OCCUPATIONAL SKIN DISEASE IN HAIRDRESSERS AND BARBERS

Hairdressers and barbers have been identified as one of the occupational categories with the highest incidence of occupational skin disease in the UK, according to HSE statistics. Consequently, this occupational category has been selected as a priority area for intervention within HSE's Skin Disease Project, which in turn forms part of the Disease Reduction Programme.

This document summarises what is currently known about the nature and scale of occupational skin disease amongst hairdressers and barbers and gives a brief overview of the characteristics of the industry; it reviews the available evidence for the causes of skin disase in this occupational sector; and finally, lays out some of the interventions that have been tried for this sector in two other EU countries, and their success, to the extent that the interventions have been evaluated.

Most of the data that have been used to inform this work relate to hairdressers, and there is little or no information on barbers as a separate occupational group. However, given that there are many similarities between these two occupations, information on hairdressers will be assumed to be relevant to barbers. In this context, the terms 'hairdressers' and 'hairdressing' will be used to cover both hairdressers and barbers.

1. NATURE AND SCALE OF THE PROBLEM AND CHARACTERISTICS OF THE INDUSTRY

Nature of the problem

Definitions of occupational skin disease

In hairdressers and barbers, the main type of occupational skin disease reported is occupational contact dermatitis (OCD). By definition, OCD is caused by work and in its more severe forms is characterised by red, rough, sore and sometimes itchy skin of the affected area. The condition is also known as eczema. OCD can be further subdivided into irritant contact dermatitis (ICD) or allergic contact dermatitis (ACD). ICD can be caused by a single or small number of exposures to a strong irritant (acute ICD) or by more frequent exposures to a weaker irritant (cumulative ICD), as a result of progressive damage to the skin. ACD involves a delayed immune response to certain chemicals, generally those of a reactive nature. Exposure to such chemicals may induce a sensitised state, whereby subsequent re-exposure can elicit a skin reaction.

It has been reported that up to 70% of hairdressers will get some form of skin damage (English, 2004), either ICD or ACD. The areas most likely to be affected are the hands and fingers, but other areas such as the arms, face and neck may also be involved.

The role of pre-existing skin conditions in the development of occupational skin disease in hairdressers

Two of the most commonly studied areas are atopy and sensitivity to nickel (Lee and Nixon, 2001).

Atopic dermatitis

Atopic dermatitis can be defined as a genetic predisposition to developing hypersensitivity skin reactions. It has been stated that certain jobs cause skin problems for people with atopic

dermatitis (Coenraads and Diepgen, 1998) and there is some agreement that atopic dermatitis may increase the likelihood of developing OCD – possibly with the development of ICD initially and ACD subsequently (Nethercott *et al*, 1986; Lee and Nixon, 2001; Saunders *et al*, 2003). However, the evidence is not conclusive. For example, in a large scale German study, a considerable proportion of atopic hairdressing trainees studied over three years did not develop skin changes during the study period (Uter *et al*, 1999).

Overall the role of atopy in the development of OCD is unclear, although it may well be a risk factor. However, by early identification of those at risk, there may be the potential to provide education and counselling regarding the risks of developing ICD and ACD so that appropriate protective measures can be adopted early (Lee and Nixon, 2001).

Nickel sensitivity

A German study in hairdressers found that nickel sensitivity was not a statistically significant risk factor in OCD and no correlation was found between nickel sensitivity and hand eczema (Lee and Nixon, 2001).

Scale of the problem

There are two statistical measures that are used to express the amount of disease in a given population. Disease incidence is a measure of the rate of occurrence of new disease per year and is expressed as the number of new cases per year per 100 000 workers. Disease prevalence reflects the burden of disease within a population i.e. how much there is of it. In specifying targets for reducing occupational skin disease, HSE has elected to focus on reducing disease incidence and therefore this is the measure that will be used to establish the baseline position against which to evaluate progress. The use of incidence rather than prevalence data as a performance measure is consistent with the approach recommended by Diepgen (2003).

There are two main reporting schemes in the UK that monitor the incidence of occupational skin disease including contact dermatitis: EPI-DERM and OPRA (the Occupational Physicians Reporting Activity). EPI-DERM is a surveillance scheme for occupational skin disease and its causative agents, reported by dermatologists; OPRA is a scheme used by occupational physicians for reporting all occupational ill-health, including skin disease (Meyer *et al*, 2000). Both schemes form part of a wider network for the recording of occupational ill-health - THOR (The Health and Occupation Reporting network).

More than 200 dermatologists participate in the EPI-DERM scheme. Of these about 20 are ‘core’ reporters who report cases every month throughout the year. The remaining participants are ‘sample’ reporters who are randomly sampled and send in reports for one month in each year. To avoid any systematic seasonal biases these sample reporters are randomly allocated their reporting month, and this allocation changes from year to year. Reports from ‘sample’ reporters are scaled up to estimate the annual totals of disease; cases reported by ‘core’ reporters are included in the estimated annual totals without scaling. Given this, the estimated annual disease totals are based on smaller (often considerably smaller) numbers of actual reported cases, and are subject to random variation due to sampling error. In the case of OPRA, reports are submitted by over 700 occupational physicians, including HSE medical inspectors.

Whilst these schemes provide specific information on the incidence of occupational skin disease in the UK, they will undoubtably underestimate the true scale of the problem, certainly among hairdressers. This is because EPI-DERM will report only those cases that are sufficiently serious to warrant referral to a dermatologist; and hairdressers and barbers do not have access to occupational physicians at their place of work, hence, no data for these occupational groups will be reported into OPRA. Nevertheless, the information from EPI-DERM is considered to be the most reliable source of data for the scale of occupational skin disease among hairdressers that is currently available.

The information from EPI-DERM on new cases of occupational skin disease is translated into an incidence rate (number of new cases per 100 000 workers in each industry) using denominators from the UK Labour Force Survey (LFS). The LFS is a quarterly sample survey of private households that collects information on the UK labour market. The incidence data from EPI-DERM for the occupational category of hairdressers and barbers for the years 1993-2003 are presented in Table 1.

