

# Perceptions of risk of cervical cancer and attitudes towards cervical screening: a comparison of smokers and non-smokers

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**Objectives.** The aim of this study was to compare smokers' and non-smokers' perceptions of risks of cervical cancer and attitudes towards cervical screening.

**Methods.** A cross-sectional descriptive study was carried out in 722 women aged between 20 and 64 years.

**Results.** While smokers perceived their relative risk of heart disease to be greater than that of non-smokers, they did not perceive their risks of cervical cancer to be greater. Smokers held less positive attitudes towards cervical screening than did non-smokers. Smokers and non-smokers did not differ in their intentions to attend for cervical screening: for both groups, intentions were very high. Using logistic regression analysis, both attitudes towards cervical screening [odds ratio (OR) 1.9; 95% confidence interval (CI) 1.7–2.2] and perceived relative risk of developing cervical cancer (OR 1.5; 95% CI 1.0–2.1) were predictive of intentions to attend for screening, as well as educational level (OR 3.8; 95% CI 1.2–11.3) and marital status (OR 0.6; 95% CI 0.3–0.9).

**Conclusions.** Smokers seem unaware of their increased risks of cervical cancer and hence the increased value for them of regular smears. Evaluations are needed to determine the effectiveness of interventions delivered in the context of cervical screening aimed at (i) raising smokers' awareness of their increased risk of cervical cancer and (ii) stopping smoking.

**Keywords.** Cervical cancer, cervical screening, perceived risk, smoking.

## Introduction

There is now good evidence to suggest that smoking doubles the risk of cervical cancer.<sup>1</sup> There is also evidence that, for those with a low grade cervical abnormality, stopping smoking leads to improvements in ~50% of women.<sup>2</sup> Evidence linking smoking and cervical cancer was not strong at the time when most cervical screening programmes were established. As a result, the link between smoking and cervical cancer is not part of the routine messages used in cervical screening programmes in many countries. To help in the design of such messages, it is important to know women's awareness of such links. The first aim of the current study is to compare smokers' and non-smokers' perceptions of the risk of cervical cancer.

While non-smokers perceive smoking as more damaging than do smokers,<sup>3,4</sup> nonetheless, the majority

of smokers are aware of the more common health-damaging effects of cigarette smoking.<sup>5,6</sup> The most commonly cited health consequences are lung cancer and circulatory problems. Few, if any, individuals mention risks of cervical cancer in response to open questions about the illnesses caused by smoking.<sup>4</sup> Several studies show that many women undergoing cervical screening are unaware of the risk factors for cervical cancer, of which smoking is one.<sup>7–11</sup> Orbell and colleagues found that smoking status was unrelated to perceived need for a cervical smear, suggesting no association between smoking and perceived vulnerability, although the latter was not assessed directly.<sup>12</sup> In summary, the evidence to date suggests that smokers do not perceive their risks of cervical cancer to be higher than those of non-smokers.

Given smokers' increased risks of cervical cancer, they have more to gain than non-smokers from attending for screening. The evidence concerning the association between smoking and attendance for cervical screening is equivocal, with some studies finding it unrelated,<sup>12,13</sup> but others finding smokers less likely to attend.<sup>8</sup> A further aim of the current study is to determine whether smokers and non-smokers hold similar attitudes towards cervical screening.

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## Methods

### Participants

The sample comprised 722 women aged between 20 and 64 years of age, recruited throughout England. The age range was selected to reflect that of women participating in the National Cervical Screening Programme. The sample was also selected to be representative of educational level for this age group of women. The data reported in this paper were collected as part of another study evaluating different ways of presenting negative smear results.<sup>14</sup>

### Measures

*Intention to attend for cervical screening.* Intentions to attend for cervical screening 3 years hence were assessed using a 7-point rating scale ranging from 1, definitely do not, to 7, definitely do.

*Attitude towards cervical screening.* This was assessed using the combined responses to two questions:

- (i) "How important are regular smears for women to remain healthy?" Responses were made on a 7-point scale ranging from 1, not at all important to 7, extremely important;
- (ii) "How useful is cervical screening?" Responses were made on a 7-point scale ranging from 1, not at all useful, to 7, extremely useful.

The alpha coefficient of reliability for the two scales was 0.82.

*Perceived value of exercise and not smoking.* These were assessed by asking respondents to state how important they considered each to be for a woman to remain healthy, rated using a 7-point scale ranging from 1, not at all important, to 7, extremely important.

*Perceived risk of cervical cancer and heart disease.*

- (i) Absolute risk. This was assessed by asking respondents to state how likely they were to develop (a) cervical cancer, and (b) heart disease, using 7-point scales ranging from 1 not at all likely, to 7, extremely likely.
- (ii) Relative risk. Respondents were asked to state whether they considered their risks for each of these diseases to be much below average, below average, average, above average or much above average.<sup>5</sup>

*Smoking.* Current smoking status was inferred from responses to one question asking those who smoked to state their intentions to stop smoking over the next 6 months.

