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SHORT REPORT

Respiratory function and chemical exposures among female hairdressers in Palestine

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Background	Hairdressers are exposed to chemicals and work tasks that may cause respiratory symptoms. There is little awareness of occupational health among hairdressing salons in Palestine.
Aims	To characterize respiratory symptoms, lung function, and knowledge of exposure to hazards among female Palestinian hairdressers.
Methods	Cross-sectional study of female hairdressers and controls of female university students and staff. Working history and respiratory symptoms were collected using questionnaire. Lung function was measured. Working conditions were characterized in salons.
Results	A total of 170 hairdressers from 56 salons and 170 controls participated. Nineteen per cent of the hairdressers reported wheezing versus 11% in the control group. The mean forced vital capacity was 3.31 l compared with 3.42 l for controls. Adjusting for age and height, there was a forced expiratory volume in 1 s reduction of 0.093 l (95% confidence interval (CI) = 0.06–0.15) comparing hairdressers with controls. A small number of hairdressers used respiratory protective equipment, and satisfactory ventilation in salons were lacking.
Conclusions	Female hairdressers had higher prevalence of reported asthma and respiratory symptoms than the controls, but these differences reduced markedly when adjusted for age, height, weight and years of education. They had lower lung function measurements than the control group. Increasing the awareness of occupational health hazards and improving the work conditions for the hairdressers in Palestine is needed. Possible bias could be present as hairdressers might have over reported symptoms or lung function measurements might be affected by differences in socioeconomic status between the two groups.
Key words	Asthma; hairdressing; lung function test; occupational exposures; occupational health; respiratory signs and symptoms.

Introduction

Hairdressers are exposed to potentially hazardous chemicals used during hair styling and care techniques such as hair dying, bleaching, curling, cutting and other methods [1]. These substances may have irritant and sensitizing effects on the airways [2].

The major respiratory problems and symptoms among hairdressers, reported in previous studies are chronic bronchitis [3], rhinitis [4], cough and phlegm [2], and many studies focused on occupational asthma [3–5].

In a study from Finland [2], the prevalence of chronic bronchitis was 6.8% in hairdressers versus 1.9% in saleswomen. The prevalence of occupational asthma among hairdressers in a study from Turkey [5] was 14.6%, which was more than twice that of the general population [5].

Most research on exposure to chemicals among hairdressers was conducted in developed countries [2,3,6], while few studies were conducted in developing countries [5,7]. No studies on occupational health among hairdressers have so far, to our knowledge, been conducted in the Middle East.

This study aimed to assess respiratory symptoms and lung function among female hairdressers in Hebron City, Palestine. In addition, we aimed to describe work conditions in hairdressing salons including the use of personal protective equipment and the quality of ventilation systems.

Methods

A cross-sectional study was carried out of hairdressers selected systematically from all female hairdressers in Hebron in 2008. Smokers were excluded. For the control group, a sample of volunteer female students (160) and staff (40) from Hebron University was collected. All participants answered a questionnaire and performed lung function test.

Ethical consent was obtained from the Norwegian regional ethical committee. The subjects voluntarily participated in the study and signed a written informed consent.

A modified version of a standardized questionnaire from the American Thoracic Society [8] was used for respiratory symptom questions. Descriptive data were included in the questionnaire.

A lung function test (LFT) was performed by all subjects using a PC spirometer according to American Thoracic Society/European Respiratory Standards guidelines [9]. Participants were given instructions on the forced maximal expiratory manoeuvres. The LFT included peak expiratory flow rate, forced vital capacity (FVC), forced expiratory volume in 1 s (FEV_1), $FEF_{25-75\%}$ and the expiratory flow rate at 75% of FVC ($FEF_{75\%}$).

A checklist was used to record the working conditions in each hairdressing salon, including presence and type of ventilation and presence of personal protective equipment.

The Statistical Package for Social Sciences was used for data entry and statistical analyses.

Results

Of the 200 hairdressers selected, 20 refused to participate and 10 were excluded (three were smokers), giving a participation rate of 85%. For the control group, 170 out of 200 participated. All 340 participants answered the questionnaire and performed lung function test.

The mean age for the hairdressers was 28 years and 25 years for the controls, the mean height was 160 cm for the hairdressers and 162 cm for the controls, and the mean weight was 62 kg for the hairdressers and 59 kg for the controls. The mean level of education was 11 years for the hairdressers and 15 years for the controls (standard deviation (SD) = 1.9).

Hairdressers had more adverse respiratory symptoms than the controls, but this was not significant when adjusted for age, height, weight and years of education. The prevalence of doctor-diagnosed asthma among the hairdressers was 5.9%, while that of controls was 0.6%, odds ratio (OR) 11.17 (95% CI = 0.94–133.6; Table 1).

Table 2 shows that the lung function measurements that include flow rates were consistently lower for the hairdressers compared with the control group.