Table 1: EPI-DERM data on occupational dematitis in hairdressers and barbers

Period covered	Annual average estimated number of cases	Average number of hairdressers and barbers (from LFS)	Rate per 100 000 workers per year
1993-1999	139	119 800	116
2000-2002	126	94 740	133
2001-2003	130	131 300	99

Although there are other potential sources of information on the incidence of occupational skin disease (e.g. the Industrial Injuries Scheme, The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR, 1985; updated 1995)), none of these provide any useful additional information on the scale of the problem among hairdressers, primarily because the numbers of cases reported into these schemes for hairdressers is very low.

Incidence data from other national reporting schemes

Reporting schemes for occupational skin disease are established in several European countries, as well as the US and Australia. These provide information on scale of occupational skin disease among hairdressers in these countries, which can be compared with the UK data. Although direct comparison of incidence rates between different reporting schemes is hampered by differences in their methodology, nevertheless, they can give an indication of how the UK rates compare with those in other countries. Such a comparison may be indicative of the extent to which the UK schemes may suffer from under-reporting, if it is assumed that hairdressing practices are similar in different countries and therefore the rate of occupational skin disease within the hairdressing profession should be similar.

Of the various national schemes that are in operation, the most comprehensive information that is available in the published literature concerns the German scheme. Therefore the data from the German scheme have been compared with the UK situation.

In comprehensive studies of the occupational disease registers in North Bavaria for the period 1990-1999, hairdressers and barbers emerged as the occupational group with the highest incidence of occupational skin disease (Dickel *et al*, 2001; Diepgen and Coenraads, 1999; Diepgen, 2003). In 1990, the incidence of occupational skin disease among hairdressers and barbers was 194 (per 10 000 workers). This value had fallen to 18 per 10 000 workers in 1999, following implementation of a targetted intervention strategy. These numbers are higher than those found for the UK, a finding that supports the view that the UK data underestimate the true incidence of occupational skin disease.

Other information

In a survey of 20 Further Education colleges in Scotland, of the 200 students interviewed 20% had pre-existing skin problems on beginning the course and a further 10% developed ‘significant’ skin symptoms after commencing the course (Keddie, 1998).

In a survey of 41 hairdressing salons (all of them small to medium-sized enterprises (SMEs) i.e. less than 50 employees) in the Greater London area, staff in 58% of the salons had dermatitis (Fairman and Yapp, draft). In 8% of the salons, the condition was so severe that it

was reportable under RIDDOR. Five of the SMEs (12%) reported that staff had left their employment because of dermatitis. There was anecdotal evidence that 'quite a lot' of individuals give up because of dermatitis although many also continue despite having the condition. In another anecdotal statement, one salon indicated that most junior staff develop dermatitis at some stage.

The remainder of SMEs (42%) reported no problems with dermatitis, although it is notable that many of these (8/17) had been in business less than 5 years. It is stated that there was a general attitude (by staff and/or management – this is not clear from the review) that dermatitis was 'an inevitable' consequence of working in a salon.

In a self-administered questionnaire survey of 134 hairdressers conducted in Germany, 55% reported skin changes during the period of employment (Schwanitz *et al*, 2003). The most frequently reported signs and symptoms (selected from a pick-list of 6) were dryness (94.5%), redness (61.6%), fissures (34.2%) and blisters (27.4%).

Characteristics of the hairdressing industry

This section gives a broad overview of some of the general characteristics of the hairdressing industry. These may be relevant in considering causes of, and potential interventions for, occupational skin disease.

Numbers employed

According to the Labour Force Surveys (2001-2003), there is an estimated 130 000 hairdressers and barbers. No information is available on future trends for employment in this sector.

Age and gender

Hairdressing and barbering are predominantly female professions - hairdressing with 87% female workers, barbering with 69%. These industries are characterised by a young workforce, with over 50% of the hairdressing workforce aged between 16 and 34. In hairdressing, 83% of recruits are aged under 26 and 56% are under 19; in barbering the figures are 58% and 16% respectively (HABIA 2004 Skills Survey).

In a survey of 41 hairdressing salons in the Greater London area, many (number unstated) had trainee hairdressers on work placement from local colleges, or pupils from local schools on work experience placements (Fairman and Yapp, draft). No indication was given as to the age range of these placement staff, although it can be assumed that their average age would be low.

Salon size

There is only limited information available on the size of salons (in terms of numbers of employees) in the UK. In a sample survey of hairdressers (all SMEs) in Greater London (Fairman and Yapp, draft) the majority (35/41) employed fewer than 10 staff, i.e. 'micro' firms.

Chemical exposures and wet work

Hairdressers and barbers wash, shampoo, cut, style and treat hair which potentially involves frequent and/or prolonged exposure of the skin (mainly the hands) to specialist formulations of chemicals and to wet work (contact of the skin with water and/or chemicals in aqueous solution or suspension). Hairdressers and barbers may be exposed to many thousands of chemicals through the use of specialist formulations. The formulations can be broadly categorised as hair colouring preparations (bleaches, dyes), hair styling preparations (setting lotions, hair sprays, waving preparations, straightening preparations) and hair treatments (shampoos, conditioners).

Many of the wet work procedures such as hair shampooing and the application and rinsing of perm and tint, are carried out by apprentices (Ling and Coulson, 2002). As more experience is gained and hairdressers progress in their career, more complicated procedures tend to be performed, which may involve handling products that contain hazardous chemicals; the proportion of time spent in wet work may also tend to decrease.

Training

In the UK there are two main pathways to enter hairdressing training: enrolment as a full-time college student; or apprenticeship with a hairdressing salon. Full-time college students attend study lessons for 18 hours per week, combining theory with practical sessions. A salon apprentice attends college as a day-release student (usually 1 day per week), and works at the salon for the other 4 or 4.5 days (Ling and Coulson, 2002).