*Demographic characteristics.* Participants provided information on their age, marital status, educational

qualifications, whether they had ever had a cervical smear and whether they had ever had an abnormal result.

### Procedure

Participants were approached by recruiters across England, employed by a research agency (Research Initiatives Ltd), and asked to complete a questionnaire concerning women's health. The response rate was not recorded but was estimated to be >95%.

## Results

The demographic characteristics of the sample, according to smoking status, are shown in Table 1. This sample was less well educated than the general population for this age group of women, amongst whom 14% have a university degree, 21% have no formal educational qualifications and 65% have qualifications below degree level (Department for Education and Employment, 2000, personal communication).

The sample comprised 257 smokers, 36% of the total sample. The two groups were similar in age and cervical screening history. They differed in marital status and level of education: smokers were less likely than non-smokers to be married or well educated. In order to control for the potentially confounding effects of these differences, the variances associated with marital status and education were partialled out of the dependent variables using regression analysis. The univariate tests reported in the tables below were therefore controlled with respect to group differences in marital status and education. For clarity, however, the data reported refer to the untransformed variables.

Smokers and non-smokers held similarly high intentions to attend for cervical screening in 3 years time

TABLE 1 Demographic characteristics and mood of smokers and non-smokers

	Smokers (n = 257)	Non-smokers (n = 465)	
Age	36.6 (10.9)	38.1 (10.3)	
Marital status			
Married/cohabiting	73% (187)	83% (385)	P < 0.001
Single	27% (70)	17% (80)	
Education			
Degree	2% (6)	8% (39)	P < 0.001
No qualifications	33% (84)	24% (111)	
Previous smear			
Yes	93% (239)	96% (446)	
No/don't know	7% (18)	4% (19)	
Previous abnormal smear			
Yes	20% (51)	21% (96)	

Results are given as means (SD) or % (n).

TABLE 2 Comparison of smokers' and non-smokers' perceptions

	Smokers	Non-smokers	
Intention to attend for cervical screening in 3 years	6.6 (1.1)	6.6 (0.9)	
Attitudes towards cervical screening	13.0 (1.9)	13.4 (1.3)	$P < 0.01$
Value of exercise	5.1 (1.7)	5.6 (1.5)	$P < 0.0001$
Value of not smoking	5.3 (1.7)	6.5 (0.9)	$P < 0.0001$
Perceived risk of cervical cancer			
Absolute	5.1 (1.9)	5.1 (2.0)	
Relative			
Much below average	6% (15)	9% (40)	
Below average	23% (59)	22% (100)	
Average	62% (161)	63% (289)	
Above average	9% (23)	6% (28)	
Much above average	–	1% (3)	
Perceived risk of heart disease			
Absolute	5.0 (2.0)	4.8 (2.0)	
Relative			
Much below average	9% (23)	10% (47)	
Below average	30% (77)	37% (168)	
Average	49% (127)	45% (206)	$P < 0.05$
Above average	12% (31)	7% (35)	
Much above average	–	1% (5)	

Results are given as means (SD) or % (*n*).

(Table 2): 75% (539/722) of women stated that they definitely intended to attend, i.e. they circled 7 on the scale.

While smokers and non-smokers held very positive attitudes towards cervical screening, smokers' attitudes were significantly less positive. Similarly, smokers held less positive attitudes towards regular exercise and not smoking. There were no differences between smokers and non-smokers in their perceptions of their absolute and relative chances of developing cervical cancer. For heart disease, smokers and non-smokers held similar perceptions of their absolute chances of developing heart disease, but smokers perceived their relative chances to be higher than those of non-smokers.

In order to conduct a logistic regression analysis predicting intention to attend for screening, intention was treated as a binary variable (dividing respondents into those who definitely intended to attend, and those who were less certain). Three groups of factors were entered: demographic variables (age, marital status, whether or not women had a degree); cervical screening history (whether or not women had had a smear before; whether or not women had had an abnormal smear); and attitudinal variables (attitude towards cervical screening, perceived absolute and relative risk of cervical cancer). Smoking status was also entered. Four variables were significantly predictive: positive attitude towards cervical screening [odds ratio (OR) 1.9; 95% confidence

interval (CI) 1.7–2.2], perceiving a higher relative risk of cervical cancer (OR 1.4; 95% CI 1.0–2.1), being single (OR 0.5; 95% CI 0.3–0.9) and having a university degree (OR 3.7; 95% CI 1.2–11.3) (Table 3).

## Discussion

While smokers perceived their relative risk of heart disease to be greater than did non-smokers, smokers and non-smokers held similar perceptions of their relative risks of developing cervical cancer. Smokers differed from non-smokers in their attitudes towards cervical screening although they did not differ in their intentions to attend for cervical screening: for both groups, intentions were very high. Having a positive attitude towards cervical screening and a higher perception of the relative chances of developing cervical cancer each predicted intention to attend for cervical screening.

