

BRIEF COMMUNICATION

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Prevalence of Asthma and Rhinitis in Bakery Workers in the City of Sanandaj, Iran

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ABSTRACT

Baker's asthma is one of the most common forms of occupational asthma. This study was conducted to determine prevalence of asthma and rhinitis among bakery workers in the city of Sanandaj, the provincial center of Kurdistan province in the west of Iran in the in Summer 2006.

In this study 776 bread bakery workers were included. These subjects were selected randomly among 1620 bakery workers. The diagnosis of asthma was based on a medical history of episodic symptoms of cough, chest tightness, and dyspnea and spirometry. Airflow obstruction was determined with spirometry, the definition of airflow obstruction which was used in this study was an FEV₁/FVC ratio < 0.8, and FEV₁ or FVC increases of ≥ 12 percent and at least 200mL after using a short-acting inhaled beta2-agonist. Rhinitis was diagnosed by typical history of work related symptoms. Analyses were performed on 776 subjects (all were men) without missing data for asthma and rhinitis.

All of subjects were male with mean age of 33.69±11.09 years. Mean duration of bakery working for these subjects was 13.91±9.37 years. Prevalence of asthma at the time of study was 11.9%. 93 subjects were diagnosed as asthma with history, physical and spirometry findings. 31 (33.3%) of asthmatic workers were diagnosed as asthma previously and 62 (66.6%) workers were known as new asthmatic patients which were diagnosed in this study program. The prevalence of rhinitis was (9.9%). Subjects with asthma had longer history of working at bakery than others (P=0.001).

Asthma prevalence among these bakery workers that were included in our study was similar and in some instances the prevalence was lower than other studies.

Key words: Asthma; Bakery; Occupational asthma; Prevalence

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INTRODUCTION

Materials inhaled in the workplace can lead to all of the major chronic lung diseases except those due to

vascular disease¹. Around 200 to 300 agents are encountered at work that have been reported to cause asthma through respiratory sensitization.² Asthma is a common chronic disease in adults and consequently has a substantial impact on public health and health care expenditures.² Occupational asthma (OA) has become one of the most common forms of occupational lung disease in many industrialized countries^{3, 4} and it is commonly defined as asthma caused by exposure to agents at work.⁵ Baker's asthma is one of the most common forms of occupational asthma that was described three centuries ago.⁶

Case reports from the beginning of the 20th century established the concept of baker's asthma as an allergic disease because of the observed combination of positive skin tests to flour extracts and respiratory symptoms suggestive of asthma.⁷⁻⁹ Respiratory diseases such as asthma or rhinitis may occur in bakers due to inhalation of bakery dust. Several studies report the prevalence of asthma, chest symptoms, or rhinitis in bakers.⁷

Some authors found a high prevalence of respiratory disorders, abnormal lung function parameters, and sensitization to bakery allergens. Most frequently, bakers with workplace-related respiratory symptoms show sensitization to wheat flour (64%), rye flour (52%), soy bean flour (25%), and alpha-amylase (21%).¹⁰ One study was conducted to investigate supermarket baker's asthma. In this survey 324 in-store bakeries producing bread from raw ingredients conducted a three-stage health surveillance programme in around 3000 bakery employees. The overall employee response for the first stage was 77%; a quarter of those with respiratory symptoms reported that they were work related.¹¹

This study was conducted to determine prevalence of asthma and rhinitis among bakery workers in Sanandaj, the provincial center of Kurdistan province in the west of Iran in the Summer 2006.

MATERIALS AND METHODS

The study populations of this cross-sectional study consisted of 776 bread bakery workers that were selected randomly among 1620 bakery workers. They have had inclusion criteria; at least one year working continually at the bakery and no history of respiratory illness, rhinitis or allergy before they begun to work at bakery. Exclusion criteria consisted of history of

abdominal and thoracic surgery in the previous two months and chest deformity. The subjects that had inclusion criteria and did not have exclusion criteria were interviewed with the purpose of identifying the prevalence, nature and pattern of any work-related respiratory symptoms.

The diagnosis of asthma was based on a medical history of episodic symptoms of cough, chest tightness, and dyspnea. Airflow obstruction was determined with spirometry, the definition of airflow obstruction which was used in this study was an FEV₁/FVC ratio < 0.8 and FEV₁ or FVC increases \geq 12 percent plus at least 200mL after inhalation of two puffs of salbutamol (Metered-Dose Inhaler, Galax, England)^{1, 3, 12, 13}.

