

Herbal remedies used by asthmatic children in Iran

Samaneh Kouzegaran (MD)¹, Hamid Ahanchian (MD)^{1,2*}, Seyed Ahmad Emami (PhD)³, Neda Ansari (MD)⁴, Jamshid Yousefi (MD)⁴, Nasrin Moazzen (MD)^{1,2}, Nafiseh Pourbadakhshan (MD)², Rana Tafrishi (MD)², Aida Ansari (PhD)³, Nasrinsadat Motevalli Haghi (MD)¹

¹ Allergy Research Center, Mashhad University of Medical Sciences, Mashhad, Iran.

² Clinical Research Development Unit of Akbar Hospital, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.

³ Department of Traditional Pharmacy, School of Pharmacy, Mashhad University of Medical Sciences, Mashhad, Iran.

⁴ Department of Pediatrics, Faculty of Medicine, Islamic Azad University of Medical, Mashhad, Iran.

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ABSTRACT

Introduction: Asthma is a very common chronic disease among children. As for its treatment, in recent years there is an increased tendency towards supplemental treatments. Hence, many of these patients are administered complementary and alternative treatments including herbal medicine.

Methods: Through a cross-sectional study, we evaluated the common herbal remedies used in asthmatic children referred to the allergy clinic of Sarvar Children's Hospital in Mashhad. All data related to the patients (i.e., age, sex, and history of all remedies consumed as well as the responsible persons prescribing the pertinent medications) were recorded in a checklist.

Results: In this study, 582 asthmatic children with the average age of 41.7±77.4 months were evaluated. The overall herbal remedies usage was %59.8. There was no significant differences between age groups, sex, or asthma severity and herbal remedy usage. Thirty-seven different herbal remedies were prescribed to the patients, the most common herb was thymes (%65.3) followed by a four-seed herbal mixture (%23.6), Plantago major (%12) and Cydonia oblonga (quince) (%10.8).

Conclusion: Limited information is available regarding complementary and alternative medicine in asthmatic children in Iran. The present study showed the high prevalence of herbal medicine usage in asthmatic children in this region. Hence, further studies should determine the clinical benefits of these remedies.

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Introduction

Asthma is known as a chronic inflammatory airway disease that causes airway spasm and reduces air flow triggered by an array of stimulants (1). The prevalence of asthma has increased during the last three decades to about 10-12% of adults and 15% of children in developed countries (1).

In an international study this rate is reported to be almost 4.1% in children living in Iran, India, and Malaysia (2). Based on Iranian studies conducted in Iran, asthma prevalence in children is estimated to be 5.5% across the country and 4.6% in the city of

Mashhad (3). Noticeably, for 1-4 year old children in developed countries nowadays, the incidence of asthma and atopic dermatitis has increased 160% and two to three-fold, respectively (4).

It seems that available treatments are not completely satisfactory to parents and children with asthma; moreover, the side effects of the commonly prescribed drugs for the treatment of asthma, corticosteroids and beta-agonists, are considerably detrimental for long-term usage. Therefore, as there is no definite and curative

***Corresponding author:** Hamid Ahanchian,
Allergy Research Center, Mashhad University of Medical Sciences,
Mashhad, Iran.
E-mail: ahanchianh@mums.ac.ir
Tel: 09153112207

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treatment, most families opt for a complementary treatment or even as a complete substitution for conventional medical treatments. It has been shown in previous studies that complementary and alternative treatments are used in 33-89% of asthmatic children (4,5).

Medicinal plants affect the human immune system through various ways. These are materialized by raising the tolerance to stressful physical, chemical, and environmental factors as well as activating the immune defense to viral and bacterial infections (6). *Thymus vulgaris* L. (from the family Lamiaceae) is known as a useful medicine to treat influenza, sinusitis, and sore throat (7,8).

In a study conducted on 60 patients, the outcome of the treatments with either thymus syrup or bromhexin as the chemical drug was shown to be the same (9). *Plantago major* L. (from the family Plantaginaceae) reduces respiratory mucosal secretions that are demonstrated to be an imperative risk factor in sinusitis, influenza, bronchial inflammation, and asthma via releasing mast cell granules (10).

Therefore, this plant can be exploited to treat chronic and severe cough in children, particularly those with asthma (11,12).