Attitudes to risk

The attitude of trainees to the risk of developing occupational skin disease is likely to be influenced by the level of personal experience or knowledge concerning this condition and the importance that has been placed on it during their training. However, it is not clear what level of priority is given to occupational skin disease by hairdressers themselves compared to other potential health and safety issues such as cuts, slips and trips and client health and safety. Anecdotal evidence suggests that it is a low priority.

Knowledge sources used by salons

The survey of 41 salons conducted by King's College (Fairman and Yapp, draft) provided a breakdown of the information sources used by salons to obtain health and safety information:- local authority sources were used by 54%; National Hairdressers Federation by 49%; college by 39%; Hairdressers Journal by 24%; flyers by 22%; consultants by 7%; websites by 5%; 12% of salons did not seek information.

Anecdotal statements given in reply to this survey indicated that written information was of limited use. A number of salons indicated that they had not read leaflets sent to them. Other statements indicated that health and safety is considered to be 'a matter of common sense'. Furthermore, in cases where written information is read, if it is not immediately relevant to the local situation or context of that salon, then it was likely to be discarded. In this respect, several people interviewed noted that the information sent to them from the trade associations tended to be specific and more directly relevant to them than information from the local authority.

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2. CAUSES OF THE PROBLEM

This chapter gives and overview of the readily available information on the possible causes of occupational skin disease in hairdressers and barbers.

Hairdressing chemicals and preparations

The information available from EPI-DERM identifies 'hairdressing chemicals' (not further defined) as the most commonly reported suspected agents of occupational skin disease in hairdressers and barbers. Occupational skin disease triggered by 'hairdressing chemicals' could take the form of either irritant contact dermatitis (ICD) or allergic contact dermatitis (ACD).

However, currently there is no information available on the relative contribution of ICD versus ACD to the totality of occupational skin disease in hairdressers, certainly for the UK.

However, based on knowledge of the products commonly used within hairdressing, whilst individual chemical components of products may be primary irritants, they are present in such dilute form in the final preparation that their potential to cause primary irritation is reduced. Thus, the main concern for chemical exposure within the hairdressing profession is most likely to be for the development of ACD. The vast majority of the available data relating to chemical exposure within the hairdressing profession address this aspect, although it should be noted that some chemicals that cause ACD might also have the potential to cause primary irritation of the skin.

There are many case reports that attribute the development of ACD to a specific chemical cause. These highlight a relatively small number of individual chemicals as being responsible for the majority of ACD cases in hairdressers and barbers. Of the chemicals to which hairdressers are potentially exposed, it has been reported that para-phenylenediamine (PPD) may be responsible for up to 60% of the cases of ACD in hairdressers and glyceryl thioglycolate for up to 30% of cases of ACD (Lee and Nixon, 2001). In the case of PPD, it is also possible that cross-sensitivity with other para amino compounds and azodyes may occur (Seidinari *et al*, 1997)

In Germany, confirmatory diagnosis of occupational skin disease is required as part of the occupational compensation scheme. Dickel *et al* (2002) studied the occupational relevance of sensitisation responses and occupational causation in over 5000 cases, including 997 hairdressers and barbers, in the context of this employee compensation scheme. All workers were patch tested with a standard patch test battery. Patches were applied once for 24 or 48 hours and the skin observed at 24 or 96 hours later. PPD (1% in petrolatum) produced a positive response in 219 of 257 individuals (85%). Other frequent positive responses were found for nickel sulfate (5% in petrolatum), with 39/464 positive responses (61%); fragrance mix (1% aqueous solution) giving 25/51 positive responses (49%); and chloromethylisothiazolinone / methylisothiazolinone (0.01% aqueous solution) with 18/32 (56%) positive responses.

In a study of 662 hairdressers considered to have delayed type and/or work related skin sensitisation, the most common allergens considered to be occupationally relevant were glyceryl thioglycolate (50%), PPD (29%), ammonium persulfate (23%) and toluenediaminesulfate (19%). The remaining allergens had sensitisation rates of 6% or less (Diepgen *et al*, 1994).

In a brief report (English, 2004), the frequency of positive patch test responses in hairdressers attending the dermatology clinic of a Nottingham University hospital was 40% for ammonium persulfate, 33% for PPD, 31% for nickel, 26% for para-toluenediamine, 20% for glycerol thioglycolate, and 11% in each case for pyrogallolo and thiuram mix.

In an occupational dermatology clinic in Spain, 379 of 9506 registered patients were hairdressers (Conde-Salazar *et al*, 1995). Clinical histories were taken and examinations, including patch testing with a standard screen test battery and hairdressers series, were

performed. The mean age of hairdressers was 21 years, 29.5% had worked for less than 1 year and 38.5% for between 1 and 3 years. ACD was diagnosed in 185/223 cases (83%) and ICD in 79 cases (21%). In the ACD affected cases, all had involvement of the hands and dorsal area of the fingers. The most frequent patch positive results were obtained for Disperse orange (3.1% in petrolatum), 4-aminobenzene (0.25% in petrolatum) and thioglycolic acid (2% in petrolatum) with positive responses in 33%, 32% and 15% of patients tested, respectively.

A study of cross reactions between various hair dye components was conducted in 40 hairdressers with a known allergy to PPD and/or 2,5-diamonesulfate (DTS) and/or 2-nitro-4-phenylenediamine (ONPPD) and a history of hand eczema. Subjects were patch tested with various 'new generation' hair dye chemicals (hair dyes based on 'FD & C', 'D & C' and acid-based dyes) and formulations containing these chemicals as well as other ingredients such as propylene carbonate, denatured alcohol, lactic acid, 'PVM/MA decadiene crosspolymer', dimeticone copolyol, fragrance and sodium hydroxide (Fautz *et al*, 2002). The authors report that the new generation dyes are more fashion orientated than oxidative dyes, which contain PPD and have the advantage of covering grey hair. Maximal non-irritant concentrations of the new generation chemicals were determined in ten volunteers who did not have dermatitis, anti-histamine or systemic corticosteroid treatment, history of severe allergic reactions nor had over-exposure to UV light for at least 1 week prior to testing. In the main tests, 40/40 (100%) subjects showed positive reactions to 1% PPD (in petrolatum), 15/40 (38%) to 1% DTS (in petrolatum) and 6/40 (15%) to 1% ONPPD (in petrolatum). No subject showed any reaction to individual hair dyes (at up to 2% in petrolatum). Two hairdressers showed a weak "doubtful" reaction to one or more of 8 formulations tested at a concentration of up to 10% (in petrolatum). There was a possibility that in one of these two cases, it was co-formulants (e.g. fragrance component) that may have been responsible, but this was not pursued further.

