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SCIENTIFIC REPORT

Teenagers' perceptions of blindness related to smoking: a novel message to a vulnerable group

Phillip Moradi, Judith Thornton, Richard Edwards, Roger A Harrison, Stephen J Washington, Simon P Kelly

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Background: Cigarette smoking often starts in teenage years. It is not known whether teenagers are aware of the association of smoking with eye disease and blindness.

Aim: To explore the knowledge of the link between smoking, and eye diseases and blindness, and the likely impact of this knowledge among teenagers in UK.

Methods: A cross-sectional survey, using a structured interview of teenagers attending four organised social events, was conducted. Awareness and fear of blindness, and of three smoking-related diseases (lung cancer, heart disease and stroke) and a distractor condition (deafness) was investigated. The likelihood of smokers quitting on developing early signs of each condition was determined.

Results: A 92% "opt in" response rate was achieved. Out of 260 teenagers (16–18 years), 15%, 27% and 81% believed that smoking caused stroke, heart disease and lung cancer, respectively. Only 5% believed smoking caused blindness. Subjects ranked their fear of each of the five conditions, scoring five for the most feared and one for the least feared. Subjects were significantly ($p < 0.01$) more fearful (mean scores in brackets) of blindness (4.2) than of lung cancer (3.4), heart disease (2.3) and deafness (1.2). More teenagers ($p < 0.01$) said they would stop smoking on developing early signs of blindness compared with early signs of lung or heart disease.

Conclusions: Awareness of the risk of blindness from smoking is low among teenagers, but fear of blindness may be more likely to motivate teenagers to stop smoking than fear of lung or heart disease. Teenagers should be made more aware of the ocular risks of cigarette smoking as a novel public health measure.

The toxic components of cigarette smoke are well documented, and tobacco remains the leading cause of disease, disability and premature death.¹ Many eye diseases are associated with the harmful processes that occur during exposure to cigarette smoke.² Nuclear cataract and age-related macular degeneration (AMD) are accelerated by smoking^{3,4} as well as other ocular morbidities such as retinal ischaemia, anterior ischaemic optic neuropathy and Graves' ophthalmopathy.^{2,5} In the UK, 214 000 individuals may have impaired vision because of AMD,⁶ of whom it is estimated that 52 000 are visually impaired or blind, secondary to smoking-related AMD.⁷

Cigarette smoking most often starts in late teenage years, and teenagers and younger adult smokers are the major source of new or "replacement" smokers for the tobacco industry. People who start smoking at an early age are more likely than other smokers to smoke for a prolonged period and to die prematurely from a smoking-related disease,⁸ but data on teenagers' awareness of the associations of smoking with health disorders are poorly reported. We explored UK teenagers' knowledge

about the link between smoking and eye disease and the likely impact of this knowledge among teenagers who smoke. Our aim was to determine whether teenagers are aware of the risk of eye disease from smoking and whether this information might act as a stimulus for them to stop smoking.

MATERIALS AND METHODS

Subjects and setting

Teenagers, aged 16–18 years, attending four organised youth functions (involving up to 1200 teenagers at each event) in Bournemouth, Winchester, Manchester and Southampton between April and June 2006 were invited to participate in an interview.

Data collection

Subjects were approached outside dancing venues with supervisors' verbal consent. Subjects participated in a structured interview conducted in public areas but out of earshot of other attendees to prevent conferring. Data collected included demographic details and smoking status. Smokers were defined as individuals who smoked one or more cigarettes daily. Ex-smokers were defined as individuals who previously smoked daily. By using a questionnaire previously validated in National Health Service outpatient adult attenders,⁹ participants were asked about their awareness of a link between smoking and the four smoking-attributable conditions (lung cancer, heart disease, stroke and blindness) and a distractor condition (deafness). The distractor condition, for which we are not aware of a causal link with smoking, was included for comparison and to reduce the risk of over-reporting for the blindness-related questions because of participants guessing the focus of the study. To assess the fear of developing each of the five conditions, participants were asked to rank them from most to least feared. Responses were scored from 5 (most feared) to 1 (least feared). Smokers were asked the likelihood that they would quit smoking on developing early signs of each condition.

Analysis

Data from all locations were combined for analysis. Statistical analysis was carried out using SPSS V10.1 or Confidence Interval Analysis (CIA) software. Wilcoxon's signed rank and Mann-Whitney U tests were used to compare fear rankings for paired and independent sample data, respectively. Confidence intervals (CIs) for differences in proportions were calculated using Wilson's method for paired data and Newcombe's method for non-paired data.

Abbreviation: AMD, age-related macular degeneration

RESULTS

Response and demographic profile

Of 283 teenagers approached, 260 (92%) agreed to participate. The mean age was 17.3 years. The population was comprised of 55% women, and included 88% white, 3% Asian and 9% Afro-Caribbean teenagers. There were no significant differences in sex and ethnicity between teenagers attending the four youth events. Of 143 female participants, 30 (21%) were daily smokers, 100 (70%) non-smokers and 13 (9%) ex-smokers. The 117 male participants included 18 (15%) daily smokers, 95 (81%) non-smokers and 4 (3%) ex-smokers.

Awareness of the link between smoking and blindness

The proportion of teenagers who believed smoking "definitely" or "probably" caused stroke, heart disease and lung cancer was 39 (15%), 70 (27%) and 210 (81%), respectively. However, only 14 (5.4%) believed smoking caused blindness compared with 39 (15%) for deafness. The differences between the proportion believing that blindness could be caused by smoking and that believing each of the other conditions as causes was significant ($p < 0.001$, Mann-Whitney U test). Only 1 out of 48 (2%) smokers believed that smoking caused blindness compared with 13 of 212 (6%) non-smokers, although the difference of 4% (95% CI 1% to 6%) was not significant.

