

## DO FAST/JUNK FOODS HAVE AN EFFECT ON ASTHMA IN CHILDREN

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<https://doi.org/10.52340/jecm.2022.02.002>**Abstract**

*Certain types of food may increase or decrease the frequency of asthma exacerbations. The study is aimed at determining whether there is an association between consuming fast/junk foods and asthma. A well-adjusted, standardized questionnaire was used for the collection of information. This study is focused on finding a relationship between fast food intake and frequency and severity of asthma exacerbation rather than a causative relationship. This is a cross-sectional study done in the southern part of India in the state of Kerala. The correlation between fast food and asthma is established through a detailed analysis of the results. After adjusting for confounding variables like Environmental Tobacco Smoke (ETS) and allergens at home we were able to indicate that fast/junk food consumption is a risk factor for asthma symptom exacerbation in children.*

**Introduction**

Asthma is one of the most commonly seen chronic diseases in childhood. Around 300 million people have asthma worldwide, and it is likely that by 2025 a further 100 million may be affected [1]. According to WHO 2016, 15–20 million people out of the global asthma population were from India alone [2]. It is a serious non-communicable disease with significant public health implications for both children and adults, including high mortality rates in severe cases. Despite knowing extensive details about asthma, its prevalence and severity increase every year. A recent study in the United States has shown that one in every 13 Americans lives with asthma, and similar global asthma reports have estimated that approximately 20–25 million Indians are affected by asthma, suggesting that almost everyone in 10 asthma patients is an Indian. An epidemiological study conducted in India as a part of a global initiative showed that more than 6% of the child population is affected by asthma in India [3]. Over the past few decades, an increase in asthma prevalence has been noted to impact public health, and accordingly, several studies are conducted regularly to adequately assess the condition and its different aspects. According to current data, asthma is a complicated condition with interactions between genetic susceptibility, host factors, and environmental exposures playing a role in its etiology [4]. One of the growing problems that have been hypothesized for the rise in the incidence of asthma is the change in diet. Fast food restaurants and junk food items can be found in practically every city in the world. While most people are aware that fast or junk food is not the healthiest option, many are unaware of the extent to which it can harm the body. A poor-quality diet is believed to trigger more inflammation in the body, which can aggravate asthma symptoms. Many studies show consuming fruits and vegetables can prevent asthma while consuming fast or junk food increases the risk of contracting the disease. Several studies have been conducted regarding the effect of diet on asthma globally, but endemic to southern parts of India, there is a negligible amount of data regarding it [5]. This study aims to prove or show an association between increased fast and junk food consumption and an increase in exacerbation of asthma.

**Methods**

The study was initiated after every team member underwent a thorough review of the base topics to establish a solid foundation for the research and its state of the art. Data from previous studies were collected, explored, and then a proposal was drafted to initiate the research process. This study is a cross-sectional study conducted at the Amala Institute of Medical Science of Kerala between the period of January 2021 and June 2021. The consent forms were approved by the hospital administration and the consent was obtained from the parents in advance regarding the collection of data through a questionnaire-based survey. Children aged 6 to 14 years with the diagnosis of asthma and no exposure to smoke were determined as eligible for the study. The diagnosis of asthma was based on the GLOBAL INITIATIVE OF ASTHMA (GINA) guidelines. The diagnosis of asthma was met if the following criteria were met: (a) More than one of the following - wheeze, chest tightness, shortness of breath, and cough. (b) Symptoms occur variably over time and vary in intensity. (c) The symptoms occur or are worse at night or early morning.

(d) Symptoms are often triggered by exercise, laughter, allergens, or cold air. The severity of asthma was classified from intermittent to persistent asthma. The diagnosis was made by the pulmonology department based on GINA criteria and the participants were currently treated at the hospital. Inclusion criteria children with asthma flare-ups and informed consent from parents. Due to the limited number of patients during the covid pandemic, a sample size of 42 patients between the age of 6 to 14 years were taken. Of the 42 patients whose information was taken 6 were ruled out due to the exposure to smoke and the presence of other cardiopulmonary diseases. From the 36 study participants who survived the exclusion criteria 12 were classified into the main group based on their fast-food consumption (more than twice a week) and 24 as the controls who had not consumed any fast food or less fast food.