Nickel sensitivity

A high proportion of apprentice hairdressers show nickel sensitivity, a finding that is pertinent considering the use of instruments containing nickel within the hairdressing and barbering professions (e.g. scissors). However a German study in hairdressers found that nickel sensitivity was not a statistically significant factor in occupational contact dermatitis and no correlation was found between nickel sensitivity and hand eczema (Lee and Nixon, 2001).

Conclusions

There is strong evidence from a number of studies that the chemicals used in hairdressing products (either singly or in combination) are implicated in the cause of occupational contact dermatitis in hairdressers. Whilst there are many hairdressing chemicals that have the potential to cause an allergic skin response there are a few substances (PPD, glyceryl thioglycolate and ammonium persulfate) that appear to be responsible for the majority of ACD reported in hairdressers. The role of other risk factors such as concurrent skin conditions in the aetiology of chemical-induced ACD is unclear.

Wet work

Wet work can be defined as all occupational activities that:-

- Cause the skin of either or both hands to be in frequent and/or prolonged contact with water or water-based irritant solutions; and/or

- Necessitate the wearing of waterproof protective gloves over a prolonged period, causing the hands to become moist from perspiration (Jungbauer, 2004).

Within the EPI-DERM reporting scheme, wet work features amongst the top seven most commonly reported suspected agents of contact dermatitis in hairdressers and barbers (Meyer *et al*, 2000).

Lee and Nixon (2001) observed that irritant contact dermatitis (ICD) appears to occur early on in a hairdresser's career, at a time when a high proportion of time is spent on wet work - tasks such as shampooing and rinsing hair. They concluded that wet work appears to be responsible for the development of ICD. The specific degree to which water alone is involved in the development of ICD is not clear, since, in addition to water exposure, there is also likely to be co-exposure to surfactants, which may in themselves be a cause of ICD either by primary irritation or defatting of the skin.

Surfactant concentration, duration and frequency of exposure are known to play an important part in the potential for wet work to cause skin changes. Water temperature may also play a role in the development of ICD by surfactants, with greater potential for ICD at higher temperatures (Berardesca *et al*, 1995).

In a UK study of hairdressing students many first year students developed red, dry, cracked skin on their hands, which tended to improve as they did less shampooing, without any other intervention (Rivett and Merrick, 1990).

In a large and well conducted prospective study, a total of 2352 hairdressing apprentices from 15 vocational training schools in NW Germany were interviewed and examined by dermatologists or physicians over a period of 3 years (Uter *et al*, 1999). Wet work was found to be a consistent risk factor for changes to the skin. Elevated odds ratios for skin changes were found for tasks that involved $\geq$ 2 or $\geq$ 4 hours wet work compared with < 2 or < 4 hours, respectively, irrespective of the extent of glove use (OR 1.64-2.33; 95% CI >1 in each case).

In a survey of 41 small to medium-sized hairdressing premises (SMEs) in the London area, conducted in 2004 by King's College, London (Fairman and Yapp, draft), three SMEs (7%) considered that shampooing caused skin problems in their trainees. Anecdotal evidence from these three respondents implied that skin is expected to 'toughen up' with time, such that the skin problems resolve themselves.

No information was available in hairdressers and barbers on the consequences (if any) to the skin of hands made wet or moist (either due to perspiration or entry of liquids) caused by wearing gloves.

There are anecdotal reports that wearing of hand/arm jewellery by wet-workers (such as hairdressers) may trap and cause a build-up of chemicals and/or detergents that may exacerbate OCD.

Wet work is not specific to hairdressing and it has been recognised that employees in other occupations that involve wet work are at increased risk of occupational skin disease (Diepgen and Coenraads, 1999).

Conclusions

Wet work is an identified risk factor for occupational skin disease in hairdressing. A primary issue is the amount of time (frequency and/or duration) the skin is exposed to water, although other factors may also contribute to the development of occupational skin disease e.g. co-exposure to surfactants, water temperature.

Use of personal protective equipment (gloves)

Most of the available information on the use of personal protective equipment among hairdressers and barbers comes from studies of students and trainees.

A UK study of hairdressing students found that 9% used gloves for shampooing, an activity which is apparently considered by those undertaking it as 'low-risk' in relation to skin damage (Ling and Coulson, 2002). In the same study, up to 58% of students wore gloves for hair perming. The risk of skin effects tended to be higher in those situations where glove use was lowest (<2 hours/day).

When questioned, it was found that although a high proportion of students had been given instructions on hand care, when asked specifically whether they considered that the wearing of gloves hindered their work, many of those answering the question (44%) felt that it did.

A German study found that although many gloves provided were intended for single use only, many apprentices re-used gloves, which may lead to a reduction in their protective effect (Schlesinger *et al*, 2001). In 1999, protective gloves were available to up to 98% of 2369 individuals questioned, but similar to study by Ling and Coulson (2002), glove usage for hairwashing in particular was relatively low (about 25%). The gloves were mainly worn in work that might stain the hands and nails; thus 89% of apprentices said that they used gloves when applying dyes and tints and about 60% when rinsing dyes and tints.

In a study of UK hairdressing students, a high (unstated) proportion of second year students were reported to have developed skin problems for the first time during a 1-month work experience period outside the college when they were mainly shampooing, neutralising perms or tinting without wearing gloves (Rivett and Merrick, 1990).