Patients with typical history of asthma, FEV₁/FVC ratio <0.8 and response to bronchodilator were diagnosed as asthma. Non-smoker subjects with clinical signs and symptoms of asthma and normal spirometry were considered as probably asthmatics. If FEV₁/FVC ratio >0.8 but typical signs and symptoms of asthma was present and predicted response to bronchodilator was achieved asthma was validated. Smokers with FEV₁/FVC ratio between 0.70 and 0.80 and inadequate response to bronchodilator were considered as smoking relate bronchitis and were excluded from asthmatic list.

The diagnosis of rhinitis was based on history of work related symptoms. Characteristic symptoms included repetitive sneezing; rhinorrhea (runny nose); post-nasal drip; nasal congestion; pruritic (itchy) eyes, ears, nose or throat; and generalized fatigue.⁷ Analyses were performed on 776 subjects (all were men) without missing data for asthma and rhinitis.

RESULTS

In this study 776 bakery workers were included in the study. All of them were male and mean age was 33.69 year (SD=11.09), the youngest worker was 15 years old and the oldest 79 years old. Mean duration of bakery working was 13.91 years (SD=9.37). 215 (27.7%) of study population were current smokers. In table 1 some data about study population are presented.

Prevalence of asthma at the time of study was 11.9%. 93 subjects were diagnosed as asthma with history, physical and spirometry findings. Thirty one (33.3%) of asthmatic workers were diagnosed as asthma previously and 62 (66.6%) workers were known as new asthmatic patients who were diagnosed in this study.

Prevalence of Asthma and Rhinitis in Bakery Workers

Table 1. Demographic data of study population.

Variables	Number	Mean	SD
Age (Total Population)	776	33.69	11.09
Age (Asthmatic Patients)	75	38.71	12.38
Age (Smoker Group)	215	34.60	9.78
Duration of Smoking	215	13.64	8.9
Age at Start of Smoking	215	21.19	6.35
Height (Cm)	776	170.66	7.09
Weight (Kg)	776	68.96	11.95
Body Mass Index	776	23.66	3.79

Table 2. Association between mean duration of work at bakery and asthma.

Topics	Number	Work History at Bakery (year)	Standard Deviation
Asthmatic Worker	89	18.76	10.21
Healthy Worker	687	13.36	9.10

Mean duration of working at bakery was longer among asthmatics than healthy workers. $P=0.001$, CI (3.07-7.48)

Seven subjects (1.2%) have had FEV₁/FVC ratio <0.8 but inadequate increase of FEV₁ post bronchodilator inhalation, which were considered as probable asthmatics.

The subjects that were included in the study were interviewed for symptoms and signs of rhinitis and 77 (9.9%) of them had work related rhinitis.

The subjects with asthma had longer history of working at bakery than others (Table 2).

DISCUSSION

Towards the end of the 20th century, just as other work-related respiratory illnesses, such as pneumoconiosis, were on the decline in industrialized countries, the prevalence and incidence of occupational asthma (OA) began to increase¹⁴. This may have been due, at least in part, to changing environmental conditions in the workplace; *i.e.* the introduction of new asthmagenic agents. It is interesting to note that at the time this increase was observed, the prevalence and incidence of asthma in the general population had also increased. In the USA, for example, it increased during 1982 and 1994 from 40 in 1,000 to 60 in 1,000¹⁵. This

increase may have contributed to the increasing rates of OA among work-related lung diseases¹⁶.

According to the result of this study prevalence of asthma or probable asthma in bakery workers at the time of study was at least 11.9% (7 subjects (1.2%) were considered as probably asthmatics).

In this study we determined the rate of asthma in bakery workers and did not estimate bakers' asthma because sensitization to allergens was not evaluated, which was a great limitation of our study. On the other hand symptoms of subjects were work-related and none of them had history of asthma or respiratory symptoms before beginning to work at bakery. This rate of asthma among bakery workers was higher than 4-6% in general population¹² but similar to reported prevalence of recent asthma in longitudinal and cross-sectional studies that was estimated 9-17%.¹⁵

Some studies indicated that the incidence rate of asthma for the bakers with highest exposure (dough makers) was 7.3 and 6.5 /1000 person-year in men and women, respectively, while this rate was 43.4 and 38.5 /1000 person-year in men and women for rhinitis, respectively. There was a significant association between the dust concentration at onset of disease and the risk for asthma or rhinitis^{7, 17-19}. McDonald reported incidence of occupational asthma in the United Kingdom. There was great variation between occupations, with highest annual rates per million (sexes combined) observed in spray painters (658), chemical processors (364), plastics workers (337), and bakers (334), compared to an overall average of 20 per million. Regional differences were also considerable, explained in part by the distribution of industry and perhaps also by uneven levels of reporting.²⁰ Other result of this study showed that 46 asthmatic workers (61.33% of all asthmatic workers) were diagnosed at the time of study that was noted low surveillance.

We concluded that the prevalence asthma among bakery workers that were included in our study was high and we found low health surveillance.

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