MUSCULOSKELETAL HEALTH OF HAIRDRESSERS

Background

Musculoskeletal disorders (MSDs) remain the most common work-related health problem in the EU, and workers in all sectors and occupations are affected. Apart from the effects on workers themselves, MSDs lead to high costs to enterprises and society as a whole.

It is in this context that in 2017 the European Agency for Safety and Health at Work (EU-OSHA) started a 4-year research project on work-related MSDs ([1]). The specific objectives of this project are the following:

- to encourage more and better-targeted policy instruments at EU and national levels by providing a better picture of the prevalence and costs of MSDs in Europe;
- to contribute to improving the prevention of MSDs, as well as the management of chronic MSDs in European workplaces, by raising awareness and by identifying and disseminating good practice among national authorities, employers and sector-level organisations in particular;
- to stimulate and support measures at national level among policy-makers and occupational safety and health (OSH) intermediaries designed to improve preventive action in the workplace through the identification and sharing of successful initiatives;
- to promote greater success in the sustainable reintegration of workers with MSDs by identifying successful schemes and workplace measures.

In the framework of this research project, some sectors — such as hairdressing — have been identified as top priority sectors because of the high prevalence of MSDs among its workers. A series of sector-specific articles focusing on MSDs has been developed with the aim of contributing to the better prevention of MSDs in the respective sectors by increasing awareness (and knowledge) about the specific MSD-related risk factors and their related preventive measures.

This article is a shortened version of the scoping review: *Musculoskeletal Health of Hairdressers – Protection of Occupational Health and Safety at workplace. Medical Reference Document* ([2]). This scoping review was carried out as part of the ErgoHair (https://www.ergohair.eu/) project. The studies systematically compiled during the review formed the scientific basis for the initiative. A full article on the topic is also published in the *Journal of Occupational Medicine and Toxicology*([3]).

The aim of the ErgoHair project was the 'development and promotion of a healthy and safe working environment through the design of ergonomic workplaces and work processes in the hairdressing sector'. The project builds on the European framework agreement on the protection of OSH in the hairdressing sector.

Introduction

Musculoskeletal disorders (MSDs) are common in the working age population and are conditions that affect bones, joints, muscles, tendons, ligaments or peripheral nerves [1]. MSDs are highly prevalent in manual-intensive occupations such as manufacturing, construction, or services [2-4]. Hairdressers are a group of workers whose working ability and state of health could be affected by specific work-related activities. Because of the nature of the job, hairdressers often work with their backs bent forwards or twisted (e.g. washing hair at the sink). Repetitive tasks, static postures and long periods of standing have been observed during all client-related activities [5]. The results of posture analysis revealed that

([1]) All the outputs of this research project are available at: https://osha.europa.eu/en/themes/musculoskeletal-disorders/eu-osha-research-activity-work-related-musculoskeletal-disorders

([2]) Available at: https://www.ergohair.eu/wp-content/uploads/ERGOHAIR-MEDICAL-REFERENCE-DOCUMENT-2019-ENG.pdf

([3]) Kozak A, Wirth T, Verhamme M, Nienhaus A. Musculoskeletal health, work-related risk factors and preventive measures in hairdressing: a scoping review. J Occup Med Toxicol 2019;14:24.

hairdressers spend a considerable amount of time with their arms elevated above shoulder level [6, 7]. This is considered a major risk factor for clinically verified shoulder disorders or persistent severe pain [8, 9]. In a study on the working conditions of Finnish hairdressers, the most hazardous factors for health were repetitive movements, awkward working postures, standing, uncomfortable temperatures and chemicals [10].

To understand the impact of working conditions on MSDs in this occupational group, it is necessary to assess the frequency of MSDs, disability or injury, potential risk factors for these health effects and effective preventive or rehabilitative measures. This is the first attempt to systematically map the activity, extent and nature of research on these aspects by synthesising empirical, measurement-based or interventional studies in hairdressing. Thus, the following question should be answered:

'What is known from the existing literature about the frequency of MSDs work-related risk factors and measures to prevent or reduce MSDs in hairdressers?'