In an evaluation of the health and safety provisions of 20 Further Education hairdressing colleges conducted by a HSE Medical Inspector, 81% of trainees reported receiving training in the use of personal protective equipment (focussed mainly on using gloves and aprons) and 97% of trainees identified glove wearing as the main preventative measure against exposure to substances hazardous to the skin (Keddie, 1998). However, 74% had concern about the provision of suitable gloves and had experienced problems related to durability, limited sizes and poor functional dexterity as a result of poor fit.

In a survey of 41 small to medium-sized hairdressing premises (SMEs) in the London area, conducted in 2004 by King's College, London (Fairman and Yapp, draft), gloves were worn mainly when using 'chemicals' rather than during shampooing; however, individuals who already had dermatitis also tended to wear gloves during shampooing. Furthermore, although all SMEs provided gloves for their staff, the majority allowed individual staff members to elect whether or not to wear them; only 4 premises (10%) enforced the requirement to wear gloves whilst colouring hair.

In a study of hairdressers in Germany, 240 female hairdressers from 97 salons were interviewed face-to-face by a master hairdresser (Stresemann *et al*, 1998). Ninety-four hairdressers (39%) reported using latex or vinyl gloves when dyeing, bleaching and tinting. Thirty-eight percent reported glove wearing for wet work, a figure which dropped to 26% when the interviewer challenged those who reported using gloves for wet work without exception. It was reported that cotton lining gloves were rarely used.

A number of different glove types are available to hairdressers, including polyethylene, latex and vinyl. It has been recognised that a proportion of hairdressers may already have or may develop an allergy to latex. Consequently, it has been suggested that vinyl is the best protective material for hairdressers (Van der Walle and Brunsveld, 1995). In 1998, latex gloves were used in almost all 20 UK Further Education training colleges included in a survey (Keddie, 1998).

Use of skin care creams

In a large prospective study of over 2000 hairdressing students, the more frequent use of in-salon emollients (more than 10 times per day) was not associated with decreased risk of skin changes (Uter *et al*, 1999).

In the study by Stresemann *et al* (1998), most interviewees reported using protective creams. Protective foams were used by 7.7% of hairdressers.

Conclusions for use of gloves and skin care creams

Glove use among hairdressers is variable, and appears to be dependent on the task being undertaken. Thus, the proportion of hairdressers (students and professionals) who wear

gloves for dyeing and tinting is relatively high, compared with the proportion wearing gloves for other tasks; in this respect, the motivation for glove use in the former situation appears to be cosmetic (prevention of staining of the hands and nails) rather than for protection of the skin from damage. Based on limited evidence, glove use appears to be lower among trainees than among professional hairdressers, for the same task. Inappropriate re-use of single-use gloves may lead to skin problems as a result of inadequate protection, as may the choice of material – extensive use of latex could be a cause of skin allergy among hairdressers. However, again, the supporting evidence for these conclusions is limited.

There is no useful information on the use of other protective measures, such as hand care creams and barrier creams.

Knowledge and training

In the UK, trainee hairdressers tend to work towards National or Scottish Vocational Qualifications (NVQ/SVQ) level 2 as a minimum. A check of the study material available from the Hair and Beauty Industry Authority (HABIA) website indicates that dermatitis is covered within the hairdressing syllabus.

The attitude of trainees to the risk of occupational skin disease is likely to be influenced by the level of personal experience or knowledge concerning this condition and the importance that has been placed on it during their training. There is little published information on the level or order of priority that is given to occupational skin disease by hairdressers themselves compared to the other potential health and safety issues such as cuts or ‘slips and trips’ for example. However, anecdotal evidence suggests that it is a low priority.

In a UK based questionnaire completed by hairdressing students, 74% stated that they had been given instructions on hand care during their hairdressing course (Ling and Coulson, 2002). In assessing the hairdressing curriculum, Ling and Coulson indicated that the emphasis was primarily client-orientated and practical advice on hand dermatitis was relatively limited. Glove wearing was advised when handling hairdressing chemicals and in shampooing ‘only if the skin becomes dry and cracked’, with use of moisturising cream encouraged ‘only as often as required’ rather than as a routine. They considered that whilst this information was generally accurate, it was brief and lacked sufficient emphasis on the practical aspects of hand care.

In an evaluation of the health and safety provisions of 20 Further Education hairdressing colleges conducted by a HSE Medical Inspector, a number of deficiencies were found (Keddie, 1998). In particular, the colleges showed limitations in knowledge of relevant health and safety legislation, deficits in standards and provision of training regarding health and safety and limited understanding of COSHH (Control of Substances Hazardous to Health Regulations). In 2004, an update to this study found that little improvement has been made at these colleges (Keddie, personal communication). Knowledge among lecturers of how to carry out risk assessments was poor. This appears to be because there is no system in place for ensuring regular review by a 'competent' person with an understanding of hazard and risk etc. Therefore hazards are not eliminated or minimized and working methods are not reviewed or improved. So, for example, students are not prevented from wearing hand jewellery; poor hand drying is tolerated; there is inadequate advice on chemical handling techniques. Most colleges do not demonstrate good practice, for example by carrying out skin checks. There are no formal skin care policies and advice on skin care tends to be delivered in an *ad hoc* manner. The students interviewed had poor knowledge of health and safety issues, regardless of their year of study (1-3). Health and safety issues tended to be taught alongside subjects such as fire safety and other emergency procedures. This subject matter is taught early in training and seldom revisited therefore retention of these matters is generally vague and extremely poor. Many course lecturers are poorly informed on health and safety and on the subject of dermatitis, other than recognizing the obvious development of a skin rash.

No information was available on the knowledge level of hairdressing and barbering professionals.

An Australian report indicates that the degree of knowledge in career counsellors regarding risk factors for occupational contact dermatitis is low (Saunders *et al*, 2003). Hence if the same holds true for UK counsellors then individuals looking to enter the hairdressing profession may get little focussed advice relating to occupational skin disease prior to entering the industry.

Managerial attitudes towards skin disease and health protection

This section describes how the attitudes and behaviours of hairdressing salon managers towards skin protection can impact on the incidence of occupational skin disease in their staff.

