Prevalence of Occupational Asthma and Early Bronchial Airflow Impairment Among Hairdressers in Denizli

Denizli İlindeki Kuaförlerde Mesleki Astımların prevalansı ve erken havanın etkiliyeti

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Summary

Objective: To define asthma prevalence among hairdressers in Denizli and to determine the effect of time of exposure to etiological agents on Pulmonary function tests (PFTs).

Method: Data were collected from 27 salons, including 151 hairdressers. Respiratory symptoms, duration of exposure to etiological agents, relation of symptoms to work, and smoking habit were collected by a questionnaire in a person to person interview. PFTs were performed to 31 hairdressers who defined respiratory symptoms. Fifteen hairdressers who described asthma like symptoms agreed to undergo serial measurement of peak expiratory flow (PEF) at work and away from work for a period of three weeks. Control subjects (n=55) were office workers at our hospital and had similar sex, smoking habit, social and economic status.

Results: Our study population comprised 151 hairdressers (66% female) with a mean age of 23.6±8.67 yrs. Among hairdressers 20% defined cough. Other respiratory symptoms were 15% wheezing, 15% dyspnea, and 4% phlegm respectively. The mean FEV1 of the hairdressers was found to be significantly lower than the control group (p<0.01). There was a negative correlation between the FEV1 and time of exposure of etiologic agents (r =-0.69; p <0.001).

Conclusion: We found the serial PEF based prevalence of occupational asthma among hairdressers in our city as 7.3%. In addition, we observed a negative correlation between FEV1 and duration of exposure to etiological agents. These findings strongly suggest the importance of continuous medical surveillance in hairdressers. (Archives of Lung 2007; 8: 14-8)

Key words: Occupational asthma, hairdressers, pulmonary function tests

Özet

Amaç: Denizli ilindeki kuaförlerdeki astım prevalansını belirlemek ve sorumlulu etiyojik ajanların solunum fonksiyon testlerine (SFT) etkilerini araştırırak.


Bulgular: Çalışma populasyonundaki 151 kuaförden %66 si bayandi ve kuaförlerin ortalaması yaşları 23.6±8.67 idi. Kuaförlerin %20 si öksürük tarif etmektediydi. Diğer solunumsal semptomlar sırasıyla %15 hırtılı, %15 dispne, ve %4 balgam çıkarma idi. Kuaförlerin ortalaması FEV1 düzeyleri kontrol grubunda anlamli düzeyde düştüğü (p<0.01). Etiyojik ajanlara maruziyet ile FEV1 düzeyleri arasında negatif bir korelasyon mevcuttu (r =-0.69; p <0.001).

Sonuç: Kuaförlerde seri PEF ölçümlerine dayalı mesleki astım prevalansı %7.3 olarak saptadık. Olgularında FEF25-75 ve etiyojik ajanlara maruziyet Süreleri arasında bir negatif korelasyon da bulunmamaktaydı. Bu bulgular bize mesleki astım açısından kuaförlerde seri tibbi kontrollerin yapılması gerekliliğini vurgulamaktadır. (Akciğer Arşivi 2007; 8: 14-8)

Anahtar Kelimeler: Mesleki astım, kuaförler, solunum fonksiyon testleri

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Introduction

Occupational asthma (OA) is defined as asthma causally and specifically related to exposure to inhaled chemical, physical, and microbiological agents in the form of dust, fumes, gases, and vapours (1). Many occupations have been reported as a risk factor for asthma, including hairdressers (2-5). Hairdressers are exposed to several reactive agents with potentially irritant and sensitizing effects on the airways (6). Some of the frequently used irritant and allergic chemicals in hairdressing include persulphates (S2O8), reactive dyes, epilating substances, formaldehyde, latex, cosmetic agents, henna, hair creams and gels (2). These agents produce type I and type IV hypersensitivity reactions and provoke asthma, however, the molecular mechanism is still not clear (2,4,5,7-9). Among these possible etiological agents in hairdressers’ asthma, the main focus has been on persulphates used in bleaching powder. While some studies showed a higher risk of occupational asthma with frequent use of these etiological agents compared to infrequent use (2,10,11), the others couldn’t define this relation (12). Few asthma studies have been published from developing countries, where occupational factors are distinct from industrialized countries. There is only one study from Turkey which defines questionnaire-based prevalence of asthma among hairdressers (2).

We planned this study to define asthma prevalence among hairdressers depending on pulmonary function tests (PFTs) and peak expiratory flow (PEF) follow-up results. We also aimed to determine the effect of time of exposure to etiological agents on PFTs.

Method

This study was conducted at the city of Denizli, located in western Turkey. All subjects were volunteers who gave informed written consent to their participation in the study. The study was approved by the Institutional Review Board.

Data were collected from 27 salons, including 151 hairdressers. In terms of avoiding collection bias, all data, including questionnaires, were collected by two experienced pulmonologists. Demographic data, allergic and respiratory symptoms, duration of symptoms, duration of exposure to etiological agents, relation of symptoms to work, health history including allergic status and smoking habit, were collected by a questionnaire modified from American Thoracic Society Questionnaire (13). The questionnaire was administered in a person to person interview.

Pulmonary function tests were performed to 31 hairdressers who defined respiratory symptoms. PFTs were conducted according to American Thoracic Society criteria (14), while the patients were at rest and seated in the upright position with a portable spirometer (MIR Spirobank). The forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), and forced expiratory flow at 25% to 75% of the FVC (FEF25-75) were determined. Fifteen hairdressers who described asthma like symptoms agreed to undergo serial measurement of peak expiratory flow (PEF) at work and away from work for a period of three weeks.

