

MILK AGGRAVATES ASTHMA – THE TRUTH OR THE PERCEPTION

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ABSTRACT

Objective: To assess the notion that milk can cause or aggravate asthma and break this myth.

Study Design: A cross sectional study.

Place and Duration of Study: Medicine department, Combined Military Hospital Lahore, from Jan 2019 to Dec 2020.

Methodology: A survey was conducted whereby known asthmatics were questioned about their opinion whether milk aggravates their asthma. Those who confirmed their positive response were exposed to milk and some liquid resembling milk, and their Lung functions were tested after each drink. The 42 patients who considered milk as the primary aggravator were called for the study for spirometry

Results: A total of 600 people from the general population were surveyed. Two hundred and six (34.3%) of them were illiterate, 394 (65.6%) were educated from middle to graduates. In the first milk/milk encounter, the combined dyspnea scale showed increase of 50.3% and improvement of 0.008% in FEVI/FVC. In the second substitute /milk encounter, the dyspnea score showed an increase of 61.8% and an increase of 0.90% in FEVI/FVC. In the third milk/substitute encounter the dyspnea score showed a decrease of 22.9% and the FEVI/FVC decreases by 5.5%. In the 4th substitute/substitute encounter, dyspnea scores decreased by 8.4% while the pre and post-encounter FEVI/ FVC scores were 2726 and 2711 with 0.55% decrease with insignificant *p*-value >0.05.

Conclusion: Drinking milk or milk substitute has negligible effect on the spirometric parameters.

Keywords: Dyspnea score, FEVI/FVC ratio, Milk allergy.

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INTRODUCTION

Asthma is global health issue and most common disease among children which affects all age groups with prevalence from 1% to 21% in adults and nearly 20% in children¹. According to WHO estimates, a total of 339 Million people were affected worldwide with asthma in 2016 and causes around 80% asthma related deaths occur in low to middle income communities^{2,3}.

Food allergy is a common entity and is thought to be on the rise with the incidence of up to 10% in some regions^{4,5}. In the United States the incidence of food allergy is reported to be 6-8% with the incidence of milk allergy being 1.94%⁶. The incidence of food allergy has been reported as 6.7% in Canada and 5.9% in European countries^{7,8}. The perception that food items can trigger

or aggravate asthma is common. The cow's milk which is an important component of a healthy human diet can cause or aggravate asthma is widely held not only in asthmatic patients but in the general population as well⁹. The prevalence of cow's milk allergy (CMA) occurs between 0.3% and 5%, relatively higher in children than adults. Drinking milk or eating dairy products doesn't cause asthma. However, if someone has a dairy allergy, it may trigger symptoms that are similar to asthma. People who are allergic to cow's milk can also be allergic to milk from other animals such as goats, sheep and buffalo¹⁰.

If someone has both asthma and dairy allergy, milk or dairy products may worsen asthma symptoms. About 40-50% of children with asthma also have some kind of dairy and other food allergies and are more susceptible to have asthma or other allergic conditions than children without food allergies. Adults are much less afflicted with milk allergy than children^{11,12}.

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In Thailand using oral food allergy test as the yard stick, 9.1% of asthmatics and 28.6% of the patients with rhinitis were found allergic to some food component. In this group of allergic patients, cow's milk allergy was found to have the highest incidence of 31%¹³. Symptoms of milk allergy differ and may range from mild reactions to a severe allergic reaction called anaphylaxis. Symptoms may occur immediately or may take some time to develop^{14,15}.

Risk factors for developing food allergy include family history for food allergy, male gender¹⁶, ethnicity with it being more common in Asians and black races than whites vitamin D insufficiency¹⁶. It has also been associated with filaggrin gene mutations and stat 6 gene polymorphism^{17,18}.

The rationale of the study is to nullify the commonly held belief that milk is associated with aggravation of asthma and deprive the people of this nutritional drink in their diet. However it should be noted that people with known food allergy or milk intolerance should be differentiated from people who have fear of their disease aggravation without any solid evidence.

METHODOLOGY

After getting approval from the hospital ethics committee, a survey was conducted in different markets of the city and asthmatic patients reporting to the Hospital where by adults of either gender were questioned about asthma, its causative factors and probable food items aggravating asthma. Inclusion Criteria were Asthmatic patient above 12 years of age. Exclusion criteria included known chest disease other than asthma, positive chest x-ray, diabetics, smokers current or past, asthmatics with FEVI less than 60%, recent history of asthma exacerbation, patients with signs of upper respiratory tract infection and patients with signs of respiratory distress.