In a survey conducted by the King's College (Fairman and Yapp, draft), it was noteworthy that the colleges themselves may play some part in ensuring compliance with health and safety considerations, since 7 hairdressing SMEs (17%) stated that the reason that they complied with legislation was because of the local training college. It was noted that a college could remove placement students if the standards were inadequate. Four hairdressing SMEs (10%) cited a "moral" obligation to protect staff, particularly as many of their staff were young school leavers. In relation to liability, it appears that the 21 SMEs (51%) who were worried about liability also showed a higher awareness of and implementation of COSHH than those who were not worried about liability.

Although all hairdressing SMEs considered that they complied with COSHH, it was clear from the survey that only a minority (19.5%) actually complied fully. Another 54% were considered to be in partial compliance by collecting safety data sheets. One reason cited in the survey for this discrepancy between theoretical and practical compliance was the differing views between the hairdressing SMEs and enforcement officers of what actually comprised compliance. To an enforcement officer, compliance would mean 'complying with legal requirements'. However, hairdressing SMEs in the study considered themselves to be compliant unless told otherwise. Following a visit from an enforcement officer, the implementation of any necessary changes resulting from that visit was considered by the SMEs to bring them into compliance until again told otherwise.

Interestingly, this survey determined that it is not just enforcement inspectors who are perceived as compliance assessors. Representatives from the local hairdresser's training college who visited salons in order to monitor student progress were also considered to be compliance assessors. The SMEs viewed both as able to direct and advise on compliance with occupational health and safety legislation.

What also emerged from this survey was a general attitude (by staff and/or management – this is not clear from the survey report) that dermatitis was 'an inevitable' consequence of working in a salon.

In discussions with a very limited number of hairdressers in the HSE sponsored work by Biggs and Crumbie (2000), variations were expressed in the attitude of managers to safety of hairdressing as a profession and in particular the risks posed by chemicals. One manager had personal experience of young hairdressers who had developed severe dermatitis and had to abandon their career and hence took the issue seriously; another manager was of the opinion that product manufacturers have conducted "safety checks" on their product and that labelling is an adequate means of communication. One salon manager mentioned preventing junior/inexperienced staff undertaking hair straightening/relaxing for "afro hair" as it was suggested that proper training was needed in knowing when to remove the product and there was the potential for skin irritation (although it is not clear here whether this was to the client or person applying the product).

In general, salon managers provided information on the safe use of products to staff, often verbally (in addition to, or sometimes instead of written information). It is not clear whether understanding of this knowledge was checked. Many of the people working in the hairdressing salons were college-trained, and some reliance appears to be placed on the health and safety knowledge gained from this training, although there did also appear to be a view that 'common sense' should be used in approaching the use of protection (gloves) when

handling hazardous chemicals. Although most indicated that gloves are used routinely, it is not clear if this is for all activities, or a few selected activities which are considered hazardous. The use of barrier creams was also mentioned.

Other anecdotal evidence suggests that salon managers tend to adopt a 'common sense' approach to dealing with health and safety in the salon, and that the health and safety of customers often takes higher priority than that of staff.

Overall, salon managers have a positive attitude towards health and safety, but there is no clear consistency in the approaches taken to ensure the health and safety of their staff. One influence on salon managers appears to be the training colleges, either directly via visits to the salon, or indirectly via the training that their staff receive. Knowledge of chemical hazards may be patchy and chemicals may be seen as less of a threat than other hazards in the workplace.

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3. INTERVENTIONS

This chapter describes interventions that have been applied in the hairdressing and barbering sector, to tackle the occurrence of occupational skin disease. It focuses on two major intervention strategies that have been developed for this sector, one in Germany, the other in the Netherlands. These two strategies are considered to be most informative of possible intervention measures that could be applied within the hairdressing and barbering sector within the UK. In the case of the German intervention strategy, an evaluation of the impact of the adopted measures on the incidence of occupational skin disease is also available; the strategy developed for the Netherlands has only recently been agreed (2001) and therefore no evaluation of its impact has yet been undertaken.

Each strategy involves a range of measures to tackle the causes of occupational skin disease among hairdressers and barbers. However, as far as possible, the measures within each strategy that are aimed at tackling individual causes (such as, for example, wet work) have been drawn out separately in this document, to allow direct links to be made between the main causes of occupational skin disease among hairdressers and barbers identified in the previous document, and corresponding interventions that have been tried.

Overview of the German and Dutch intervention strategies

The German strategy

Two key pieces of legislation were introduced in Germany in the 1990s to address the recognised problem of skin disease among hairdressers: Technical Standard for Hazardous Substances (TRGS) 530: Hairdressing trade, was introduced in 1992 and TRGS 531: Skin damage from work in wet environments, was introduced in 1996. The introduction of these two regulatory instruments has been supported and supplemented by information campaigns run by the workers' compensation board, and, in 1995, a voluntary agreement reached between hair cosmetics manufacturers and the Hairdressers Guild to stop the use of glyceryl thioglycolate in permanent wave solutions.

The Dutch strategy

The Dutch approach has been to develop a 'working conditions covenant' between the Dutch regulatory authority and the social partners (industry and the unions). This covenant lays out targets for the reduction of occupational skin disease among hairdressers through a broad range of legislative and voluntary measures, including elimination and/or reduction of exposure to causative agents, improved training and increased awareness of the problem among employers and employees.

Specific intervention measures

In general, the intervention measures proposed within the German and Dutch strategies overlap considerably. Therefore, the following description of specific measures does not distinguish between the two strategies, but provides an overview of the totality of measures that have been developed. Where a bullet point list of measures is presented, these are given in no particular order.