For methodological purposes, the framework for a scoping review, as adopted by Arksey and O'Malley [11], was implemented. A detailed description of the methodology applied can be found in the original article.

Results

In total, 44 studies were included in the qualitative data synthesis. Of the eligible studies, 29 were conducted in European countries. Most of the studies included were published in peer-reviewed journals. In total, 19 studies provided data on MSD prevalence in at least one body site.

Frequency and burden of MSDs

The most frequently examined body regions were the lower back, neck, shoulder and hand/wrist. The prevalence values between the studies varied considerably. On average, the highest 12-month MSD prevalence was reported for the lower back (range 13-76 %), neck (range 9-58 %), shoulder (range 28-60 %) and hand/wrist (range 11-53 %). A study from France examined trends in hairdressers' compensation claims for the years 2010-2016. Permanent incapacity (incidence rate 2/1,000) and the number of lost workdays increased significantly by 16 % during the study period. In total 666,461 days were lost because of work-related MSDs [12].

Comparison with other professions regarding MSD prevalence

A national German health survey provided representative data for back pain prevalence by occupation. Hairstylists/beauticians were among the top five professions with above average prevalence for back pain (1-year prevalence: 70 %) [13]. According to the US National Health Interview Survey on back pain, female hairdressers belong to the top six high-risk occupations for back pain [14]. Compared with non-hairdressing controls, hairdressers reported significantly higher levels of MSDs, including shoulder, hand/wrist, upper back or lower back pain [15, 16].

Carpal tunnel syndrome in hairdressers

Surveillance data on carpal tunnel syndrome (CTS) from France showed that a substantial proportion of new CTS cases (2002-2004) among female hairdressers were attributable to work. Thus, they belong to the top 10 high-risk occupations for CTS [17]. Another study from Turkey showed that hairdressers had higher CTS prevalence compared with a group of unemployed individuals. They also showed significantly higher pain intensity and functional loss levels. Hairdressers who were diagnosed with CTS had worked significantly longer in their profession than those hairdressers without CTS [18].

Employment status and MSDs

A study from France analysed data from occupational health examinations of self-employed and wage-earning hairdressers. The risk of musculoskeletal injuries was significantly higher among the self-employed (67 % vs 30 %) [19].

Health reasons for leaving the hairdressing trade

In a Finnish study the risks of leaving the profession were assessed among female hairdressers compared with workers engaged in commercial work. The relative risk (RR) of leaving the profession among hairdressers was significantly increased by a repetitive strain injury of the wrist and elbow (RR 2.7) and by diseases of the neck or shoulders (RR 1.7) [20]. Two other studies from Denmark examined the health reasons for leaving the job. Among all former hairdressers the primary health complaints causing them to leave their jobs were musculoskeletal pain (42 %) and hand eczema (23 %) [21]. During a 3-year follow-up study, 22 % of hairdressing apprentices had left the trade, 70 % of them due to health complaints. The most frequently reported reasons were musculoskeletal pain (47 %) skin diseases (42 %) and respiratory symptoms (24 %) [22].

Work-related risk factors for MSDs

Fifteen studies examined potential risk factors for work-related MSD in hairdressers relying on self-rating or statistical estimation. The reported risk factors were synthesised into the following six main categories:

1. strenuous hand or arm postures and movements (e.g. arms above shoulder, repetition);
2. awkward postures and movements of the spine (e.g. bending and twisting the back);
3. workload and biomechanical strain (e.g. mechanical workload, overtime, no breaks);
4. prolonged standing and sitting;
5. other factors (e.g. work experience, mental stress, burnout, low support, gender);
6. specific hairdressing tasks (e.g. cutting, styling or dying hair).

