 females and 44 males. The age ranged from 4-50 years with mean age of 43.91± 5.8. The table 1 describes the demographic features of the study population.

Table 1. The demographic features of the study population

Variables	N (%)
Age	
0-5 years	6 (7.9%)
6-10 years	14 (18.4%)
10-20 years	17 (22.4%)
21-30 years	23 (30.3%)
31-40 years	8 (10.5%)
41-50 years	8 (10.5%)
Gender	
Male	44(57.9%)
Female	32 (42.1%)
Residential area	
Urban	61 (80.3%)
Rural	15 (19.7%)

The use of bee's honey showed significant improvement in all pulmonary functions including FEV1, FVC,

PEFR in both moderate and severe uncontrolled persistent asthma compared to baseline as shown in Table 2. Asthma control test score was also found significantly improved in patients using bee's honey compared to the baseline. Patients with less severe grade of asthma showed significantly good response in clinical parameter upon using honey.

Table 2. Results of pulmonary function, respiratory muscle power tests and asthma control test score before and after the treatment

Parameter	Asthma severity grade					
	Severe persistent			Moderate persistent		
	Mean±SD (Baseline)	Mean±SD (After 3 months)	P value	Mean±SD (Baseline)	Mean±SD (After 3 months)	P value
FEV1(L)	1.7±0.3	2.33±0.42	0.02	1.65±0.71	2.00±0.73	0.04
PEFR (L/min)	263±79.04	361±36.41	<0.002	238±87.1	307±107.61	<0.02
FVC(L)	2.31±0.62	2.99±0.49	0.03	2.17±0.9	2.91±1.00	0.01
MIP (cm/H2O)	55.7±13.75	97.5±13.76	<0.001	73±29.35	96.10±26.38	0.001
ACT score	13.5±3.87	22.80±1.59	<0.002	11.10±2.1	24.30±0.95	<0.005

Discussion

Complementary and alternative medicine (CAM) is defined as a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine (11). Lung problems especially allergic diseases and asthma rank in the top 15 most important diseases for which CAM is used for both children and adults (12,13). In some studies, pediatric CAM use by asthmatics has been reported to be 66% while in others was as high as 80 % (14,15). In the same context, honey (as a part of CAM) has been widely used as a treatment for cough, infections, fever, and inflammation (16). It is reported to have anti-inflammatory, antibacterial, antioxidant, and anti-immunomodulatory effects (17,18). It was suggested that honey nebulization is effective in treating upper acute asthma in pediatric patients (19). Additionally, many studies showed that honey was effective when taken orally with decreasing both symptoms and frequency of attacks (20–24).

Our study aims to measure effect of using honey as a treatment in asthma patients. But the most popular combination in literature was honey and NS combination. All studies done showed significant improvement in all aspects of pulmonary functions (FVC, FEV_1 and PEFR), muscle power tests (MIP and MEP), ACT and clinical assessment (wheezes and vesicular breathing). This impressive improvement pulmonary functions could be explained by the special benefits of honey and NS combination including anti-inflammatory/anti-allergic and immunomodulatory characteristics (25). The improvement in MIP and MEP can be possibly explained by the medicinal characteristics of honey (26). However, more severe cases will need potentiation by the synergistic bronchodilator, antitussive and other medicinal properties of NS (26). Moreover, the significant improvement in ACT score associated with obvious reduction in the use of rapid reliever/rescue inhalers which is consistent with global strategy for asthma management and control (27).

Other combinations mentioned in literature were honey with either celery seeds or VG. Both combinations associated with significant improvement either in pulmonary functions (FEV_1, FVC) or different aspects of clinical features. In addition to the aforementioned demulcent effect of honey, celery seeds contain lemonen and antioxidant vitamins (A, E & C) (28). These components increase the serum selenium levels which is an integral components of glutathione peroxidase (28) (part of pulmonary anti-oxidant system) and thus increasing stability and integrity of the cell membrane.

On the contrary, honey alone has no significant advantage in the aspect of controlling asthma in humans. However, animal studies showed contradicting results which may be due to using different animal models (mice and rabbits) or different forms of honey. The positive effects obtained with rabbits are more reliable due to more phylogenetic similarity with humans and better understanding of lung structure than mice (24). Additionally, using aerolised honey ensures maximum deposition of honey on airway surfaces. Also, the negative results showed in mice model may be due to honey-induced vasodilatation and immuno-stimulatory effects leading to increased incidence of cascade events of asthma.

The most obvious limitation of our study is the small number of studies and population included. Many confounders were not taken into consideration for example different type of populations, ages or severity of the diseases. Disease physiopathology and severity perception may differ among populations leading to use of CAM by different patients from different social groups to in different degrees. Although, sever persistent disease, high education level, and congruence with the patient's own beliefs, values or philosophical orientations toward health and life are established predictors of the use of CAM (29).

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