Awareness of smoking risks and attitudes towards graphic health warning labels on cigarette packs: a cross-cultural study of two populations in Singapore and Scotland

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Abstract

Background Little is known about the level of awareness of blindness as a smoking-related condition, although the relationship has been well established.

Aim To compare the awareness of smoking risks and the impact of graphic health warning labels on cigarette packs in discouraging smoking among adults in Singapore and Scotland.

Methods A cross-sectional survey using a structured interview of adults in ophthalmic, general medical, and general surgical outpatient clinics in Singapore and Scotland.

Results One hundred and fifteen out of 163 (70.6%) outpatients in Singapore and 105 out of 112 (93.8%) outpatients in Scotland responded to the study. In both samples, awareness levels for smoking-related diseases such as lung cancer, mouth and throat cancer, heart disease, and stroke were all greater than 85%. These were found to be significantly higher than the level of awareness of blindness as a smoking-related condition (χ^2 -test, $P < 0.001$). Although the awareness of blindness as a smoking-related condition was greater in Singapore (36.5%) than in Scotland (30.5%), this difference was not statistically significant. More than half of the respondents indicated that graphic health warning labels would be effective in discouraging them from smoking.

Conclusion Graphic health warning labels reading 'Smoking causes blindness' printed on cigarette packs may be useful in raising public awareness of blindness as a smoking-related condition and discouraging the habit of smoking in Singapore and Scotland.

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Introduction

Smoking is known to be a risk factor for respiratory, cardiovascular, and malignant diseases. In addition, some studies have also shown a strong association between smoking and ocular diseases such as age-related macular degeneration, cataract, Graves' ophthalmopathy, and glaucoma.¹

Despite this relationship, much of the general public is unaware of this link, compared with other more well-known conditions such as lung cancer, oral cancer, stroke, and heart attack.² A recent British study on 260 teenagers showed that although 81, 27, and 15% believed that smoking causes lung cancer, heart disease, and stroke, respectively, only 5% were aware that it causes blindness. However, the teenagers were significantly more fearful of blindness than of lung cancer, heart disease, or stroke. In addition,

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more teenagers said they would stop smoking on developing early signs of blindness compared with early signs of lung cancer, heart disease, and stroke.³ In view of this, it is important to raise the awareness of the relationship between smoking and blindness, and to encourage smoking cessation.

In an effort to discourage smoking, a number of countries such as Australia, Canada, Brazil, and Singapore have used graphic health warning labels to educate the public about the health hazards of smoking. Such labels were first printed in Singapore in 2004 and subsequently revised in 2006.⁴ In addition, recent legislation passed in the United Kingdom will also require cigarette packs to carry such labels by 2009.⁵ In 2001, a study conducted in Canada revealed that graphic health warning labels were effective in discouraging smoking among smokers, with approximately one-fifth of smokers decreasing their cigarette consumption as a result of the labels.⁶ Singapore and Scotland are both countries in the developed world with differing approaches to tobacco control, as well as a significant difference in the prevalence of smoking between the two countries (13% in Singapore⁷ and 25% in Scotland⁸).

This cross-sectional study conducted in Singapore and Scotland aims at exploring the level of awareness among adult outpatients on the association between smoking and blindness, as well as their response to graphic health warning labels discouraging smoking.

Materials and methods

Subjects and setting

Adults attending ophthalmic, general medical, and general surgical outpatient clinics from November 2007 to February 2008 in Alexandra Hospital, Singapore and Ninewells Hospital, Scotland were invited to participate in the study. Participants between the ages of 21 and 80 years were included and those unable to give written informed consent or complete the questionnaire were excluded.

Alexandra Hospital serves a population of about 310 000 in mid-western and southern Singapore, and Ninewells Hospital serves a population of 400 000 in east-central Scotland.