In an Iranian study conducted in the city of Shahr-e-Kord, the efficacy of *Zingiber officinale* Roscoe (from the family Zingiberaceae) on asthma recovery was evaluated. Some respiratory complaints like dyspnea, wheezing, and chest pain were considerably reduced in persons who received Zingiberin compared to those who did not receive this herbal medicine (p -value < 0.05) (17).

The effect of *Hedera helix* L. (from the family Araliaceae) was evaluated on lung histopathology of chronic asthmatic mice. The results revealed that *helix* can only reduce the number of goblet cells and the thickness of basal membrane in asthmatic airways, while, comparatively, dexamethasone was better ineffectively decreasing all histopathological parameters although it did not have an effect on the thickness of the basal membrane (1).

Another study showed that using the concentrate of Ding Chuan Tang dissolved in hot water significantly reduce the hypersensitivity of the airways and asthmatic symptoms (2). Also, usage of the STA-1 formula (combination of mMMDT and LWDHW) as a form of plant medicine can produce the same effect as systematic corticosteroids via reducing the serum level of IgE, which consequently improves lung function (3).

Mai-Men-Dong-Tang (MMDT), known as a supplemental herbal treatment in mild to moderate asthmatic children can improve the forced expiratory volume in 1 second (FEV-1) of the spirometry tests compared to patients receiving a placebo (18).

The efficacy of ASHMI (a plant medicine) in 91 asthmatic patients was also assessed for four weeks. The amount of serum eosinophil, IgE and TH2 cytokines in peripheral blood were reduced, the effect of which is similar to prednisolone usage (19).

Considering the above information, due to the wide spread consumption of traditional drug supplements in Iranian children, we decided to determine the common herbal remedies used by asthmatic children in the city of Mashhad, located in the northeast of Iran.

Materials and Methods

This cross-sectional study was approved by the research council of the Mashhad University of Medical Sciences. Sampling was done during a period of 18 months at the allergy clinic of Sarvar Children's Hospital in Mashhad, which is the largest city in the northeast of Iran, during 2009 to 2018. The research tool was a researcher-made questionnaire that was confirmed by content validity, internal consistency, and correlation value reliability ($r=0.85$).

The main aim of this study was to identify the prevalence of the usage of plant medicines in asthmatic children. First, the aim, methods, and pertinent ethics of our study were completely explained to the children and their parents. The confidentiality of all subjects was guaranteed and those who give informed medico-legal consent were enrolled in our study.

The non-probability sampling technique was simple and purposeful. The practical checklist was used as a data collection method. Demographic information (age and sex), family history, past medical history (especially history of allergy diseases) and the severity of asthma were asked from the children or their parents.

They were also asked about whether they have used any plant medicine (traditional or synthetic) and how they received access to this medicine (physician, traditional prescription, family member, etc.). Another question was about the duration and timing of the supplemental drugs during a period of either acute asthma attack or chronic asthma. Type and severity of cough and allergy were assessed carefully. All data were assessed by SSPS software.

We used the t-test for variables with normal distribution and the Mann-Whitney test for non-normally distributed variables.

Regarding the qualitative variables (name and rank), both the Fisher's exact test and the Chi-square test were used in the two groups of cross-tab. $P \leq 0.05$ was considered as a statistically significant difference.

Results

Totally, 582 asthmatic children were evaluated

with mean age of 77.4 ± 41.7 months. Of the 582 subjects, 235 (40.4%) were female and 347 (59.7%) were male. Among all patients (n=582), 501 (80.1%) had nocturnal cough while 268 (46%) had a day-time cough. Cough was exacerbated with activity in 321 (55.2%) subjects and cough without sputum

was observed in 491 (84.4%) subjects.

The mean duration of chronic cough was 15.1 ± 19.7 months. Regarding the allergy history in the subject or family, the most common allergic disease was allergic rhinitis (Fig 1).

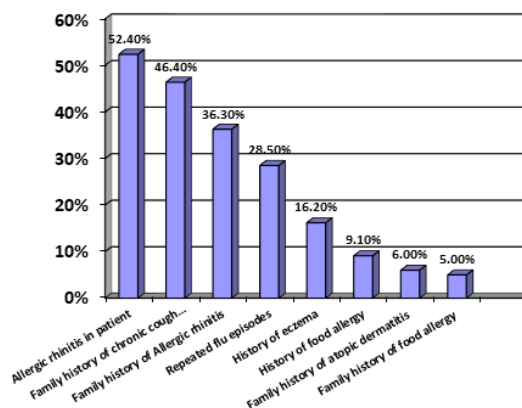


Figure 1. History of allergic disorders in all study cases

Among the 582 asthmatic children, mild asthma (intermittent and persistent) was seen in %55) 320) cases, %34.5) 201) subjects had

moderate asthma, while %10.5) 61) subjects had severe asthma (Fig 2).