There are several limitations to the current study that should be noted. The measure of smoking was indirect, i.e. it was inferred from responses to a question asking smokers to state how strongly they intended to stop smoking. While we are unaware of how biases in responding might have affected the study results, it seems likely that a direct measure would provide more precise data. A further limitation is that behaviour was not assessed directly, i.e. actual attendance for screening. Behavioural intentions have, however, been found to be strong predictors of a wide range of behaviours.<sup>15</sup> Furthermore, the demographic predictors of intention found in the current study are similar to those reported for actual attendance for cervical screening, providing evidence of the ecological validity of the current study.<sup>12,13</sup> The study sample is slightly less educated than the general population, but this difference is unlikely to account for the differences observed between smokers and non-smokers, for whom the effects of education were partialled out from the analyses.

TABLE 3 Logistic regression analysis to predict intention to attend cervical screening in 3 years time

	Odds ratio (95% CIs)
Age	0.99 (0.97–1.00)
Marital status	0.56 (0.32–0.91)
Educational level	3.76 (1.18–11.31)
Previous smear	0.50 (0.14–1.75)
Previous abnormal smear	0.61 (0.36–1.02)
Smoker	1.44 (0.91–2.28)
Attitude towards cervical screening	1.92 (1.65–2.23)
Perceived chance of cervical cancer (absolute)	0.92 (0.81–1.06)
Perceived chance of cervical cancer (relative)	1.50 (1.04–2.15)

The results of this study provide evidence to support the view that many women are unaware of the link between smoking and cervical health. This reflects the results of a survey of women undergoing cervical screening in Australia. Only 30% reported having their smoking status assessed and, amongst smokers, just 34% recalled being advised to stop smoking.<sup>16</sup> Stressing these links may have one of two desired effects: increasing the participation of smokers in the cervical screening programme and encouraging smokers to stop smoking.

Several studies suggest that there is an inverse association between participation and level of risk in that those at most risk of cervical cancer are least likely to attend.<sup>17-19</sup> It is unclear whether making individuals aware of their personal risks of cervical cancer will increase their participation. Without making reference to risks of cervical cancer due to smoking, a Dutch study showed that the method of inviting women for screening differentially affected those at increased risk. Personal invitations by a GP, as opposed to invitation through a national call system, resulted in an overall increase of 18% in attendance for screening, and a 28% increase in those at higher risk of cervical cancer.<sup>20</sup> It is possible that this effect may be enhanced by targeting predictors of intention to attend, namely attitudes towards screening, in particular its effectiveness. Although we are unaware of any study that has used this variable to predict actual attendance, there is a wealth of theory and empirical evidence from other areas showing its role as a predictor of behaviour.<sup>21</sup> Attitude towards cervical screening was a predictor for both smokers and non-smokers. Given that smokers have a less positive attitude towards cervical screening than non-smokers, interventions aimed at enhancing positive attitudes to screening have the potential to increase attendance for smokers more than for non-smokers. One factor that may reduce the effectiveness of such interventions is the defensiveness of smokers to health messages.<sup>22</sup> The less positive attitudes of smokers towards cervical screening may reflect a generally lower endorsement amongst smokers of behaviours that enhance health. In the current study, smokers held less positive attitudes towards regular exercise and not smoking.

It remains to be determined whether making women more aware of the link between smoking and cervical cancer will motivate them to stop smoking. To date, there has been one trial attempting to reduce smoking amongst women following cervical screening.<sup>23</sup> Women randomly allocated to a smoking intervention were presented with information describing the link between smoking and cervical cancer, and given a self-help booklet for stopping smoking. In addition, they received three telephone counselling calls. The intervention compared with the control had no impact upon stopping smoking. In discussing the possible reasons for this, the authors state that, despite being given information about the links between smoking and cervical cancer, women remained

sceptical. Such scepticism was also evident in an interview study of women smokers in the UK attending for treatment of a cervical abnormality.<sup>24</sup> Research in other areas of health care show that patients' explanatory models of illness predict the likelihood that they follow professional advice to treat or reduce the risks of an illness.<sup>25</sup> It therefore seems likely that for messages linking smoking and cervical cancer to be accepted, women need an explanatory model that links these two seemingly unconnected events.

In addition, it is possible that in order for interventions to maximize the motivating potential of information linking smoking and cervical cancer, they need to be delivered as part of screening. It may also be necessary for the information to be delivered by a health professional. Neither of these conditions pertained in the trial described above.<sup>23</sup> Women could be made aware of this link at any of several time points: when invited for screening; at the time of screening; and when results have been received. For women referred to a gynaecologist following detection of a cervical abnormality, this represents another opportunity.

In summary, smokers seem unaware of their increased risks of cervical cancer and hence the increased value for them of regular smears. Evaluations are needed to determine the effectiveness of interventions delivered in the context of cervical screening aimed at raising smokers' awareness of their increased risk of cervical cancer and hence the potential for them of reducing this risk by attending for screening, and stopping smoking.

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