Data collection

Data from randomly selected participants were collected using a structured interview, which included the participant's demographic details and smoking status. All interviews were conducted by the same interviewer (DHLN). The setup of the questionnaire was based partly on that used by Bidwell *et al*² and Moradi *et al*.³ Subjects

were asked to grade how harmful they thought smoking was to health on a scale of 0–10 (with 0 being 'not harmful' and 10 'harm resulting in death') and their opinion of whether they believed there was a link between smoking and six medical conditions—namely heart disease, stroke, lung cancer, mouth and throat cancer, blindness, and deafness. Subjects were then asked to choose the one condition that they would prevent if it was possible to prevent only one, as well as the one condition for which they would seek treatment for if it was possible to treat only one. They were then asked to rank the six conditions in order from the one they feared most (1) to the one they feared least (6).

Following this, subjects were shown warning labels that have been used on cigarette packs in Australia.⁹ They were then asked for their response to the warning labels with respect to the amount of fear and disgust experienced, as well as the level of motivation that the warning labels would provide to non- and ex-smokers to discourage them from smoking and to current smokers to encourage them to quit smoking. These were graded on a scale of 0–10 (with 0 being 'not at all' and 10 being 'a lot'). The graphic warnings were as follows: 'Smoking causes heart disease', 'Smoking causes blindness', 'Smoking causes lung cancer', 'Smoking causes mouth and throat cancer', and 'Smoking doubles your risk of stroke'. Respondents in Singapore were also asked if they had actively avoided looking at the warning labels already in use on cigarette packs.

Statistical analysis

All data collected from both study sites were analysed using Microsoft Excel 2000 (Microsoft Corporation, USA).

Ethics approval for this study was obtained from the Domain Specific Review Board in Singapore and the NHS Tayside Committee on Medical Research Ethics in Scotland. Permission for the use of the Australian graphic health warning labels in this study was also obtained from the Australian government.

Results

Response and demographic profile

The response rates among those eligible to participate were 70.6% (115/163) in Singapore and 93.8% (105/112) in Scotland. In Singapore, the majority of interviews were conducted in English. Thirteen percent (15/115) of the interviews were conducted in Mandarin for respondents who did not possess an adequate understanding of the English language, with the content of the graphic warnings translated into Mandarin. All interviews in Scotland were conducted in English. The respondents'

Table 1 Participants' demographic profile and smoking status

	Singapore (N = 115)	Scotland (N = 105)
Mean age (range, years)	49.8 (21–75)	54.8 (21–78)
Sex (N)		
Male	57	54
Female	58	51
Ethnicity (N)		
Caucasian	1	105
Chinese	81	0
Malay	15	0
Indian	14	0
Others	5	0
Smoking status (N)		
Current smoker	5	21
Ex-smoker	22	36
Non-smoker	88	48

demographic details and smoking status are listed in Table 1.

The respondents in Singapore were predominantly Chinese, while all respondents in Scotland were Caucasian. The most striking difference between the two populations was in the proportion of current smokers (4 and 20% in Singapore and Scotland, respectively).

Level of harm of smoking to health

There was no significant difference in the mean score for the perceived level of harm that smoking has on one's health in the two study populations, namely, 9.0 and 9.1 in Singapore and Scotland, respectively (χ^2 -test, $P = 0.98$). Sixty percent (69/115) of respondents in Singapore and 67.6% (71/105) in Scotland believed that smoking was extremely harmful to health, capable of resulting in death. In both countries, only about 5% scored the health-related harm of smoking as 5 or less.

Awareness of smoking-related conditions

In both Singapore and Scotland, the awareness levels of the link between smoking and lung cancer were highest at over 95% (Table 2). This was followed by that of mouth and throat cancer, heart disease, and stroke, which were all over 85%. Only 36.5% in Singapore and 30.5% in Scotland were aware of the association between smoking and blindness. This difference between the two countries was not statistically significant (χ^2 -test, $P = 0.34$). In both study populations, however, the difference between the awareness of blindness as a smoking-related condition and that of other smoking-related conditions (χ^2 -test, $P < 0.001$) was statistically significant.

