Cancer mortality in male hairdressers

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SUMMARY Although hair dyes have been shown to be highly mutagenic the literature on possible human cancer risk is confused. A variety of studies using different methods in different countries have provided a range of positive and negative findings. In the present study the observed and expected mortality among a sample of hairdressers identified in the 1961 census was examined and followed until 1978; attention was focused on five malignancies reported to have increased in male hairdressers in the other studies. The overall mortality and number of deaths from all neoplasms were lower than the 'expected' figures. No appreciable or significant excess was found for cancer of the oesophagus, larynx, lung, and bladder, or for leukaemia. The present report, based on the follow-up of nearly 2000 hairdressers for more than 15 years, provides no support for other work which has suggested that male hairdressers or barbers are at risk of certain cancers. These results provide only a limited probe into the influence of hair dyes; another part of the study involved follow-up of women hairdressers from the 1971 census, though it will be a number of years before enough deaths have accumulated to warrant analysis.

It has been shown that a range of hair dyes for application by hairdressers and also for home use contain chemicals that are highly mutagenic on various short-term tests.^{1,2} The complementary literature on hazard to humans has been somewhat confusing. An excess of chromosomal abnormalities was found in women using hair dyes, though the reverse was found in men.³ Three studies of occupational mortality⁴⁻⁶ showed no general excess of malignancy in male hairdressers or barbers, though there were excess deaths from oesophageal cancer in one.⁶ Danish data⁷ showed an appreciable deficiency of cancer incidence in male hairdressers, but consistent excess for a number of sites for females. Two studies of mortality and incidence data from California showed an excess of lung cancer in beauticians.^{8,9} A preliminary report of sickness absence from work indicated excess cancer certification for various sites in cosmetologists in the United States of America.¹⁰ In a 'fishing expedition' which examined the occupations reported by patients attending Roswell Park, it was suggested that barbers had an excess of laryngeal cancer.¹¹

Four case-control studies have suggested that hairdressers or barbers have an excess risk of bladder cancer¹²⁻¹⁵; this was not confirmed by two other studies.^{16,17} (Only one of these six investigations¹⁷ was launched specifically to explore the risk linked to use of hair dyes).

Five case-control studies of breast cancer have specifically explored prior exposure to hair dyes.¹⁸⁻²² Two found a significant excess (one after standardising for other risk factors for breast cancer) while two others failed to detect any significant differences. The fifth study found no difference in hair dye usage between all breast cancer patients and controls but increased use in women with prior benign lesions (this information was obtained on the telephone or from relatives). A prevalence study among nurses inquired about hair dye usage in all respondents, including those reporting treatment for cancer²³; a slight excess risk for all sites was found. For the large number of women with breast cancer there was no difference in hair dye exposure compared to those without breast cancer. There were significant differences for women with cancers of the cervix and vagina, but this was thought to reflect other confounding factors. Two major prospective studies of women beauticians in the United States of America failed to detect any general excess of cancer^{24,25}; one found a significant excess of leukaemia, which could not be explained.²⁴

In a peripheral exploration of this issue, the national statistical systems of England and Wales have been used to examine the mortality patterns of hairdressers in this country. The study was designed to test whether there was an excess of deaths from cancers in general, or specifically from those sites

previously suggested as resulting from exposure to hair dyes (that is, the oesophagus, larynx, lung, bladder, or leukaemia). This report is restricted to male hairdressers and thus the question of an excess of breast and female genital cancers has not been explored.

It is suggested that, compared with the general male population in this country, men employed in women's hairdressing may be more exposed to hair dyes. The data recorded at the census were inadequate to distinguish those working in men's from those in women's hairdressing—an immediate source of dilution of the population at risk (it is assumed that few of these men work in 'unisex' hairdressers and few of them apply the dyes to their own or other men's hair). A separate but equally important point is the method of applying the dye. When gloves are worn and a good standard of practice exists, the degree of exposure should be slight.²⁶

Method

This study is based on statistics extracted by the Office of Population Censuses and Surveys (OPCS). The OPCS selected a 10% sample of 'hairdressers' identified in the 1961 census and then examined the records at the National Health Service Central Register to identify the cause of death of those who had died. (Included in the category 'hairdresser' were men working as barbers cutting men's hair, as well as those working in women's hairdressing salons, cutting, dyeing, or tinting.) The appropriate dates were used to calculate person-years-at-risk and this work was carried out by the OPCS. No information about identified individuals left the OPCS at any stage.