Those patients who thought that milk was the primary aggravator were then called to conduct this study. After taking a written consent they graded themselves on a numerical dyspnea score marked 0-10 with 0 being completely nor-

mal and 10 being the most breathlessness ever experienced by them. A detailed present and past history was taken and patients were assessed by clinical examination and a blood sugar, x-ray chest and any other appropriate lab or radiological investigation were carried out as and if indicated by the history and clinical examination of the patient. A spirometric lung function study was then carried out particularly focusing on FEVI and FVC.

After 15 minutes they were given either cow's milk flavored with chocolate or cows milk substitute which was made to look and taste like chocolate milk. For this purpose Ensure powder (TM) was supplemented with chocolate and white icing color which consisted of can syp, sugar glycerol, carmosine, gelling agent agar gum, preservative, potassium sorbate, and citric agent. Both were served at room temperature in a 250 ml transparent glass. The patient on the first occasion were given milk and they were informed that they were drinking milk. On the second occasion they were given the milk substitute and they were misinformed that they were drinking milk. A third time they were given milk and were misinformed that they were drinking a substitute. On the fourth and final encounter of the study they were given a substitute and informed correctly about the nature of the drink. On each encounter a dyspnea score on the numerical dyspnea scale was calculated 15 mins before and after the encounter. Spirometric lung function studies were also done after calculating the dyspnea scale both prior and after the encounter. The patient were kept at the lung function studies lab for one hour after the procedure and a dyspnea scale was again marked at the end of the first hour.

RESULTS

A total of 600 adults from the general population were surveyed, 456 (76%) were males 144 (24%) were females. The overall mean age was 33.4 ± 16.3 SD years. Two hundred and six (34.3%) of them were illiterate, 394 (65.6%) were educated from middle to graduates. Fifty four (9%) gave history that they were asthmatics and

546 (91%) thought that they had no asthma however 522 (87%) knew somebody who had asthma, 533 (88.3%) out of 600 people questioned

Table-I: Demographics of participants.

Variables	n (%)
Age (Years)	
12-18	54 (9%)
19-30	134 (22.3%)
31-45	168 (28%)
46-60	152 (25.3%)
>60	92 (15%)
Gender	
Male	456 (76%)
Female	144 (24%)
Education	
Illiterate	206 (34.3%)
Literate	394 (65.6%)
Middle	118 (19.6%)
Matriculation	92 (15.3%)
Intermediate	108 (18%)
Graduate	76 (12.6%)

Table-II: Incidence of food allergy and asthma types.

Variables	n (%)
Asthma	
Asthmatics	54 (9%)
No personal experience	546 (91%)
Know someone with Asthma	522 (87%)
Asthma by Food	
Yes	533 (88.3%)
No	67 (11.1%)
Asthma Type	
Allergic	504 (84%)
Hereditary	76 (12.6%)
No idea	20 (3.3%)
Food	
Milk	257 (48%)
Rice	199 (37.3%)
Banana	77 (14%)

were convinced that one or the other food item could aggravate or precipitate asthma and 67 (11.1%) thought that food had no relation to

asthma rather dust or other environmental agents were responsible. Two hundred and fifty seven (48.2%) thought that milk is most important and common food item causing aggravation of asthma.

The 73% patients who thought that asthma is an allergic disease when asked about their personal experience regarding which food item aggravated their disease 42 (57.5%) considered milk as the commonest agent while 26 (35%) considered rice and 5 (6%) considered bananas as the primary agent in this respect. The 42 (57.5%) individuals who considered milk as the primary aggravator were called for the study after consenting to the study. They were explained about the procedure and written consent was taken. Thirty seven (88%) of the 42 completed the study.

In the first encounter, labeled as "milk/milk" when milk was given and the patients were told that they were drinking a glass of milk, the combined dyspnea scale before drinking was 157 while 15 minutes after the drinking the combined dyspnea score of all 37 patients was 236 which is an increase of 50.3%. The combined FEV1/FVC percentages of the 37 patients added upto 2780 prior to the encounter and 2804 after the encounter which was an actual improvement of 0.008%. So while the subjective dyspnea increased by 50.3%, the objective FEV1/FVC also paradoxically increased by 0.008%.