There was a significant difference between the proportion of Singaporean and Scottish participants who believed that deafness was related to smoking (χ^2 -test, $P < 0.001$). This tendency of Singaporean participants to associate deafness with smoking may suggest (but does not prove) a general tendency to over-associate all the study conditions to smoking in this study population. Alternatively, it may be an indication that Singaporean participants are more aware of the growing body of evidence linking deafness to smoking.¹⁰

Ranking of fear of smoking-related conditions

Of the six diseases, majority of respondents in both populations would choose to both prevent (Singapore—32.2%; Scotland—38.1%) and treat (Singapore—32.2%, Scotland—40.1%) lung cancer first. Although lung cancer and heart disease were the two most feared conditions in both populations, the two populations differed on the ranking of the third most feared condition, this being stroke (18.3%) and blindness (17.1%) in Singapore and Scotland, respectively. However, there was a significant difference between the two populations with regard to the proportion of respondents who feared blindness most, this being 17.1% in Scotland and 7.8% in Singapore (χ^2 -test, $P = 0.035$). Deafness was the least feared condition in the majority of respondents in both populations, constituting 79.1 (91/115) and 80.0% (84/105) in Singapore and Scotland, respectively.

Main stimulus for smoking cessation

Personal health was the main stimulus (50.0% in Singapore; 69.4% in Scotland) for smoking cessation in smokers and ex-smokers. Other significant stimuli included financial costs of smoking and health of their family members.

Emotional response to warning labels

The mean score for the amount of fear experienced was 6.8 in Singapore and 5.6 in Scotland, while the mean score for the amount of disgust experienced was 7.4 in Singapore and 6.4 in Scotland. Twenty percent (23/115) of respondents in Singapore and 26.6% (28/105) in Scotland indicated that they experienced no fear at all when looking at the labels (χ^2 -test, $P = 0.24$). A total of 39.1% (45/115) in Singapore and 25.7% (27/105) of those in Scotland felt extremely fearful when looking at the labels (χ^2 -test, $P = 0.034$). Overall, 12.2% (14/115) in Singapore and 22.8% (24/105) in Scotland found that the labels were not at all disgusting (χ^2 -test, $P = 0.036$),

Table 2 Awareness of smoking and disease

	Singapore awareness of smoking and disease (N = 115)			Scotland awareness of smoking and disease (N = 105)		
	Yes	No	Not sure	Yes	No	Not sure
Lung cancer	111/115 (96%)	3/115 (3%)	1/115 (1%)	103/105 (98%)	2/105 (2%)	0/105 (0%)
Mouth and throat cancer	106/115 (92%)	6/115 (5%)	3/115 (3%)	101/105 (96%)	4/105 (4%)	0/105 (0%)
Heart disease	104/115 (90%)	8/115 (7%)	3/115 (3%)	96/105 (91%)	5/105 (5%)	4/105 (4%)
Stroke	98/115 (85%)	9/115 (8%)	8/115 (7%)	94/105 (89%)	3/105 (3%)	8/105 (8%)
Blindness	42/115 (37%)	42/115 (37%)	31/115 (27%)	32/105 (31%)	46/105 (44%)	27/105 (26%)
Deafness	24/115 (21%)	47/115 (41%)	44/115 (38%)	3/105 (3%)	64/105 (61%)	38/105 (36%)

whereas 40.9% (47/115) in Singapore and 41.9% (44/105) in Scotland ranked a score of 10 for disgust when looking at the labels (χ^2 -test, $P=0.87$). Only 31.3% (36/115) of Singaporean respondents stated that they had actively avoided looking at the warning labels in use in Singapore. This question was not asked to the Scottish respondents as such labels were not in use in Scotland at the time of the study.

Motivation to avoid smoking

When asked to score the amount of motivation the labels would provide towards quitting smoking, 25.2% (29/115) of respondents in Singapore indicated a score of 0 compared with 29.6% (34/115) who indicated a score of 10 (χ^2 -test, $P=0.45$). In Scotland, 23.8% (25/105) indicated a score of 0 compared with 34.3% (36/105) who indicated a score of 10 (χ^2 -test, $P=0.09$). The mean scores for the level of motivation the labels would provide towards quitting smoking were 5.8 and 6.2 in Singapore and Scotland, respectively. A total of 58.3% (67/115) of respondents in Singapore and 63.8% (67/105) in Scotland indicated a score of 6 or more (χ^2 -test, $P=0.40$).