The computer-generated table of person-years-at-risk, and codes of the underlying causes of death, were released to the author who then calculated the expected number of deaths by cause, based on age, sex, and calendar period specific mortality statistics for England and Wales.²⁷ The ratio of the observed (O) to expected (E) deaths has been examined. Where $E > 5$, the difference between O and E has been tested by χ^2 ; where $E < 5$, the data have been treated as a Poisson variate and the probability calculated of the same or a greater difference between O and E.

The present data relate to males only who have been followed up to include all deaths occurring in the period 24 April 1961 to 31 December 1978.

Results

In the search of the census file, 1999 men were identified, of whom 1831 (91.6%) have been traced

on the files of the National Health Service Central Register. The average follow-up has been 15.1 years.

Deaths occurred in 504 men, with 552.1 expected, giving a ratio of $\frac{O}{E} = 0.91$. The Table shows the deaths for all causes, all malignancies, and the malignancies selected for examination. For each of these, the observed and expected deaths are quoted, a ratio O/E, and the probability of the difference.

Table Mortality among 1831 hairdressers followed from 1961 to 1978

	Observed deaths O	Expected deaths E	O/E	χ^2	P
All causes	504	552.1	0.91	4.19	<0.05
All neoplasms	134	126.1	1.06	0.49	<0.50
Cancer of					
oesophagus	5	3.4	1.47	—	0.26
Cancer of larynx	1	1.3	0.77	—	0.27
Cancer of lung	52	50.8	1.02	0.03	<0.90
Cancer of bladder	7	5.6	1.25	—	0.33
Leukaemia	3	2.7	1.11	—	0.51

Discussion

Before attempting to interpret the results it is important to consider a number of caveats about the study design and the quality of the data that result from the approach. The raw data are derived from (1) individuals identified by responses on their census returns and (2) death certificates of those recorded as having died on the Central Register. The post-census check has indicated some of the problems of using data from the census, but there is no reason to suspect that there is an appreciable error in the job recording and no particular reason to suspect that hairdressers will be more or less accurately identified.

The use of death certificates for such studies is accepted practice,²⁸ though a number of studies have indicated that caution is required in interpreting the statistics so generated.²⁹ The accuracy of cancer certification is better than that of many other causes of death and there is no reason to suspect that there should be any particular bias in the quality of certification of the subjects in this study. The trace rate is already satisfactory, although continued efforts are being made to identify those at present untraced; it seems unlikely that deficiency in follow-up of 8.4% could have introduced an appreciable bias into the study.

Surveys in the United States of America suggest that hair colouring was used by 9% of the female population aged over 13 in 1954 and that this proportion had risen to 39% by 1969. Use of hair colouring has not risen so swiftly in the United Kingdom.³⁰ If it were accepted that at least a proportion of men in this study have a higher

exposure to these chemicals than the rest of the population, then the period over which they have been exposed would still be fairly limited compared with the latent interval that exists for some human carcinogens. The results therefore may not be representative of the ultimate findings after prolonged follow-up of the study population. The men have been flagged on the NHSCR and it will be possible periodically to examine their patterns of mortality.

A general problem with this class of study is whether national mortality rates are appropriate to provide an expected number of deaths. This depends upon the selection factors that determine who becomes a hairdresser, whether their way of life differs from that of the general population, and whether non-occupational factors distort their patterns of mortality. No special studies recently have enabled one to assess whether hairdressers' exposure to other known carcinogens is likely to be different from that of the general male population. For example, three of the sites implicated in other studies—larynx, lung, and bladder—are smoking-related cancers, and it is desirable that adjustments be made for patterns of smoking. (Women using hair dyes smoke more than those not using such dyes²¹; this emphasises the need to study such confounding factors).

Although 504 deaths were identified in the study, the numbers of deaths by specific cause were relatively small. The method of analysis attempts to check whether any of the excesses could be due to chance, but the test of significance can only enable confidence limits to be estimated. In particular, it is not possible to identify whether any relatively rare cause of death is genuinely increased but cannot be demonstrated to be significantly raised because of small numbers.

The present report, based on the follow-up for more than 15 years of nearly 2000 hairdressers, provides no support for other work which has suggested that hairdressers or barbers are at risk of certain cancers. This is, of course, only one oblique study of the influence of hair dyes—a query initially set off by studies of mutagenicity of the chemicals involved.¹ Because of the relatively firm evidence that there might be a potential hazard, indicated by short-term tests, there has been great concern to evaluate the human risk both to influence public health policy, and to see whether such tests are relevant in indicating a human hazard. The second part of this study will be the follow-up of women hairdressers. However, technical problems, namely, the lack of date of birth on the 1961 census computer records, mean that tracing women through the NHSCR is practicable only from the 1971 census.

Because of the very low average age of women employed in hairdressing and the limited period of time since the 1971 census, examination of their mortality patterns is not yet appropriate.

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