Comparisons with other professions regarding work-related risk factors

In Norway, an observational study was carried out on a young cohort of students from technical schools entering working life. After 2.5 years of follow-up, student hairdressers showed higher pain levels in the neck-shoulder region compared with the other students. Concurrently, they showed the highest sustained muscle activity (median 52 %) of the total working day compared with electricians (33 %) or various other jobs (27 %). The relative time of sustained muscle activity correlated with pain in the upper body [23]. Compared with other female students, hairdressers spent significantly longer times with their arms elevated arms over 60° (11 % vs 1 %) and over 90° (2 % vs 0.4 %). For every additional unit increase in arm elevation, an estimated 28 % increase in shoulder pain was found [24]. Over the course of 6.5 years the moderate/severe pain for female students (majority of hairdressers) increased significantly. Mechanical workload and perceived muscle tension were identified as risk factors for neck and shoulder pain in female students [25].

Potentially hazardous work activities, movements and postures

In the following section, studies are presented that examined hairdressing activities and/or the corresponding body postures and movements. According to work monitoring studies, all principal hairdressing activities performed for at least 50 % of the working day exhibited intermediate to high risk for work-related upper limb disorders [26]. Nearly two thirds of all postures studied could be classified as high-risk postures for work-related MSDs [27]. A high proportion of time with the spine bent forwards was recorded during cutting (66 %), washing (62 %) and dying (36 %). All daily hairdressing activities led to highly repetitive actions in the upper extremities. The risk reference values for high repetition in

the shoulder, elbow and hand were significantly exceeded, particularly when using a round brush to straighten hair (e.g. right hand 50 reps/min) [28].

Straightening curly hair can take up to an hour and this task also requires high mechanical load on the neck and spine [29]. Moreover, the upper limbs are stressed from repetitive movements in protracted extended positions. Repeatedly using the wrist and elbow as well as working in static positions are predominantly triggered by tasks such as blow-drying and cutting, which comprise up to 82 % of the working day [30]. Other studies using objective measurements to assess the mechanical exposure of wrist movements and arm postures confirm that working with high force exertion and wrist velocity as well as elevated arms may account for the greater rate of hand/wrist pain in hairdressers [6, 7, 31]. A lack of sufficient uninterrupted breaks contributed to the strain experienced by hairdressers [30].

While washing and cutting hair, hairdressers often had to bend forward or twist their spines and work in prolonged static postures. This poor posture was often combined with a hunched back. Those who used a rolling stool often showed a strongly inclined lower back and had to raise their hands more often above shoulder level [5].

Work-related preventive measures

To assess the effect of an exercise programme targeted to the neck and lower back, a 6-week intervention study was conducted [32]. The intervention group received the exercise programme in combination with an ergonomics brochure; the control group received only the brochure. After the intervention, no significant differences were found in pain intensity or level of disability between the two groups. Another study [6] examined the effect of a short-term intervention, including five recommendations on working techniques to reduce neck and shoulder workload. The control group received a brochure with corresponding illustrations. There was no effect on muscular load, velocity of arm movements or neck and shoulder complaints. However, only time spent with highly elevated upper arm postures was reduced. In a further study, young trainees were provided with an education programme on the prevention of risks related to skin, respiratory or upper limb disorders. Two years after the beginning of the school training their knowledge on risks and symptoms and adoption of preventive measures was reassessed. Positive effects on their knowledge of preventive measures and work-related dermatitis were observed. However, the rates for lower back pain (9-36 %) and shoulder or elbow pain (3-15 %) increased significantly over the 2 years [33].

Work-related rehabilitative measures

Three studies from Finland evaluated the effectiveness of occupationally oriented medical rehabilitation courses on changes in working techniques, subjective well-being, physical and muscular capacity, frequency of MSDs, perceived work ability and redesign of workplaces [34-36]. The courses were addressed to hairdressers and other occupations with a history of chronic neck-shoulder or back pain. After the rehabilitation courses, hairdressers reported significant reductions in subjective physical and mental strain, neck-shoulder and back pain as well as visits to the doctor due to MSDs [34, 35]. According to objective data, the static, dynamic and peak muscle load decreased significantly. Correspondingly, the overall pain intensity decreased from 5.0 to 2.6 points on a visual analogue scale [36]. When asked for subjective reasons for the decrease in strain the following aspects were mentioned: use of new working techniques, frequent use of a chair, use of exercise breaks, increased physical fitness and new ability to relax during work [34].