Fear of blindness and other conditions

The median (mean) fear ranking score was 3 (3.4) for lung cancer, 2 (2.3) for heart disease, 2 (2.4) for stroke, 4 (4.2) for blindness and 1 (1.2) for deafness (fig 1). The differences in rankings between each of the four other conditions and the ranking for blindness were all significant ($p < 0.001$, Wilcoxon's signed rank test). The median (mean) score for fear of blindness was 4 (4.1) among non-smokers and 4 (4) among smokers, with no significant difference in rankings (Mann-Whitney U test).

Stimulus to quit on developing early signs of disease

The difference in proportions of participants stating that they would quit on developing early signs of blindness (90%) compared with early signs of lung cancer (78%) was 12% (95% CI, 8 to 14%), and that for early signs of blindness compared with early signs of stroke or heart disease (80%) was 10% (95% CI 7% to 12%). These differences were significant ($p < 0.01$). There was no difference by sex for any of the questions posed.

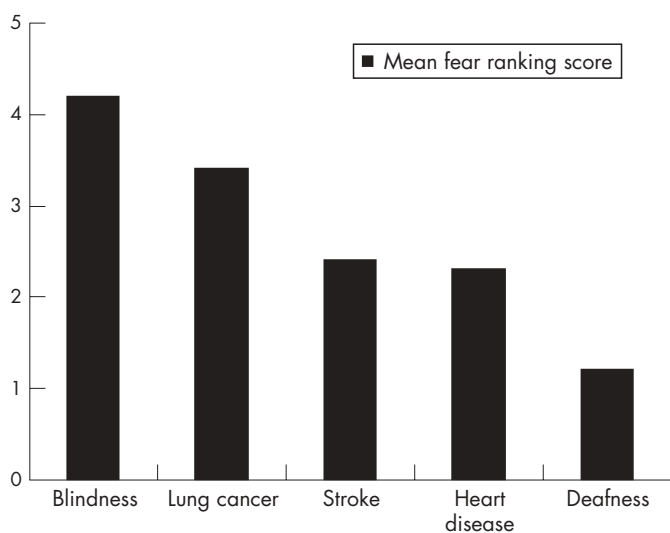


Figure 1 Mean score for fear of developing smoking attributable conditions.

DISCUSSION

Despite a reduction in the overall prevalence of smoking in the UK in recent decades, there has been little change in smoking rates among young people.¹⁰ In 2005, 42% of secondary school girls and 37% of boys <16 years old had ever smoked.¹⁰ In 2004, 26% of men and 23% of women aged 16–19 years were regular smokers.¹⁰ Our study is the first to have examined the awareness and likely impact of the link between smoking and blindness in teenagers. The results showed that few young people, both smokers and non-smokers, were aware that smoking causes blindness. This contrasted with higher awareness that smoking causes lung cancer, although teenagers' awareness that smoking causes cardiovascular disease was only moderate. Teenagers stated that they were more fearful of blindness from smoking than of developing lung cancer or cardiovascular diseases. This is significant given the major investment in health promotional activities drawing attention to these risks.

Strengths of this study included the large sample size and high response rate, and the use of survey questions that had been validated through use in our previous study.⁹ Our study had some limitations. We used a convenience sample of teenagers attending public, organised youth gatherings. These may not be representative of general teenage populations. Most of the participants in the study were white, with few responders from other ethnic groups.

A recent report described the hazardous use of tobacco, alcohol and drugs by young people in the UK and its implications for policy.¹¹ The report recommended the need to provide teenage school pupils with accurate, credible and consistent information to redress the disappointing impact of current drug prevention classes. The low level of awareness of the link between smoking and blindness in teenagers reflects both a lack of general health promotion information on this topic and its omission from the Schools National Curriculum. The health educational courses taught in all schools, although including information on the adverse health effects of smoking, need to be updated to include poor ophthalmic health. In a meta-analysis of 48 smoking cessation studies in teenagers, quit rates were higher in school-based clinical and classroom approaches compared with control conditions.¹²

There is a lack of awareness in general of this link between smoking and eye disease. Results from a study of the awareness of the link between smoking and eye disease among National Health Service outpatient adult attenders with the same survey tool were comparable using these results in teenagers.⁹ In 2005, the AMD Alliance International conducted a global survey to assess the awareness of AMD and its risk factors (http://www.rnib.org.uk/xpedio/groups/public/documents/PublicWebsite/public_smokingreportp.pdf). Out of 1023 UK adults interviewed by telephone, only 7% thought that smoking could harm their eyes.

In both adults and teenagers, this lack of awareness but subsequent increased desire to quit once aware of the association between smoking and eye disease suggests that wider health promotional campaigns should be instituted. "Smoking causes blindness" is a compelling stark message that has been suggested by the Royal College of Ophthalmologists and partners.¹³ Preliminary data on the effect of television advertisement campaigns on a call to national quitlines in Australia¹⁴ and New Zealand¹⁵ show that the link between smoking and blindness acts as a powerful stimulus for smokers to quit. The UK Department of Health has recently launched initiatives aimed at young people, highlighting that smoking causes wrinkles and impotence. Currently, no European Union member state issues warning messages on tobacco products highlighting the ocular hazards of smoking. The European

Union Commission has stated that revision of tobacco warnings will be necessary to maintain and increase their effectiveness and to take account of new scientific developments; the risk of blindness may be considered as one of the first new messages.¹⁶

Eye care practitioners, particularly high street optometrists, should also consider asking their adolescent patients whether they smoke and to provide advice on quitting to smokers. Currently this opportunity is untapped¹⁷ and there are opportunities for ophthalmologists to improve their practice on smoking advice.¹⁸

Our study adds weight to targeting teenagers, with the novel message "smoking causes blindness".

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