The mean number of workers in a salon was 5, ranging from 1 to 18 workers. Altogether 43 (77%) of the salons had a ventilation system, while only 13 (23%) salons had no mechanical ventilation at all. The ventilation method included windows (84%), air conditioning (14%) and small openings, such as holes in the walls (2%). Some personal protective equipment was present in 45 salons (80%) but only four salons (7%) provided masks and goggles.

Discussion

In this cross-sectional study of Palestinian female hairdressers, we found a higher prevalence of respiratory symptoms than in the control group, but these differences reduced markedly when adjusted for age, height, weight and years of education. The hairdressers had a statistically significant lower FVC, FEV1 and flow rates than the control group even after adjustment. Presence of respiratory protective equipment was almost completely lacking in the salons and the mechanical ventilation systems were not satisfactory.

This study has described working conditions and possible health problems among female hairdressers with a high participation rate (85%). Having a group of non-smoking women of both hairdressers and controls made the control for one important risk factor for respiratory ill-health unnecessary.

The control group of female university students and staff was similar to the hairdressers group in age, height and weight, but it was different in levels of education, possibly in socioeconomic status. The latter might affect lung function measurements, so we adjusted the lung function measurements for years of education.

The prevalence of respiratory symptoms we found was similar to that found in Turkey [5] and different from some European studies, such as Norway [6] and Finland [2]. Differences may be real or due to different diagnostic tools across studies.

We found an asthma prevalence of 5.9% among hairdressers, which is lower compared with a study of male hairdressers from Turkey [5] but more than that reported in the New Zealand study [3].

Table 1. Selected respiratory symptoms and doctor-diagnosed asthma in 170 female hairdressers compared with 170 controls in Hebron city, 2008

Symptom	Hairdressers, *n* (%)	Controls, *n* (%)	Crude		Adjusted[a]	
			OR	95% CI	OR	95% CI
Wheezing or whistling in the chest, in the last 12 months	32 (19)	19 (11)	1.84	0.99–3.40	1.15	0.49–2.66
Morning chest tightness, in the last 12 months	53 (31)	42 (25)	1.38	0.86–2.22	0.94	0.48–1.86
Shortness of breath during the last 12 months	42 (25)	40 (23)	1.07	0.65–1.75	0.80	0.39–1.64
Cough in the morning	29 (17)	13 (8)	2.48	1.24–4.97	1.92	0.75–4.93
Chest phlegm in the morning	37 (22)	24 (14)	1.69	0.96–2.98	1.80	0.80–4.07
Asthma (ever)	10 (5.9)	1 (0.6)	10.60	1.34–83.5	11.17	0.94–133.6

[a]Adjusted for age, height, weight and years of education.

Table 2. Means and adjusted differences in lung function parameters between 170 female hairdressers and 170 female controls in Hebron city, 2008

Measurement	Hairdressers		Control		Adjusted decrease (l)[a]	
	Mean	SD	Mean	SD	Coefficient	95% CI
FVC (l)	3.31	0.6	3.42	0.5	0.049	0.098–0.195
FEV1 (l)	2.74	0.4	2.95	0.4	0.043	0.060–0.146
PEF (l/s)	5.61	1.2	5.97	1.5	0.115	0.275–0.506
$FEF_{25–75\%}$ (l/s)	3.03	0.9	3.72	1.1	0.309	0.072–0.666
$FEF_{75\%}$ (l/s)	1.49	0.7	2.03	0.8	0.351	0.137–0.565

PEF, peak expiratory flow rate.
[a]Adjusted for age, height, weight and years of education.

Personal protective equipment was found in most of the salons but very few provided masks or goggles. Few salons in our sample had air conditioning or proper mechanical ventilation beyond windows. Hairdressing salons should have mechanical ventilation to reduce exposure to hazardous substances throughout the salon [10].

As far as the authors know, this is the first occupational health study on female hairdressers in Palestine. Taking into consideration the possibilities for bias in this study, we conclude that hairdressers are exposed to harmful chemicals at their workplaces, they have reduced lung function compared with controls and the use of personal protective equipment and ventilation is not satisfactory.

Follow-up studies would be useful to get a clearer picture about the effect of chemical exposure and its effect on health. Further research, measuring individual exposure levels, should be done. Increasing the awareness among hairdressers is of vital importance. This could be achieved by the formulation of work and safety guidelines, including informative workshops, for this group of workers.

Key points

- As far as the authors know, this is the first occupational health study on female hairdressers in Palestine, which may contribute to increase such knowledge in a developing country.
- The cross-sectional study found a higher prevalence of respiratory symptoms and lower lung function measurements in hairdressers compared with the control group.
- The hairdressers rarely used respiratory protective equipment and the salons had insufficient ventilation.

Conflicts of interest

None declared.

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