

## Studying the Effects of Fasting during Ramadan on Pulmonary Function Test and Asthma Severity

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### Abstract

**Background and Objectives:** Studies have shown that fasting can have an impact on the course and severity of chronic diseases. There are a few studies on the association of fasting and asthma. Therefore, this study has been conducted with the purpose of examining the effects of fasting on asthma severity and pulmonary functioning tests.

**Methods:** 30 patients with asthma who attended a pulmonology clinic in Qom were enrolled in this study. The severity of patients' asthma has been studied by questionnaire and spirometry of pulmonary functioning in the month of Shaban, Ramadan and Shawwal. The results of Asthma Control Questionnaire and the pulmonary functioning tests in three months have been compared.

**Results:** The average age of patients was 43.42 years and 43.3% of patients were males. The Average score for asthma severity questionnaire in three months were 20.4, 21 and 20.17 respectively. Statistically, there haven't been any significant differences between the results of pulmonary functioning test and asthma severity before Ramadan (Shaban), during Ramadan and after that (Shawwal).

**Conclusion:** The findings of this study showed that fasting in patients with asthma has no effect on pulmonary function and asthma severity.

**Keywords:** Asthma, Fasting, Ramadan, Spirometry.

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### Introduction

Asthma is a reversible airways obstruction caused by severe bronchial hyperresponsiveness to immunological and non-immunological stimuli. This is one of the most common chronic diseases and it has high social and economic costs. Over the past 3 decades, the prevalence of this disease has been increased significantly (1). Australian studies showed a 4% increase in relation to the

prevalence of asthma symptoms each year (2,3). the prevalence of asthma in Iran and in children under 18 years is estimated to be around 13% (4).

Asthma is caused by a combination of genetic and environmental factors and its diagnosis is based on the constellation of symptoms, responses to treatments and spirometry. Clinically, these patients are classified based on the severity of symptoms, Forced Expiratory Volume in one second (FEV1) and peak

expiratory flow rate (5).

Although many studies have been done on the effects of fasting in Ramadan on chronic diseases such as rheumatoid arthritis (6), chronic heart failure (7), diabetes (8, 9) and hypertension (10), studies on asthma is very limited, and most studies have been done on spirometry changes in healthy subjects during Ramadan (11-13), which have shown conflicting and contradictory results.

The purpose of this study was to assess changes in asthma severity by the use of questionnaire, as well as changes in pulmonary functioning by spirometry before, during and after Ramadan in adults with controlled asthma.

### Methods:

A cross-sectional study on 30 patients with asthma who attended a pulmonology clinic was conducted in the city of Qom. Patients with the diagnosis of moderate to severe asthma have been enrolled who were receiving standard treatments. The study was performed on patients between ages of 15 and 65 years. Sampling was done based on convenience method. Patients with cancer, congestive heart failure and hyperthyroidism and hypothyroidism have been excluded. Patients who had any contraindications to fasting also have been excluded. Patients in the month of Shaban, Ramadan and Shawwal were studied. The study have included demographic variables (age and gender), asthma-related variables (duration and type of medication), and the asthma severity and pulmonary functioning of patients. The patients were also asked about the sutra of using the spray during Ramadan and the results were added into a checklist.

Asthma severity was assessed by standard questionnaire.

Pulmonary functioning, including FEV1, FEV1/FVC, PEF, PEF25, 75, was assessed by spirometry.

Data were analyzed using SPSS version 19. ANOVA test was used for comparison of the means in three months. The significance level was set less than 0.05.

After informing the patients about the conditions of the study and obtaining informed consent, they have been enrolled in the study and they were free to leave the study at any time. The cost of pulmonary functioning test hasn't been obtained from patients, and their information remained protected.

### Results

A total of 30 patients were included in the study and all patients continued their collaboration to end of the study. The age average of patients was  $42.43 \pm 13.04$  years and minimum and maximum ages were 20 and 60 years respectively. Of 30 patients, 13 (43.3%) were males and 17 (56.7%) were females. the duration of having asthma was 1 to 30 years with a mean of  $10.63 \pm 10.44$  years.