Data collection was done exclusively through interviews/surveys conducted with the parents/guardians or the physician of the participating patients with the help of a questionnaire. The questionnaire consisted of several questions regarding, the overall condition and the diet of the participant, course of asthma and its severity of the patient. Dietary habits were based on the consumption of specific food in the past 12 months. Specific food groups were included: meats, seafood, fruits, vegetables, pulses, cereals, rice, pasta, bread, nuts, eggs, and fast/junk food. The specific food was explained following the various regional food groups and fast/junk foods.

The asthma section of the questionnaire was derived from a pre-coded standardized questionnaire based on a phase 3 study conducted in New Zealand (ISAAC) [6]. The dependent variable was asthma severity and the independent variable was the amount of fast/junk food consumption. The severity was assessed with the different symptom presentations of asthma and was classified into intermittent, mild persistent, and moderate asthma. The symptoms and clinical presentations considered were wheeze, nighttime awakening, speech limitation, cough, and asthma exacerbation.

### Results and Discussion

A total of 36 acceptable responses were collected and their data were recorded and compiled. From the 42 responses received, 6 were excluded due to responding to having been exposed to tobacco smoke at home. The majority of the responses were filled up by parents of the participant (80.6%, n = 29), the rest were filled by the guardian or the doctor of the child (n = 5, n = 2). According to the frequency of consumption, the study sample was divided into two groups - Main group consumed fast food more than two times a week (12 patients) and the control group consumed twice or less than two times a week (24 patients). 75% of the participants in the study were in the age group of adolescents between 10 and 14. 23 responses (63.18%) from the total were male children and held the majority in comparison to only 13 female children.

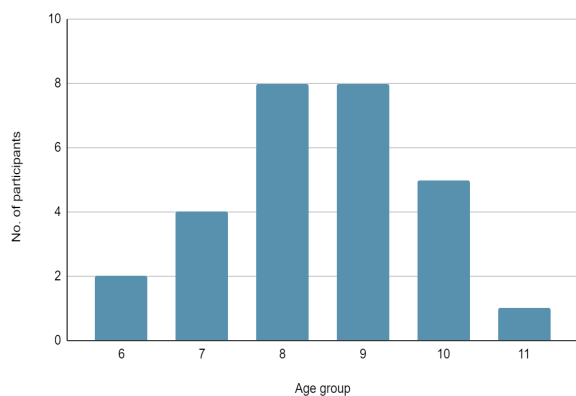
**Table 1** shows the baseline characteristics of the study population. There was no age or sex-based predilection from our analyses of the data in general. 19.4% of our study population was at risk to get exposed to some kind of allergen at home. Dust, food i.e nuts, shellfish, pets, medication were considered as allergens in the study and all participants were asked if they had any exposure. The **figure 1** shows the trend in ages of starting consumption of fast/junk foods. In this figure, we can see that 50% of the study population who consumes fast/junk food starts to consume fast/junk food at the age of 8 to 9 years. The **figure 2** highlights the participants who consume fast/junk. This figure shows that a majority of our study population (77.8%) consume fast food albeit in different frequencies and quantities. The **figure 3** indicates the BMI statistics of the study population. As seen 52.78% of the study participants have a normal BMI, the remaining participants fall into the categories of obese (30.55%) and overweight (16.67%). The BMI was calculated with the CDC's calculator for children's BMI, and the children were categorized with the CDC classification [7]. **Table 2** displays the asthma symptom presentation of the participants in the past month. The largest group of the participants (30.6%) present with having episodes of wheezing at least 4 to 12 times a month, followed by 27.8% of the study participants presenting with wheeze 1 to 3 times a month. It can be seen that the majority (47.2%) of the patients have had no nighttime awakenings and 33.4% of the population are seen to have nighttime awakenings at least once a month. Finally, in **table 3** the participant's fast/junk food consumption and their asthma severity were tabulated. Only 8 of the participants did not consume fast/junk food and reported symptoms of asthma with intermittent severity. From the 12 study participants who consumed fast/junk food more than twice a week, 8 of them presented

with moderate persistent asthma, indicating 61.53% of them demonstrated more asthma symptom exacerbation. 8 of the 36 total participants who did not consume fast/junk foods had an intermittent asthma severity. Table 3 also showed that participants who consumed fast food more were classified with more severe form of asthma indicating they had increased presentations of asthma symptoms compared to other groups as none of the 12 more frequent consumers of fast/junk food were categorized as having intermittent asthma i.e. the least severe form among the 3. In general, the participants who consumed fast/junk foods more frequently presented with worse severity in comparison with those who didn't. However, there were an array of mixed responses with 32.14% of the fast/junk food consuming participants presented with intermittent asthma.