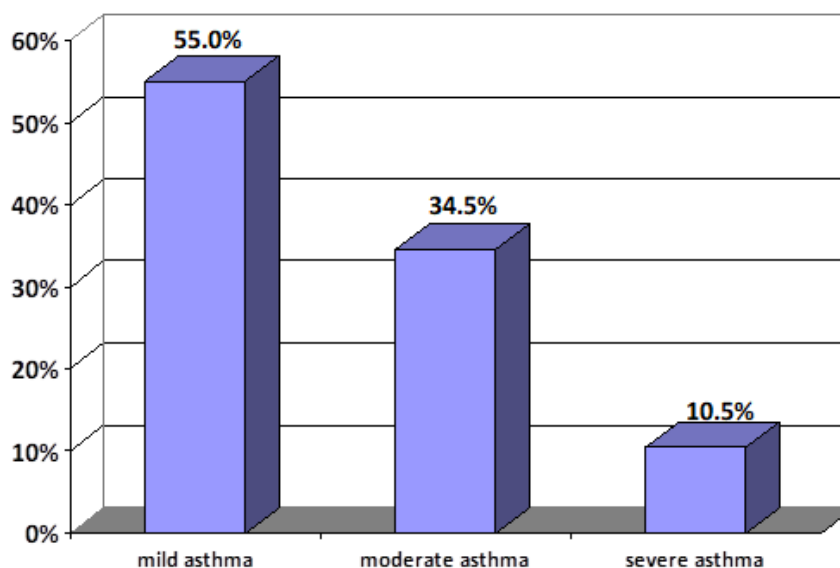


Figure2: The severity of asthma in all study cases

It was notable that all of our patients were using salbutamol as a short acting beta-agonist in the form of metered dose inhalers. Inhaled fluticasone was the most prescribed controller treatment. Also, %58.9) 343) of the cases used at least one herbal remedy while %41.1) 239) subjects did not use herbal medicines.

Thirty-seven different herbal plants were reported to have been used by some of the subjects. The most common plant medicines prescribed

to the 343 children were as followings: The most common herb (219 subjects) was *Thymus vulgaris* L., followed by a four-seed mixture (four herb seeds of *Cydonia oblonga* Mill, *Plantago major* L., *Ocimum basilium* L., and *Alyssum campestre* L.) (78 subjects), *Plantago major* L (41 subjects), *Cydonia oblonga* Mill (37 subjects), and *Amaranthus* spp. (30 subjects), *Viola odorata* L., honey and lemon juice (citrus limon) extract, and *Alcea* sp (Fig. 3).