Regarding spray used by these patients, 3 patients (10%) used Seretide, 3 patients (10%) used salbutamol, 14 patients (46.7%) used a combined salbutamol and Seretide, and 10 patients (33.3%) also used Atrovent and Seretide. The results have shown that there aren't any significant differences in pulmonary functioning test and asthma control before, during and after Ramadan.

Regarding the Sutra on the usage of inhaler during Ramadan only 33.3% of patients had any knowledge.

Table 1: Subject's asthma severity variables pre, Ramadan and post-Ramadan

| Severity variable                 | pre-Ramadan (Shaban) | Ramadan     | post-Ramadan (Shawwal) | P value |
|-----------------------------------|----------------------|-------------|------------------------|---------|
| FEV1                              | 72.5±23.58           | 74.8±23.46  | 72.43±25.49            | 0.26    |
| FEV1/FVC                          | 72.12±10.06          | 73.92±10.00 | 71.95±10.33            | 0.09    |
| PEF                               | 68.03±28.60          | 69.03±26.06 | 66.46±27.70            | 0.62    |
| PEF25,75                          | 57.10±26.30          | 60.46±25.8  | 57.16±25.43            | 0.15    |
| Asthma Control Test questionnaire | 20.47±2.95           | 21.00±4.27  | 20.17±3.12             | 0.64    |

## Discussion:

Current study compared the severity of asthma and pulmonary functioning test before, during and after Ramadan in adult patients with asthma. The results showed that none of the functioning tests before, during and after Ramadan had a significant difference.

Similar studies have been conducted on patients with asthma. Norouzi and colleagues in a study conducted on 29 patients with controlled asthma had shown that among pulmonary functioning tests, only peak expiratory flow has improved after Ramadan. This study also showed that peak expiratory flow was 13% at the beginning of Ramadan and it increased to 10% in the fourth week (14). Bener and colleagues have studied 1590 hospitalized asthmatic patients in 4 years. The results of this study showed that none of the pulmonary functioning tests in Ramadan have a significant difference before and after this month (15). Among the studies that have been conducted on healthy subjects, Siddiqui and colleagues have examined 46 healthy men before, during and after Ramadan in terms of pulmonary functioning. In this study, none of the pulmonary functioning tests in Ramadan had changes comparing to the previous month. In the month after Ramadan FVC was significantly reduced which seems that is due to the increase in BMI (11). In a study conducted by Subhan and colleagues, 46 non-smoker healthy individuals have been examined for pulmonary functioning tests in the months of Shaban, Ramadan and Shawwal. This study also showed no changes in pulmonary functioning tests before and after Ramadan. However, the forced expiratory flow rate had increased after Ramadan which these changes had a negative correlation with changes of patients' BMI (12). Mousavi et al. have performed spirometry for 117 healthy subjects 10 days before Ramadan, twice during this month, and 10 days after Ramadan. This study showed that lung capacity of healthy people increased during Ramadan (13).

One of the factors that may be effective in pulmonary functioning during Ramadan is weight changes. Some of the previous studies showed that changes occurred in pulmonary functioning are related to the changes of

patient's weight (12). In a study by Hakala and colleagues which was conducted on 15 overweight asthmatic patients, they showed that a low calorie diet which results in weight loss can decrease the constriction of airways (16).

Some animal studies acknowledge the reason for changes in pulmonary functioning after a decrease in food intake to be due to the changes in surfactant and elastin metabolism (17). However, these changes due to reduced food intake occur in the long term and it does not seem that this mechanism results in pulmonary functioning changes during Ramadan.

Some other factors that can cause changes in pulmonary functioning and disease severity in the month of Ramadan are reduced physical activity, reduced food allergens, low volume of stomach that causes less pressure on the diaphragm during these days, reduced smoking and reduced gastro esophageal reflux into gullet. Another issue is that hunger causes the stress in the body and the release of catecholamine which causes the dilation of the airways.

## Conclusion:

This study showed that fasting in patients with asthma had no effect on asthma severity and pulmonary functioning; since previous studies have shown contradictory results, further studies in this field and also studying the possible changes are suggested.

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