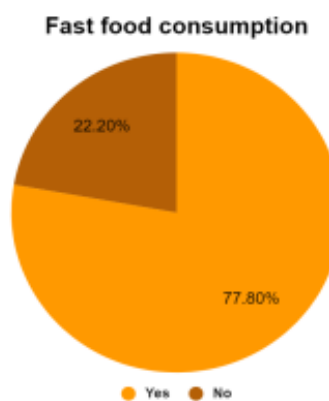
**Table 1 - Patient/participant baseline characteristics**

Characteristics	Frequency (n)	Percentage (%)
<b>AGE GROUPS</b>		
<i>6-9 CHILDREN</i>	<i>9</i>	<i>25</i>
<i>10-14 ADOLESCENTS</i>	<i>27</i>	<i>75</i>
<b>SEX</b>		
<i>MALE</i>	<i>23</i>	<i>63.9</i>
<i>FEMALE</i>	<i>13</i>	<i>36.1</i>
<b>EXPOSURE TO ALLERGENS</b>		
<i>YES</i>	<i>7</i>	<i>19.4</i>
<i>NONE</i>	<i>29</i>	<i>80.6</i>
<b>HOW FREQUENTLY DID YOU CONSUME FAST FOODS?</b>		
<i>NEVER CONSUMED</i>	<i>8</i>	<i>22.2</i>
<i>OCCASIONALLY CONSUMED</i>	<i>6</i>	<i>16.7</i>
<i>ONCE OR TWICE PER WEEK</i>	<i>10</i>	<i>27.8</i>
<i>MORE THAN 2 TIMES A WEEK</i>	<i>12</i>	<i>33.3</i>

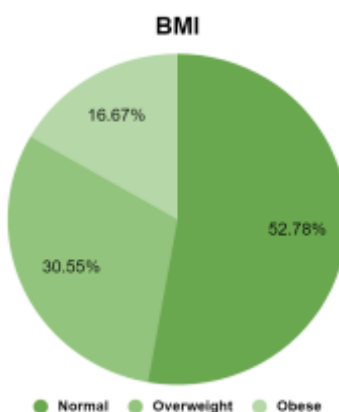
**Figure 1.**



**Figure 2.**



**Figure 3.**



**Table 2 - Asthma features in the participants**

Symptom presentation	No. of individuals	Percentage (%)
<b>WHEEZE</b>		
<i>none</i>	<i>8</i>	<i>22.2</i>
<i>1-3 times a month</i>	<i>10</i>	<i>27.8</i>
<i>4-12 times a month</i>	<i>11</i>	<i>30.6</i>
<i>More than 12 times a month</i>	<i>7</i>	<i>19.4</i>
<b>NIGHTTIME AWAKENING</b>		
<i>none</i>	<i>17</i>	<i>47.2</i>
<i>Once a week</i>	<i>12</i>	<i>33.4</i>
<i>More than once a week</i>	<i>7</i>	<i>19.4</i>
<b>ASTHMA FLARE-UPS/ EXACERBATION</b>		
<i>none</i>	<i>8</i>	<i>22.2</i>
<i>Less than twice a week</i>	<i>14</i>	<i>38.9</i>
<i>Twice or more a week</i>	<i>14</i>	<i>38.9</i>

**Table 3 - Fast/junk food consumption and asthma severity**

Study groups		Asthma severity (abs. N/%)		
		Intermittent	Mild persistent	Moderate persistent
<b>Main group</b>	<i>More than twice a week (12)</i>	0	4	8
<b>Control group (24)</b>	<i>Non-Fast/junk food consuming participants (8)</i>	8	0	0
	<i>Once or twice a month (6)</i>	5	1	0
	<i>Once or twice a week (10)</i>	4	4	2

This cross-sectional study showed an association between the consumption of specific food groups, explicitly fast or junk food groups, and the severity of asthma in children aged 7 to 14 from Thrissur, Kerala. The main goal was to inspect any association between consuming fast/junk foods, frequency of consumption, and asthma symptom exacerbation.