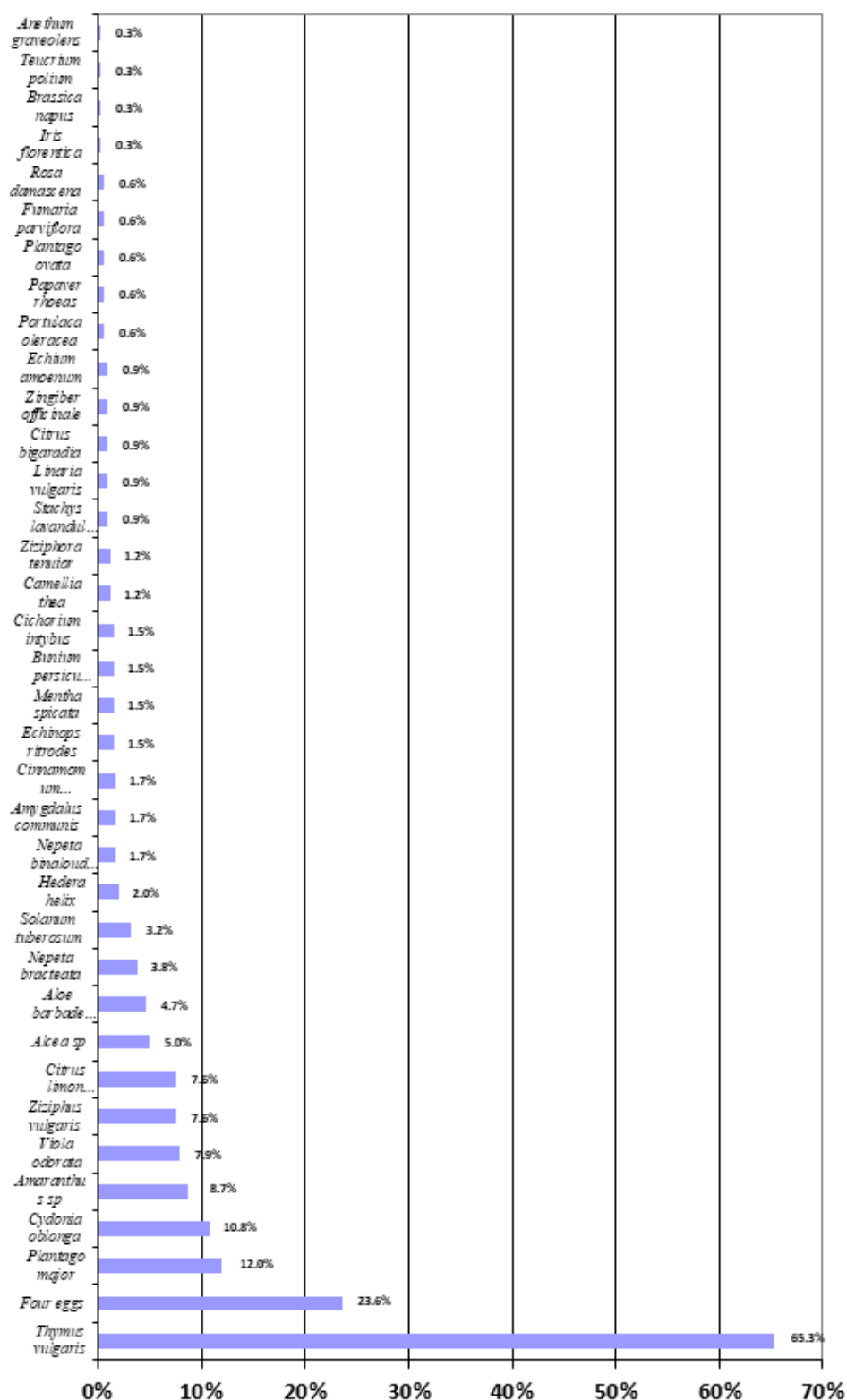


Figure 3: Percentage of herbs consumption in all study cases

There was no significant difference in usage of herbal medicine between sex ($P=0.346$). Furthermore, no significant difference was seen in the usage of herbal medicines between different age groups ($P\text{-Value}=0.621$) and the various severity levels of asthma ($P\text{-Value}=0.301$).

Children who used herbal medicine were divided into four groups based on their age, and we assessed the most common types of herbal plants used in all the groups as shown in Fig 4.

The common characteristics of herbs used by children in this study is summarized in Fig 5.

Age of Children	common types of plants used in every group
As for children less than one year old	<i>Thymus vulgaris</i> L. Four eggs that contains (<i>Cyclotia oblonga</i> Mill, <i>Plantago major</i> L., <i>Ocimum basilicum</i> L. and <i>Alyssum campestris</i> L. <i>Plantago major</i> L. <i>Cyclotia oblonga</i> Mill. <i>Nicotia glauca</i> L. <i>Citrus limon</i> (L.) and honey
children between 1-5 years old	<i>Thymus vulgaris</i> L. Four eggs that contains (<i>Cyclotia oblonga</i> Mill, <i>Plantago major</i> L., <i>Ocimum basilicum</i> L. and <i>Alyssum campestris</i> L. <i>Cyclotia oblonga</i> Mill. <i>Plantago major</i> L. <i>Aloe barbadensis</i>
children between 5-10 years old	<i>Thymus vulgaris</i> L. Four eggs that contains (<i>Cyclotia oblonga</i> Mill, <i>Plantago major</i> L., <i>Ocimum basilicum</i> L. and <i>Alyssum campestris</i> L. <i>Plantago major</i> L. <i>Cyclotia oblonga</i> Mill. <i>Nicotia glauca</i> L.
children more than 10 years old	<i>Thymus vulgaris</i> L. Four eggs that contains (<i>Cyclotia oblonga</i> Mill, <i>Plantago major</i> L., <i>Ocimum basilicum</i> L. and <i>Alyssum campestris</i> L. <i>Plantago major</i> L. <i>Cyclotia oblonga</i> Mill. <i>Citrus limon</i> (L.) and honey