In the second encounter labeled as a substitute/milk" when patients were given the substitute and were misinformed that it was milk, the dyspnea score before the encounter was 144, while after the encounter was 233 which was an increase of 61.8%. However, the combined FEV1/FVC percentage before and after the procedure was 2621 and 2645 respectively, which was an

Table-III: Effect on dyspnea score and FEV1/FVC Ratio.

Variables	First Encounter	Second Encounter	Third Encounter	Fourth Encounter
Dyspnea Score Before	157	144	148	153
Dyspnea Score After	236	233	114	140
Difference of Dyspnea Score	79	89	-34	-13
FEV1/FVC prior	2780	2621	2690	2726
FEV1/FVC after	2804	2645	2542	2711
Difference FEV1/FVC	24	24	-148	-15

increase of 0.90%.

In the third encounter labeled as "milk/substitute" when the patients were given milk and misinformed that it was a milk substitute the result were a pre-procedure dyspnea score of 148 and a post-procedure score of 114 which was a decrease of 22.9% and the FEVI/FVC was 2690 prior to the encounter and 2542 after the procedure showing 5.5% decrease. In this encounter there was a post procedure decrease in the dyspnea score of 22.9%, while there was a decrease in the combined FEVI/FVC of 5.5%.

In the 4th and final encounter labeled as "substitute/substitute" the patient was actually given a substitute and was informed correctly about the nature of the fluid the pre-encounter and post encounter dyspnea scores were 153 and 140 respectively showing 8.4%. Percentage decrease while the pre and post-encounter FEVI/FVC scores were 2726 and 2711 was 0.55%.

Table-IV: Statistical analysis.

Regression	0.828
Possible Error	43.03
Confidence Interval	95% (0.05)
<i>p</i> -value	0.1716
Two Tail t-test	
Upper Value	1.94
Lower Value	-0.6

Statistical test indicates that FEVI and FVC score of milk experiment is positive. Asthema can be caused by lactose allergy. Asthma patients would have severe reaction after milk exposure. By applying t-test on 95% confidence interval, we found insignificant *p*-value of 0.17 which was >0.05.

In our present study 88.3% of our general population think that one or the other food item can aggravate asthma. Amongst this group 48.2% blamed milk while 37.3% and 14.4% respectively thought that rice and bananas are the main triggers of asthma.

DISCUSSION

A majority of our general population and asthmatic patients believe that asthma is an

allergic disease and that milk is the primary food agent that aggravates asthma. However, when tested objectively drinking milk or milk substitute had negligible effect on the spirometric parameter. Nevertheless the drinking of milk or sham milk had appreciable effects on the spirometric parameters. Drinking of substitute or sham substitute milk neither affected the subjective dyspnea score. The subjective dyspnea scale nor the objective FEVI/FVC score changed significantly.

In a study by Omer *et al*, 67% of asthmatics thought that rice aggravated their asthma while 42% indicated milk as a trigger¹. In same study 42% of asthmatic patients were convinced that milk was their asthma trigger while 41% and 5% perceived rice and bananas respectively as main triggers of asthma. In our study 48% asthmatics attributed milk as the trigger of Asthma, and 37.3% and 14 % thought of rice and banana as the trigger of disease.

However there is a difference in perception and the reality of the food allergy. According to one study the parental complaints of food hyper sensitivity in 6 years olds was 11.8% but when history along with skin prick test and open food challenge were utilized, the incidence came down to 2.5% which further reduced to 1.6%, when double blind challenge was added to the diagnosis¹⁹.

The majority of the patients with milk allergy present in the first year of life. 57% of the children resolve their allergy by age 4-5 year and the median age of outgrowing the disease is 10 years²⁰. Children with non IgE mediated disease develop tolerance to cows milk earlier than those with IgE mediated disease. Milk allergy accounts for about 20% of the childhood food allergies and 2.5% of the total IgE and non IgE mediated reactions. Compared to children the allergy to cows milk protein tends to persist longer in adults. Only 28% of adults are symptom free after 4 years of diagnosis²¹.

Interestingly in a local Pakistani study, when skin prick test was used 39.9% people were found to be sensitive to one or more component of food

while when oral food test was used for the same purpose the incidence was 9%. But none of the patients were allergic to the cow milk²².

CONCLUSION

The above results while not denying the presence of milk allergy or intolerance however disapproves the perception of milk as a common aggravator of asthma. Hence the perception of milk as a common aggravator of asthma is a myth and not a reality.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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