Strategies and barriers to reducing or preventing MSDs in hairdressers

In an interview study, hairdressers reported that they made individual changes in working techniques and use of products or physical training to alleviate some symptoms. However, they often failed to take further steps because of a lack of knowledge or because of the salon's financial and organisational situation. At the beginning of their careers, hairdressers put more effort into training and applying acquired skills; preventive work techniques were of secondary importance. The practice of good work

routines depended on factors such as colleagues, personal knowledge or existing symptoms. Hairdressers' awareness of the preventive work gained in importance when they started a business of their own [37]. More than half of the hairdressers reported that they continue to work while suffering health problems, as they are not able to take time off from work (36 %), have a manageable disease (30 %) or because they are self-employed (21 %) [15].

Conclusions

Potentially harmful task: styling and blow-drying hair

While styling and drying hair with a round brush, high values for repetition have been measured that exceed thresholds [28, 30]. Combined with awkward postures and high peak loads, static stress on the muscles can occur [7, 26, 28]. Mechanical stress, muscular tension and working at shoulder height have been identified as risk factors for pain in the shoulders and neck [24, 25]. There is a moderate amount of evidence for an association between shoulder diseases and hand-arm elevation (odds ratio, OR 1.9), shoulder load (OR 2.0), as well as slight evidence for hand force exertion (OR 1.5) [38]. The combination of repetition and low force exertion typically leads to a moderate increase in the risk of MSDs. With high force exertion, the risk is greatly increased [39].

Potentially harmful task: cutting hair

Much of the working day is taken up with cutting hair. During this procedure, the wrist is permanently held in a non-neutral position while the scissors and comb are grasped precisely [31]. Not only are the upper extremities stressed but also the lower back and neck. In comparison with other activities, cutting hair involves relatively long periods (> 4 seconds) of static bending of the trunk and front or rear inclination [28]. Incorrect use of stools increases abnormal straightening of the lower back and can lead to additional structural stress. Hairdressers who work when seated tend to lift their arms higher than when working in the standing position [5].

Potentially harmful aspect of work organisation: lack of breaks

Another important factor is the possibility of taking a break between stressful activities, as this can prevent or alleviate micro-injuries [39]. However, the studies available show that the physical loads during normal hairdressing work exceed tolerance thresholds and that regular breaks are rarely respected [30, 33, 40, 41]. The probability of tissue damage increases with the frequency and duration of biomechanical exposure [42].

The data presented indicate that MSDs occur frequently. In comparison with other occupational groups, hairdressers are frequently exposed to manual and static physical stress. Several studies point out that MSDs can even occur in the first years at work. There is a greater chance that hairdressers will leave their profession earlier in their career mainly for health reasons. Hence, this occupational group could benefit from preventive structural, operational and educational measures. However, only a limited number of intervention studies with inconclusive results are available to provide some options for reliable action. The few studies from rehabilitation research indicate that behavioural measures, such as instruction in healthy ergonomic procedures and physical exercises, may improve physical fitness, muscle strength and ergonomic working techniques. Moreover, we need to investigate whether measures at an organisational level, such as taking regular breaks, less overtime, mutual psychosocial support and the provision of ergonomic salon equipment, may have an impact on hairdressers' health and job satisfaction. If these measures are introduced early in training or in self-employment, they could probably lead to a sustainable decrease in occupational risks and an improvement in health.

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Authors: Dr Agnessa Kozak, Tanja Wirth and Prof. Albert Nienhaus, Competence Centre for Epidemiology and Health Services Research for Healthcare Professionals (CVcare), University Medical Centre Hamburg-Eppendorf, Germany; Miet Verhamme, Unie van Belgische Kappers vzw, Belgium.

Project management Lorenzo Munar, European Agency for Safety and Health at Work (EU-OSHA).

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