Figure 4. Common herbs in asthmatic children with different ages

Part used	Common name	Scientific name	Family name of plant	
Leaves and flowering tops	Avishan	<i>Thymus vulgaris</i> L.	Lamiaceae	1
Grain	Four eggs	<i>Cyclotia oblonga</i> Mill	Rosaceae	2
		<i>Plantago major</i> L.	Plantaginaceae	
		<i>Ocimum basilicum</i> L.	Lamiaceae	
		<i>Alyssum campestris</i> (L.) L.	Brassicaceae	
Grain	Barhang	<i>Plantago major</i> L.	Plantaginaceae	3
Grain	Beh Daneh	<i>Cyclotia oblonga</i> Mill	Rosaceae	4
Air parts	Tadj Khons	<i>Amaranthus</i> sp.	Amaranthaceae	5
Flower	Banfshah	<i>Nicotia glauca</i> L.	Violaceae	6
Fruit	Anab	<i>Ziziphus vulgaris</i> Lam	Rhamnaceae	7
Fruit	Ablimoo & asal	Lemon juice and honey	Liliaceae	8
Flower	Khatmi	<i>Alcea</i> sp.	Malvaceae	9
leaves	Alovera	<i>Aloe barbadensis</i>	Asphodelaceae	10
Air parts	Zu fa	<i>Nepeta bracteata</i> Buch.-Ham. ex D.Don	Lamiaceae	11
Starch	Neshasteh	<i>Solanum tuberosum</i> L.	Solanaceae	12
leaves	Pichak	<i>Hedera helix</i>	Araliaceae	13
Air parts	Ostokhodas	<i>Nepeta bimaculata</i> Jamrad	Lamiaceae	14
Grain	Badam	<i>Amygdalus communis</i> L.	Rosaceae	15
Innere bark	Darichin	<i>Cinnamomum zeylanicum</i> Nees.	Lauraceae	16
Manne	Chakar Tighal	<i>Echinops ritro</i> des Bunge	Asteraceae	17
Air parts	Naana	<i>Mentha spicata</i> L.	Lamiaceae	18
Fruit	Zireh Siuh	<i>Bunium persicum</i> B. Fedtsch.	Apiaceae	19
Fruit	Zireh Sabz	<i>Camelinum cymosum</i> L.	Apiaceae	20
	Ahura			21
Air parts	Kasni	<i>Cichorium intybus</i> L.	Asteraceae	22
leaves	Tchai Sabz	<i>Camellia thea</i> Link	Theaceae	23
Air parts	Kakuti	<i>Ziziphora tenuior</i> L.	Lamiaceae	24
Flower	Chai Kubi	<i>Stachys lavandulifolia</i> Vahl	Lamiaceae	25
Whole plant	Moxlase	<i>Linaria vulgaris</i> Mill	Scrophulariaceae	26
Flower	Bahar Namandj	<i>Citrus bigaradia</i> Loisel.	Rutaceae	27
Root	Zandjafil	<i>Zingiber officinale</i> Roscoe	Zingiberaceae	28
	Gole zba			29
Flower, leaves	Gavzaban	<i>Echium amoenum</i> Fisch. & C.A.Mey.	Boraginaceae	30
Grain, leaves	Khorfeh	<i>Portulaca oleracea</i> L.	Portulacaceae	31
Flower	Chaghayegh	<i>Papaver rhoeas</i> L.	Papaveraceae	32
Grain	Esfarzeh	<i>Plantago ovata</i> Forsk.	Plantaginaceae	33

Figure 5. The characteristics and part of herbs used by children in this study

Discussion

This study showed that the majority of asthmatic children (58.9%) who referred to the pediatric allergy clinic of Sarvar Children's Hospital in Mashhad had used herbal medicine. It is a fact that asthma is the most common chronic disease in children worldwide. Regarding the chronicity and long-term treatment, a great deal of these patients tend to use some form of supplemental medicines like herbal remedies.