Exposure to skin-damaging chemicals

The problem of exposure to specific chemicals present in hairdressing products is recognised in both the German and Dutch strategies. Various measures to eliminate or reduce exposure to skin-damaging chemicals have been proposed:

- Stop the use of glyceryl thioglycolate in perm solutions and other hairdressing products
- Repackage or re-formulate products to reduce the potential for exposure to the skin

- Create a separate ‘Chemicals section’ in every hairdressing salon
- Prevent employees from wearing hand or arm jewellery when working with hairdressing products
- Prevent water-based preparations that contain skin-damaging substances from drying on skin
- Replace or modify tools (e.g. scissors) that may allow nickel exposure to the skin

Wet work

The following recommendations have been proposed to address wet work as a cause of occupational skin disease:

- Reduce wet work as far as possible
- Introduce breaks and/or rotation of tasks to reduce the duration of wet work for each individual employee (e.g. limit wet work to no more than 30 minutes every hour)
- Provision by employers of suitable protective gloves (not latex) for hairwashing
- Employers to disallow the wearing of hand or arm jewellery during wet work
- Substitute skin-damaging chemicals (e.g. those classified as corrosive, irritant or skin sensitisers) in situations which also involve wet work
- Limit the time wearing water-resistant gloves (maximum continuous wearing time not to exceed 4 hours)
- Provide operating instructions/skin protection plan for employees undertaking wet work to indicate the concern and the appropriate protective measures
- Provide regular training for employees undertaking wet work
- Provide skin surveillance by an occupational physician, for employees undertaking wet work

Use of personal protective equipment (PPE)

The use of appropriate PPE (gloves) for activities involving exposure to irritant or sensitising substances (in addition to wet work, which is covered above) is addressed in both the German and Dutch strategies. The range of recommendations in relation to glove use covers the following:

- Mandatory use of gloves for:
    - mixing, applying and rinsing dyes, perming and blonding agents, colour rinses
    - contact with solvents
    - contact with monomers of epoxy resins/hardening agents
    - use of preparations containing soaps, detergents and disinfectants
    - cleaning and disinfection of work tools, equipment and work areas

- Use of gloves when cutting hair after the application of hair dyes (although the preferred option is to cut before dyeing)

- Apply specific criteria to glove selection and use (e.g. impermeable to substance of concern, comfortable and well-fitting, non-allergenic, durable, worn only on clean, dry skin, rinsed before removal)

- Disallow repeat use of single-use gloves

Knowledge and training

The need for improved dissemination of information about potential skin hazards in the hairdressing sector, and for improvements in the training provided to students in relation to skin disease and its prevention, is recognised in both the German and Dutch strategies. Both strategies incorporate measures to improve education and information provision, both to hairdressing students in colleges, as well as amongst professional hairdressers.

Management behaviours

HSE's analysis of the causes of occupational skin disease in hairdressers highlights the importance of attitudes and behaviours of hairdressing salon managers in relation to promoting skin protection in employees. Although neither the German or Dutch strategies offer specific interventions related to addressing the attitudes and behaviours of managers in the workplace, measures such as improved training and knowledge is likely to have an impact on this, at least indirectly. However, there may be scope for addressing this aspect in a more targeted way.

Evaluation of interventions

As indicated at the beginning of this document, the German intervention strategy has been subject to evaluation. There is also a small number of published studies looking at the impact of various interventions in small groups of hairdressers, and summaries of these are included here.

Evaluation of the German intervention strategy

Dickel *et al* (2002) reported on the impact of the German strategy, through a population based register study. A total of 5285 cases of occupational skin disease were registered in Northern Bavaria between 1990 and 1999. Of these, 997 were identified as hairdressers, with 856 (86%) having a confirmed occupational cause. The annual incidence of hairdressers with occupational skin disease (number of cases per 10 000 workers) was calculated as 194 in 1990. This figure declined steadily over the period 1990-1999, to an incidence of 18/10 000 workers in 1999. This decline was statistically significant ($P<0.0001$). The authors conclude that this decline was due to improvements in working conditions resulting from the intervention strategy implemented in the 1990s, and the increased co-operation between stakeholders (employers, employees, unions, dermatologists, hairdressing product manufacturers) that the strategy generated. The authors also noted that to sustain the reduction in occupational skin disease in this sector, this co-operation must be maintained, and that primary prevention of skin disease should be a key goal, with the introduction of mandatory pre-employment skin examination.

The impact of measures introduced through TRGS 530 on the incidence of occupational skin disease in hairdressers was assessed by Stresemann *et al* (1998). The study involved face-to-face questionnaire-based interviews with 240 female hairdressers from 97 salons (92% of the salons that were approached). The interviewees had a range of experience, and included trainees, experienced professionals and 'master hairdressers'. When asked about the impact of the measures introduced through TRGS 530 on the skin of their hands, 23% responded with a positive statement that their skin had improved. For 33 respondents (14%), this improvement was attributed to more regular glove usage; 20 respondents (8%)

considered that the improvement in their skin could be attributed to the availability of skin protection methods required by the new legislation.

In comparison, 185 respondents (77%) noticed no impact of TRGS 530 on the condition of their skin. Various reasons for this were given: an absence of skin problems previously (72%); no change in skin symptoms despite protective measures (2.5%); or no change in skin protection measures had been triggered by TRGS 530 (% respondents not stated). None of the respondents considered that their skin condition had deteriorated as a consequence of the introduction of TRGS 530.

The authors noted that a range of factors is likely to have contributed to the observed decline in notified cases of occupational skin disease among hairdressers seen in Germany in the 1990s. In view of this, the specific contribution of the introduction of TRGS 530 cannot be determined. However, based on their interview responses, they concluded that it was probable that the introduction of TRGS 530, in particular its requirement for obligatory glove usage, had contributed to the reduction.

Schlesinger *et al* (2001) undertook a survey of apprentice hairdressers in the Lower Saxony region of Germany, to compare the incidence of contact dermatitis at three time points in the period 1989-1999. Overall, the survey found improvements in the incidence of skin disease over the 10 year period: the number of apprentices affected by skin conditions fell by 9% over the study period, whilst those who sought to leave the profession because of skin disorders reduced from 27% (757 apprentices) in 1989 to 11% (160 apprentices) in 1999. The improvements in skin condition were attributable mainly to increased glove usage and improvements in the application of skin care remedies. However, the survey also revealed that the main improvements occurred in the period 1989-1994; in this period, the percentage of students reporting skin alterations fell by 13%. In contrast, in the period 1994-1999, skin alterations increased slightly, by 4%. This increase coincided with a decline in the implementation of preventative measures. For example, in 1989, glove use for tasks other than dyeing was extremely low, whereas in 1994, there was a marked increase in glove use for other tasks as well as continued glove use for dyeing. In the 1999 survey however, glove usage had decreased slightly for most activities.