A detailed smoking history was obtained from each hairdresser and control subject. Smoking status was defined as never-smoker, former-smoker, and current-smoker. A never-smoker was defined as one who had never smoked before or smoked less than 100 cigarettes in his/her lifetime and was not a current-smoker (15). A former-smoker was defined as one who had previously smoked more than 100 cigarettes in his/her lifetime and had quit smoking more than 1 year before diagnosis. Smokers who claimed to have quit within the year before diagnosis were classified as current-smokers because their ability to sustain prolonged abstinence from smoking was in question.

Hairdressers who reported work related asthma symptoms and PEF variability which was higher than 20% during work days and improved during weekend or holidays were diagnosed as occupational asthma. Control subjects (n=55) were office workers at our hospital and had similar sex, smoking habit, social and economic status.

We used SPSS statistical software package version 10.1 (SPSS, Inc, Chicago IL). Student t test and Pearson Correlation were used to compare parametric values. Chi-square test was used to compare non-parametric values. A p value of < 0.05 defined statistical significance.

Results

Our study population comprised 151 hairdressers (66% female and 34% male) with a mean age of 23.6±8.67 yrs. The demographics of the hairdressers and the control group in Table 1. Control group comprised 55 office workers (67% female and 33% male) with a mean age of 29.8±8.7 yrs. Smoking habits of the hairdressers and control group are presented in Table 2.

Table 1. The demographics of the hairdressers and the control group

<table>
<thead>
<tr>
<th></th>
<th>Hairdressers (n=151)</th>
<th>Control group (n=55)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yr)</td>
<td>23.6±8.67</td>
<td>29.8±8.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>NS</td>
</tr>
<tr>
<td>Female (n)</td>
<td>100</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>Male (n)</td>
<td>51</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Smoking (pac-yrs)</td>
<td>5.75±7.95</td>
<td>7.5±6.5</td>
<td>NS</td>
</tr>
</tbody>
</table>

*NS: Not Significant, p>0.05
Among hairdressers 20% defined cough. Other respiratory symptoms were 15% wheezing, 15% dyspnea, and 4% phlegm respectively. These symptoms were not significantly different between the study and the control group. The respiratory and allergic symptoms among the hairdressers and the control group are presented in Table 3. Hairdressers had been employed for a mean of 126.38 ± 92.2 (range; 6-516) months. Sixty-one (40%) hairdressers’ respiratory and allergic complaints were started after they had begun to practice their job. The latency period was 50.8 months. Fifty-five (90%) of these hairdressers defined decreasing of their complaints when they were away from work. Six cases (4%) was diagnosed as asthma by a chest physician before. In the study population; 10 cases (7%) was diagnosed as having occupational disease; 8 (75%) contact dermatitis and 2 (25%) occupational asthma. According to questionnaires, 41 (27%) hairdressers had had contact dermatitis and 26 (17%) had allergic rhinitis. Family history of asthma was defined at 18 (11.9%) hairdressers and family history of allergic rhinitis was defined at 6 (4%) hairdressers.

PFTs were performed to 31 hairdressers who defined respiratory symptoms. The results of the PFTs of the hairdressers and control group are presented in Table 4. Despite the control group had older ages than the hairdressers, the mean FEV1 of the hairdressers was found to be significantly lower than the control group (p<0.01). There was a negative correlation between the FEF25-75 and time of exposure of etiologic agents (r = -0.69; p < 0.001).

Of the fifteen hairdressers, nine defined PEF variability higher than 20% during work days and was improving during weekend or holidays. With 2 other hairdressers already diagnosed as having occupational asthma we may conclude that PEF follow-up based occupational asthma prevalence among hairdressers at the city of Denizli is 7.3%.

**Discussion**

We found the serial PEF based prevalence of occupational asthma among hairdressers in Turkey as 7.3%. Questionnaire-based allergic rhinitis and contact dermatitis prevalence among hairdressers were 17% and 27%, respectively. The mean FEV1 of the hairdressers who defined respiratory symptoms was found to be significantly lower than the control group. Interestingly, there was a negative correlation between the FEF25-75 and time of exposure of etiologic agents.

Asthma acquired in the workplace is a diagnosis that is frequently missed unless the health care professional is aware of the possibility. The diagnosis requires a defined occupational history, especially in relation to exposure to sensitizing agents; absence of asthma symptoms before beginning employment; and a documented relationship between development of symptoms at the workplace and reduction of these on withdrawal from the workplace. A confirmation of occupational asthma may be successfully achieved by lung function measurement, such as serial measurement of PEF at work and away from work (16). The prevalence of occupational asthma among hairdressers was reported between 4.5% and 22% depending on the used methodology (2-4,17). In our study, we found serial PEF-based occupational asthma prevalence as 7.3%. We know that in our
city asthma prevalence amongst adults older than 15 years is 2.71% (18). According to these data, the asthma prevalence in hairdressers was more than twice that in the general population in Denizli.

Chemical agents such as persulphates, other bleaching agents, and dyes have been found responsible as etiological risk factors for occupational asthma among hairdressers (7,8,19,20). However, while some studies have shown a higher risk of occupational asthma with frequent use of these etiological agents compared to infrequent use (2,10,11), the others couldn’t define this relation (12). In our study, we showed a negative correlation between the FEF25-75 and duration of exposure to etiological agents. Small airways are involved in the pathogenesis of asthma (21). FEF25-75 might be considered as a measure of the caliber concerning distal airways, particularly in the general population. Thus FEF25-75 may be envisaged as a marker of initial bronchial impairment and occupational asthma with frequent use of these etiological agents.

Conclusion

Hairdressers are at high risk of occupational asthma. We found the serial PEF based prevalence of occupational asthma among hairdressers in our city as 7.3%. In addition, we observed a negative correlation between FEF25-75 and duration of exposure to etiological agents. These findings strongly suggest the importance of continuous medical surveillance in hairdressers.

References


