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Pulmonary Function Tests in Hairdressers

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Abstract

Introduction: Health of a person is largely affected by the environment in which they work, thus making occupation an important determinant of health. Hairdressing is a widespread occupation. Hairdressers are typically exposed to a cocktail of chemicals.

Aims and Objectives: To assess pulmonary functions among hairdressers and to compare them with matched control group.

Materials and Method: In this study pulmonary functions such as FVC, FEV_1, FEV_1/FVC, MMEF and PEFR parameters were studied in 52 hairdressers in the age group of 25-45 years. These parameters were compared with matched control group selected from general office going population using unpaired 't' test.

Results The present study shows that among hairdressers and controls, hairdressers have statistically significant low values of forced vital capacity (FVC) (P=0.0215), Forced expiratory volume in first second (FEV_1) (P=0.0135), FEV_1/FVC (P=0.0001), Maximum Mid Expiratory Flow Rate (MMEF) (P=0.0212) and Peak Expiratory Flow Rate (PEFR) (P=0.0034).

Conclusion: In the current study we identified the impact of hairdresser's job on their pulmonary functions and found significantly lower PFT parameters in hairdressers than in the general office going population. This reduction in pulmonary function can be detected with spirometry before pulmonary functions are grossly impaired.

Keywords: Hairdressers; FEV1; FVC; MMEF; PEFR; Pulmonary Function Tests

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Introduction

The nature of some jobs and the related exposures predispose certain groups of workers to considerably larger risk of developing occupational lung diseases. Workers in a hairdressing salon are periodically exposed to various chemicals in permanent oils, hair dyes, and hair lacquers capable of producing respiratory symptoms.[1-3] Potential health hazards in occupational environment of hairdressers, including biological, chemical, physical, and ergonomic factors, have a negative impact on individual's health.[2]

An association between the occupational exposure of hairdressers and chronic bronchitis, asthma, asthma-like symptoms, allergy, and other respiratory illnesses were observed in several studies.[4-7] Workplace exposure to various chemicals, which may be absorbed or inhaled, can affect airways directly or cause bronchial mucosal inflammation in hairdressers.[8] Some studies conducted have shown low PFT parameters in hairdressers.[9-11] Some of the studies conducted have shown increased respiratory symptoms suggestive of asthma and chronic bronchitis in hairdressers.[12-14] In occupational respiratory diseases, spirometry is one of the most important diagnostic tools. It is the most widely and commonly used and most basic effort dependent lung function test and can measure the effects of obstruction or restriction on pulmonary function.[15]

Hairdressing is a common occupation and hairdressers are typically exposed to a cocktail of irritative and allergenic chemicals at work place. However there are limited studies conducted in India on pulmonary functions in this group of workers. Most studies on occupational health in India are done in industrial settings whereas very few studies have looked into occupational groups exposed to hairdressing atmosphere.

Therefore, present study was carried out to evaluate the pulmonary functional status in hairdresser and to compare the findings with normal healthy matched controls not exposed to hairdressing atmosphere.

Materials and Method

The present study was a comparative cross sectional study conducted in Bidar Institute of Medical Sciences, Bidar, Karnataka, India. Ethical committee approval was obtained from the ethical committee of BRIMS, Bidar where study was carried out. The participants were 52 non-smoking hairdressers who had been working in different salons of Bidar city for at least a period of 3 years.

A similar number of age and sex matched persons were randomly selected from office going general population as controls who were not occupationally exposed to hairdresser environment at work place. Strict inclusion criteria was followed which included - age group of 25 to 45 years, non-smokers. The informed consent was taken after the detailed procedure and purpose of the study was explained. A thorough

history taking & clinical examination was carried out and the vital data was recorded.

Various spirometric measurements were made on both control and study groups with a portable, computerized spirolyzer. The recordings were carried out between 10am-12noon. All the maneuvers were performed in sitting position. Thorough instructions were given to each subject regarding the test and sufficient time was provided to practice the maneuvers. A soft nose clip was put over the nose to occlude the nostrils and disposable mouthpieces were used to minimize cross infection.

Statistical Analysis: The data obtained were expressed as mean ± standard deviation and analyzed using the student unpaired t-test. A 'p' value less than 0.05 was considered to be statistically significant.

Results

The recorded anthropometric data in hairdressers and control groups did not show any statistical significance as shown in Table 1. The present study shows that among hairdressers and controls, hairdressers have statistically significant low values of forced vital capacity (FVC) (P=0.0215), Forced expiratory volume in first second (FEV_1) (P=0.0135), FEV_1/FVC (P=0.0001), Maximum Mid Expiratory Flow Rate (MMEF) (P=0.0212) and Peak Expiratory Flow Rate (PEFR) (P=0.0034) as shown in Table 2.