The rate of fast and junk food consumption has been on the rise globally. The study setting is in a developing country and has accounted for an increase in fast and junk food consumption in the general population as well as the younger population especially the adolescents. From the responses of the study group, 77.8% of the participants were consumers of fast or junk foods and 50% of participants started consuming fast food at the age of 8 or 9. A study done to examine the relationship between BMI and junk food consumption previously has shown that although aware of the effects of consuming junk foods, adolescents are reluctant to change their dietary habits [8].

In this study, the frequency of consuming fast or junk foods more than twice a week was seen as correlating with an increased presentation of wheeze, and nighttime awakening, as more frequent asthmatic symptoms. Study participants with increased rate and quantity of fast or junk food consumption showed a worse presentation of asthma exacerbation and were categorized as moderate persistent in asthma severity. There have been similar studies conducted in various countries reporting both corroborating and contradicting conclusions. A cross-sectional study conducted in Brazil attributed the asthma symptom exacerbation towards obesity in children, in preference to their dietary patterns [9]. In contrast, a study done in Shanghai has illustrated the relationship between consuming fast foods and asthma and allergies and showed a correlation between consuming fast food, hamburgers, and asthma in an exposure-response form [10].

Studies have postulated fast and junk foods forward diets to be having lower levels of antioxidants & n-3 fatty acids and higher levels of n-6 polyunsaturated fatty acids and have generated possible

mechanisms in which they affect asthma and other atopic medical conditions [11,12]. Fast and junk foods are predominantly higher in various unsaturated fatty acids, dietary sodium, and sugar, which suggests a connection between consumption of fast/junk food and asthma. Fatty acids and antioxidants involvement in immunomodulators, and dietary sodium predisposing to wheeze-like conditions [12]. The findings are practically consistent with those of previous similar studies, and to the best of our awareness, this study is the first one in Kerala to examine the association between fast or junk food intake and asthma. An unexpected outcome was that 53% of the participants were classified as having a normal BMI and the rest of the participants were divided into overweight and obese, 30 and 17% respectively. Unlike a study previously conducted shows relatively less association between obesity and asthma symptom presentation [9].

Various limitations must be considered when interpreting this study. Through a cross-sectional study, a time-related association between consuming fast or junk foods and asthma can be confirmed. Compared with other studies in the same background, the small sample size makes this study inadequate for investigating and well-establishing the association between diet and asthma. Since a wider range in the age of the study participants may present as a confounding variable, a slight adjustment was made in the age groups (7-14) to accommodate a lesser margin of impact from the variable. Non-asthmatic children were excluded from the study because the goal of this study was to explore the link between dietary habits, specific consumption of fast and junk foods, and asthma severity and symptom exacerbation rather than the risk of developing. The findings may not apply to the general population of asthmatic children in the region as the sample size is relatively small and the study is hospital-based. Despite the lack of statistical analysis in our study, a positive connection between disease severity and the consumption of fast or junk foods is seen. The positive link with severe disease shows that fast and junk foods are a predictor of disease severity rather than disease occurrence.

The ISAAC questionnaire used worldwide for asthmatic research was the strong foundation for the survey conducted. Although the questionnaire was inspired by a previously validated and recognized set of questions, it was filled by parents/guardians of the participants. A result of systematic bias is unlikely but there were relatively low responses that can indicate a non-response bias which can be attributed to the current ongoing pandemic situation. Additionally, there was only a basic explanation about the various food groups and did not include any names in particular which could cause a misclassification in the dietary section of the responses. Self-reporting also has a potential consequence of recall bias. Another plausible margin for an erroneous result is the socioeconomic factor which may confound the association found as it was not adjusted for. Statistical analysis was overlooked in the paper, owing to limited resources, and substantially low responses for the questionnaire. Further studies can be done in search of a causal relationship after large population-based cross-sectional studies have been conducted to show a statistical association between the consumption of fast/junk foods and asthma symptom exacerbations.

In conclusion, our study assessed the correlation between fast and junk food consumption and asthma symptom exacerbation in children. Our results have demonstrated that there is a positive association between fast or junk food intake and increased presentation of asthmatic symptoms. This is more prevalent in individuals who consume fast foods more than twice a week. More research is needed to validate the correlations found in this study and determine whether there are any possible causative links between fast and junk food intake and asthma symptom exacerbations.

### **Acknowledgement**

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