Discussion

Our study found that the awareness of blindness as a smoking-related condition among adult outpatients, in comparison with other smoking-related conditions, was relatively low in Singapore and Scotland. Notwithstanding the individual levels of awareness of smoking-related diseases, personal knowledge of the harm of smoking to one's health was generally well understood. The high levels of awareness for lung cancer, mouth and throat cancer, heart disease, and stroke could be attributed to the circulation of warning labels (either pictorial or non-pictorial) on cigarette packs, as well as the use of other media such as television in anti-smoking campaigns.⁷ However, the significantly lower level of awareness of the link between smoking and blindness could be due, in part, to the absence of campaigns communicating the harmful ocular effects of smoking.

Interestingly, a global survey found that although the awareness of blindness as a smoking-related condition was generally low in many countries, Australia had the highest awareness level at 77% of respondents. This finding is likely to be due to Australia's campaigns emphasising the message that smoking causes blindness, having printed the message on cigarette packs since 2006.¹¹

Some studies have found that the use of graphic health warning labels may be an effective stimulus towards smoking cessation.^{6,12} Although graphic health warning labels have been in circulation in Singapore since 2004, by demonstrating statistically significant differences in those experiencing no disgust ($P=0.036$) and those experiencing the strongest level of fear ('extreme') ($P=0.034$), this study shows that graphic health warning levels appear to retain their effectiveness in encouraging the public to avoid smoking. Furthermore, there was no significant difference between the two samples in the amount of motivation the labels provided against picking up or quitting smoking, which adds weight to this argument.

One limitation of our study is the use of convenience sampling from outpatient clinics in the hospital, and the findings may therefore not be representative of the general population. Another limitation is the small number of smokers surveyed in the Singaporean population. However, this might be because of the lower prevalence rates of smoking in Singapore (13%)⁷ than in Scotland (25%).⁸ Individual scores for the level of fear or disgust experienced should also have been obtained for each graphic health warning, to allow for better comparison. As the aim of the study was to examine the effect of graphic health warning labels on smoking cessation behaviour, it may also have been more prudent to survey smokers rather than non-smokers.

As health—both personal and family—were important motivational factors for smoking cessation in both current and ex-smokers, it is important for the public to be appropriately informed of the health risks associated with smoking, including the dangers of passive smoking, which can also make their family members vulnerable to the same health-related effects of

first-hand smoke. Financial consideration was also another strong motivational factor, which indicates the effectiveness of increased tobacco taxation in discouraging smoking.

Many respondents in both populations mentioned that they did not find the labels scary or disgusting, but informative. These labels are in fact akin to the nutrition information labels on food products, and aim at providing an accurate as possible image of the health-related effects of smoking and provide the consumer information about the product. As such, the widespread publication of such labels, in addition to other measures such as smoking bans, can contribute to building a society where not smoking is the norm.

Although autonomy is the final determinant for one's smoking behaviour, the use of graphic health warning labels can provide an important source of education for all, regardless of their smoking status. Owing to the widespread availability of cigarette packs and the effectiveness of graphic labels in smoking cessation, a label reading 'Smoking causes blindness' printed on cigarette packs, such as that used in Australia, may have a twofold effect of raising awareness of the link between smoking and blindness, as well as discouraging the habit of smoking. In fact, efforts to create such awareness have been gaining momentum in the United Kingdom.¹³ In addition, the European Parliament also published the Green Paper 'Towards a Europe free from tobacco smoke: policy options at EU level,' with specific mention of the relation between smoking and blindness.¹⁴

In conclusion, our study shows the low awareness of blindness as another smoking-related condition in Singapore and Scotland. 'Smoking causes blindness' is a compelling novel health message, which should be exploited more fully by public health professionals and eye care professionals to reduce the prevalence of smoking.

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