Table 1: Anthropometric Data

Parameters	Hairdressers Mean ± SD	Controls Mean ± SD	P value
Age(yr)	33.28 ± 3.20	34.23 ± 4.16	P=0.1947
Height(cm)	166.31 ± 2.32	166.23 ± 2.25	P=0.8587
Weight(kg)	67.32 ± 4.34	68.27 ± 32.22	P=0.8335
BMI (kg/m^2)	24.34± 32.24	24.71± 24.35	P=0.9475

Table 2: Pulmonary Function Parameters of Hairdressers and controls

Parameters (Ltrs)	Hairdressers Mean ± SD	Controls Mean ± SD	P value
FVC(L)	2.70 ± 1.02	3.32 ± 1.62	P=0.0215
FEV_1(L/sec)	2.04±1.61	2.63±0.52	P=0.0135
FEV_1/FVC (%)	75.55 ± 3.20	79.21 ± 2.21	P=0.0001
PEFR(L/sec)	6.33 ± 2.65	7.54 ± 1.21	P=0.0034
MMEF (L/sec)	2.44+1.43	3.12+1.53	P=0.0212

Discussion

The nature of some jobs and the related exposures predispose certain groups of workers to considerably larger risk of developing occupational lung diseases. Health of a person is largely affected by the environment in which they work, thus making occupation an important determinant of health. Occupational hazards cause early deaths to millions of people worldwide and also result in avoidable morbidity that adversely affect the quality of life.

Hairdressers are exposed on a daily basis to harmful chemicals in their working environment liable to cause bronchoconstriction and airway obstruction. The prevalence of asthma and other respiratory illnesses and symptoms in populations varies widely according to environmental factors, with occupational exposures being among the most important.[16]

Our study clearly shows that among hairdressers and controls, hairdressers have statistically significant low values of forced vital capacity (FVC) (P=0.0215), Forced expiratory volume in first second (FEV_1) (P=0.0135), FEV_1/FVC (P=0.0001), Maximum Mid Expiratory Flow Rate (MMEF) (P=0.0212) and Peak Expiratory Flow Rate (PEFR) (P=0.0034).

We observed significantly low FVC and FEV_1 values in hairdressers as compared to control group. This might be due to chronic irritation of lungs by harmful chemicals. Hairdressing products emit chemicals in both gaseous and aerosol form and are inhaled by hairdressers.[9] FEV_1 values which denote strength of expiratory muscles were also reduced in the study group than controls possibly due to obstruction of air ways during expiration. Palmer et al, observed low FVC and FEV_1 values in hairdressers working in small salons.[12]

A better indicator of the condition of the bronchial musculature FEV_1/FVC was also reduced significantly in hairdressers than controls. It indicates that they suffer from combined obstructive and restrictive type of pulmonary disorder. These findings are in agreement with findings of other investigators.[9-15]

Peak expiratory flow rate (PEFR) was significantly decreased in case of study group than controls. The PEFR is an effort dependent parameter emerging from the large airways within about 100–120 ms of the start of the forced expiration[17-18] thus indicates the capacity of expiratory muscles. In this study the low PEFR values denote presence of some obstruction during expiration. This is in agreement with the findings of other investigators.[2,19]

Reduced pulmonary parameters in hairdressers compared to control group signify the harmful effect of exposure to a cocktail of irritative and allergenic chemicals at work place. From this study the exact cause of decreased pulmonary function due to inhalation of irritative and allergenic chemicals is not clear. But some studies conducted show that hairdressers are extensively exposed to low air

concentrations of numerous chemicals in cosmetic products that may cause bronchoconstriction and airway obstruction.[15] Increased prevalence of upper and lower respiratory symptoms[17-18,4] and occupational asthma.[19] Studies conducted by Adeyeye O.O et al, in female hairdressers have shown reduced pulmonary parameters in hairdressers compared to control group.[20] It has also been shown that hairdressing work is associated with increased occurrence of different health problems.[21-22]

Conclusion

The present study shows decline in pulmonary function parameters in hairdressers than controls as hairdressers in present study were non-smokers. Many of the hairdressers lack adequate knowledge on the hazards of their occupation. Adequate attention should be given to appropriate education about potential hazards and preventive strategies in this group of workers. Pulmonary function testing identify the susceptible workers and periodic monitoring can detect early signs of pulmonary dysfunctions and preventive measures like use of appropriate and personal protective equipment's could be used.

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