The survey also looked specifically at the impact of TRGS 530. Whilst there was evidence of good awareness of this regulation, it appeared that its recommendations were not systematically implemented. Failures in compliance with TRGS 530 included failure to provide skin protection formulations and protective gloves; and provision of unsuitable gloves (including latex gloves); repeat use of single-use gloves; no change in the proportion of time spent in wet-work or tasks involving chemical use, particularly in the first two years of apprenticeship.

The authors concluded that continued intervention is required, to maintain and make further progress in the prevention of skin disease in hairdressers.

Other evaluation studies

Schwanitz *et al* (2003) reported data from studies investigating the effects of educational interventions in vocational trainee hairdressers and in practicing hairdressers and barbers. In the intervention study in trainees, 73 students from a vocational training school were included in the intervention group. A ‘matched’ (no details of matching criteria provided) control group of 112 students from a different training school was identified. The students were followed through their training period (1996-1999). During this period, all study participants were examined four times by a dermatologist. The intervention group received a total of 15 hours of seminars delivered by professional educationalists, which addressed skin care management and prevention of dermatitis. In addition the intervention group was supplied with gloves and protective creams. Knowledge and attitudes to skin care management were assessed in both groups by written questionnaires administered at the beginning and end of the second year of training.

When skin condition was examined in 1997, the incidence of occupational skin disease was comparable in both groups, with 56% of individuals showing no skin changes. In 1998, 90% of the intervention group and 75% of the control group had no skin changes, a difference that was statistically significant. At the end of the intervention period, in 1999, 80% of the intervention group had no skin changes compared with 66% of the control group. In those who had skin changes, the severity was generally lower in the intervention group than in the control group. In addition, none of the participants in the intervention group had to resign from employment because of skin changes, whereas 10% of the control group were unable to work because of skin changes. In the first year of training, participants in the intervention group demonstrated greater knowledge about skin care and showed greater willingness to implement skin care measures, including glove wearing, compared to controls, a difference that was statistically significant.

A similar educational intervention in practicing hairdressers with existing skin disease was undertaken. The phased intervention took place over a 3-year period and involved an initial dermal examination and interview; a seminar on skin protection, including both theoretical and practical elements; consultations at the hairdresser's workplace, also involving the salon manager; final seminar and dermal examination. Of the initial 215 hairdressers who began the intervention study, 150 completed the course. Workplace consultations were held at 103 salons at which a total of 652 hairdressers worked and participated. A 'matched' control group (no details of matching provided) received only medical supervision.

Amongst the intervention group, 121 (81%) were free of skin disorders at the end of the course i.e. their skin disorder had resolved. A further follow-up was undertaken 3-months after the end of the study, at which time 80% of participants remained in their occuaption compared with 60% of the control group (80 people). In addition, there was a clear change in attitudes towards skin disease: at the end of the course, 26% of participants considered that 'slightly reddened or rough hands' was 'normal' compared with 47% at the beginning of the study. There was evidence for increased use of gloves during hairwashing (from 27% to 52%), and 60% of the participants in the intervention group had changed their behaviour in relation to skin care management and protection.

In the final element of this review, 155 patients with occupational skin disease (not clear if these were all hairdressers, but probably not) requiring in-patient treatment for their condition, received supplementary educational interventions. This comprised provision of general information; one-to-one consultation and small-group seminars on skin protection; and practical advice on preventative strategies to be used in the workplace.

Questionnaires were sent to all patients 1 year after hospitalisation. Of the 155 patients, 136 responded to the questionnaire. The results indicated that 62% retained their employment, 31% had to cease work because of occupational skin disease, and 7% ceased work for other or unknown reasons. The majority of respondents (78%) continued to protect their skin as advised and 49% started to obtain protective gloves from their employer.

Overall, the Schwanitz *et al* data provide evidence that educational intervention strategies can make a significant contribution to the prevention of occupational skin disease.

In another study, a group of 169 hairdressers with occupationally related skin disease were provided with a 6 week period of convalescence, hairdressing seminars, medical supervision and "endurance-testing" of damaged skin (Stresemann *et al*, 1992). Forty-three percent returned to work and 37% of these returnees remained free, or almost completely free, of skin changes in the "long-term".

In a large prospective study of over 2000 hairdressing students, the more frequent use of in-salon emollients (more than 10 times per day) was not associated with a reduction in the incidence of skin changes (Uter *et al*, 1999).

In another briefly reported study, the effectiveness of skin protection creams was evaluated (Bock *et al*, 2001). Two groups of 25 hairdressing students with contact dermatitis each used one of two skin protection creams for 4 weeks. The skin condition was assessed after 2 and 4

weeks by self-assessment, clinical evaluation of the skin by visual examination, and by measurement of three physiological parameters: trans-epidermal water loss (TEWL), the relative humidity of the stratum corneum, and assessment of the intensity of erythema by chromometry.

Analysis of self-assessment forms showed a clear reduction in subjective feelings of skin dryness, itch and redness in the majority of cases, after 2 and 4 weeks. This improvement was supported by the findings of the clinical evaluation, where clear improvements in dryness and erythema were seen over the 4 week period. The objective measures of skin condition also indicated improvements over the 4 week period, the improvement being more marked and sustained with one cream in comparison with the other. Thus, the study indicated that the use of skin protection creams can lead to an improvement in skin condition.

In contrast, in their review of the effectiveness of skin protection creams according to criteria of evidence-based medicine, Kutting and Drexler (2003) considered available studies in hairdressers as well as other occupations. Overall, whilst there was a wealth of data, especially from studies in experimental systems or small clinical trials, they considered that the data were contradictory and few studies were available which could discern the relevant contribution or otherwise of skin protection creams in interventions aimed at addressing skin disease in real world working conditions.

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