In addition to traditional medicines, nowadays herbal medicine are more frequently used all over the country. It is inevitable that besides the benefits of these supplemental medicines there also are some probable side effects particularly to asthmatic children. Hence, it is necessary to increase our information about the types and species of herbal medicines as well as the amount of usage, prescription guidelines, and their availability.

In the present study, we divided the severity of asthma into three categories: mild asthma, moderate asthma, and severe asthma. Our results revealed that 55%, 35%, and 10% of our cases had mild asthma, moderate, and severe asthma respectively.

It is noteworthy that this ratio is compatible with the normal distribution of asthma in different medical reports with mild asthma reported as the most common stage of asthma severity. An Australian study also reported the same result as severe asthma was seen in only 17% of children (23). It is of prodigious importance to note that there was no significant difference in usage of herbal medicine between the different severity levels of asthma ($P=0.301$) in our study.

Regarding the increased global consumption of herbal medicines as well as the importance of traditional medicines in Iranian culture, our study also revealed that among 582 asthmatic children, 58.9% of them used plant medicines. This great value magnifies the prominence of Iranian parents' tendency towards supplemental treatments in chronic disorders like asthma, in which its frequency is more in comparison to many developed countries.

For instance, according to an American study, just 25% of 326 asthmatic patients used supplemental treatments (24). Jill Berg et al. reported that 38% of his asthmatic patients used supplemental treatments such as a humidifier, local creams or oils, massage, especial foods, regional suction, and so forth (21). Shenfield et al. showed that 25% of asthmatic children used herbal drugs. The interesting point in his study was that only 47% of adults who received herbal drugs reported this issue without being prompted while the others confessed their herbal consumptions after being specifically asked (23). Considering the high prevalence of asthma in Iranian children in addition to the high

rate of herbal usage, it seems that financial and safety issues should be seriously taken into account. While 239 (41.1%) subjects were not using herbal medicines, these drugs were used by 343 (58.9%) of patients. We evaluated 38 common and well-known species of herbal medicine that are typically used in our region. We found that there was no significant difference in usage of herbal medicine between sex ($P=0.346$). Surprisingly, there was no significant difference in usage of herbal medicine between different age groups even in infants less than one year ($P=0.621$).

This may be due to the fact that herbal treatment is safe even in very young children. In our study, *Thymus vulgaris* was the most common plant used in all age groups. It is prescribing in different ways including digesting the plant itself or in syrups and herbal mixtures. The second herbal medicine consumed by our study subjects was the four-seed herbal mixture although it was not used in those under one year of age. In children 10 years and over (9.59%), honey and lemon juice was the third commonly used herbal treatment.

Moreover, liquorice (*Glycyrrhiza glabra*), which is one of the most recognized herbal plants in Chinese traditional medicine for its great effect on asthma and is used in antiasthma simplified herbal medicine intervention (ASHMI) (19) was not used in almost any of our subjects.

Davari et al. in a study showed that *Zingiber officinale* can be beneficial as a supplemental treatment to achieve better control in patients with uncontrolled moderate asthma (25). In our study, using *Zingiber officinale* was very rare and it ranked as the twenty-seventh plant among the thirty-seven plants that were reported to have been used by our study subjects.

The most common reason for using herbal medicine as a supplemental treatment in our cases was the parents' wariness of the side effects of corticosteroids and their unsatisfactory results resulting from the routine treatment of asthma. In conclusion, our findings show that the majority of our asthmatic children (58.9%) who referred to the asthma clinic of Sarvar Children's Hospital in Mashhad used herbal medicines.

In addition, herbal medicines were used similarly in all stages of asthma, even in children who were in the initial stages or had mild asthma. Furthermore, *Thymus vulgaris*, the a four-seed herbal mixture, *Plantago major*, *Cydonia oblonga*, and *Amaranthus* spp were the most common plants used by our study subjects. *Thymus vulgaris* was the most preferred herbal plant among them (63.8%).

Regarding the high usage of herbal medicines, which are readily available from herbal stores across

Iran, to treat Iranian asthmatic children, it seems that it is essential to increase the level of parental information about the effectiveness, advantages and disadvantages and side effects of these common and easily accessible herbal medicines.

Furthermore, the probable benefits of these herbal remedies need to be confirmed by sufficient standard randomized trials.

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