Assessing the effectiveness of a screening campaign: who is missed by 80% cervical screening coverage?

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SUMMARY

A case-control study was conducted to assess the effectiveness of a regional call programme in reaching women at risk of cervical cancer. Home interviews were conducted with a random sample of 614 women aged 20–64 who were identified from a computerized register as either having had a smear test within the previous 3 years or not having an up-to-date smear history. Unscreened women fell principally into two age cohorts: under 35 years and over 50 years. A small social class differential was found to persist following the campaign. Overall, unscreened women were not at epidemiologically higher risk than the screened population. Thirty-five per cent of unscreened women reported never having had sexual intercourse compared to 3% of screened women: 17% of the unscreened and 38% of screened women reported two or more lifetime sexual partners. No difference was observed between screened and unscreened women in the frequency of current cigarette smoking (37% unscreeened, 38% screened). Cigarette smoking was, however, associated with social class (31% classes 1 or 2 compared with 50% classes 4 and 5). Level of practical difficulties did not differentiate those who attended from those who did not, suggesting that recent changes to delivery or screening services have been effective in ensuring equity of access. Non-attenders and lower class women held more negative attitudes towards the test procedure and were less likely to believe that they were at risk of cervical cancer. Perceived personal risk was not associated with cigarette smoking, suggesting that further attention might be given to this factor in educational campaigns. If persistent social class differences in uptake of preventive services are to be combatted, further attention should be given to the socio-cultural factors which lead some women to anticipate greater emotional distress in medical settings

INTRODUCTION

Effective screening to prevent deaths from cancer of the cervix depends on achieving adequate coverage amongst those at risk. Concern about levels of coverage generally and amongst older women and women of lower social classes in particular has led to the establishment of call programmes and delivery of screening services through general practice[1-3]. To date, no study has reported on the effectiveness of these changes in service delivery in reaching women at risk of cervical cancer and in removing socio-demographic differences in uptake. The present paper reports the results from a Cancer Research Campaign funded study of women remaining unscreened following a regional campaign and call programme.

The study had three principal aims. First, to establish the socio-demographic and behavioural risk characteristics of women with no up to date screening history following the call and to compare these with those of the screened population. It has been suggested that initial response to provision of preventive health care is often highest amongst those at lowest objective disease risk[4,5]. It was an aim of the present study to compare behavioural risk characteristics of women remaining unscreened in a region where levels of total coverage are quite high. The second aim of the study was to investigate the effectiveness of the campaign and call in removing practical difficulties in attendance. Difficulties with appointment times and with access to a choice of screening sites were identified as barriers to uptake in early work on cervical screening[1,6-9]. If the changes to health service delivery since these studies were conducted have been effective, we expected to find no differences in reported practical obstacles to attendance between the screened and non-screened populations. Finally, we investigated the importance of women's beliefs and attitudes in explaining non-uptake. Previous studies of uptake have suggested that

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non-attendance is associated with perceived ineligibility for the test and negative views of the test[6-9]. We were able to assess the extent to which the campaign has modified women's perceptions of their own vulnerability to cervical cancer, and the extent to which beliefs about risk are related to women's actual risk status in terms of sexual experience and cigarette smoking. We also examined the persistence of negative views of the test procedure amongst unscreened women and examined the extent to which negative views explained socio-demographic differences in uptake.

METHODS

Screening in Tayside

A call programme of previously unscreened women was begun in Tayside in 1987 and completed in 1989[10]. The programme uses a computerized register of all women based on the community health index. General practitioners (GPs) were notified of women not listed as having had a smear within the last 3 years and they then issued personal invitations to women. The system allows for up to three invitations, and invitations were accompanied by leaflets explaining the purpose of cervical screening. Following the call 78% of women in the region aged 20–60 years had been screened[11]. By 1990, following the introduction of the new GP contract, this figure had risen to 85% amongst women, aged 21–60 years[12].

A random sample of women with no screening history was drawn from the Tayside Community Health Index. Sampling was in two stages. Twenty-three GPs were randomly selected from all those practising in Tayside with a list size greater than 1000. Women aged 20–64 years at the start of the study but no more than 60 years at the time of the last invitation to attend for screening were randomly sampled form these lists. A total of 660 non-screened women were sampled. Of these 153 were confirmed to have moved and 32 were ineligible for the test because of a hysterectomy or a test in another district. Of the remainder 307 were interviewed, giving an interview response rate of 66%. A total of 417 women with up to date screening histories were also drawn from the computer register. Of these, 41 were no longer in the area and of the remainder, 90% were interviewed, providing an age matched sample of 307 screened women. The overall response rate for the study was 77.5%. A detailed account of the contact procedures used in the study have been provided elsewhere[13].

As response rate was associated with screening status, checks were made to investigate the possibility that the obtained sample of unscreened women were a socio-demographically biased sample. No association was observed between the ages of those interviewed and those not interviewed ($\chi^2=1.66$, df=2, $P=0.44$), nor between response and social class measured by means of a social deprivation score[14] based on postal codes ($\chi^2=1.84$, df=6, $P=0.93$).

Semi-structured interviews were conducted by a qualified nurse in women's own homes[15]. Women were asked to report their marital status, occupation and husband's occupation. Age was determined from GP records. Women were also asked to read a card and indicate whether their lifetime sexual experience corresponded to no partners, one partner, two to five partners or five or more partners. Cigarette smoking was assessed by two questions concerning current and past smoking habits. A series of questions were included to assess women's attitudes and beliefs concerning the cervical screening test. The beliefs we investigated were derived from the Health Belief Model[16]. First, women were asked if they perceived themselves to be at risk of cervical cancer, whether they felt they should have the test, and whether they felt other women their age should have the test. Secondly, women were asked about the costs and benefits of the smear test. We conducted open-ended pilot interviews with 56 women at one health centre in which women were asked to list any benefits or costs of cervical screening. The most frequently reported benefits: 'Any problems found will be curable', 'The test will give me peace of mind'. The most frequently reported costs: 'I will find the test embarrassing', 'I will be very anxious'. 'Early changes will be discovered', were included in the questionnaire for the main study. Finally, women were asked about any practical obstacles to attendance. Women were asked which, if any, of six potential obstacles applied to them: paid employment; difficulties with transport; a medical problem; lack of time; cost of travel; a dependent child or elderly person. These factors have been reported as obstacles to attendance in previous studies of screening uptake[6,7].

RESULTS

Sociodemographic characteristics of screened and unscreened women

Age, marital status and social class characteristics of screened and unscreened women are shown in Table 1.

Non-screened women fell principally into two age cohorts. Forty-two per cent were aged 20–34 years and 44% were aged over 50 years. Taking all ages together, unscreened women were more likely to be single ($\chi^2=64.05$, $P<0.01$). Social class was determined from husband's occupation for married women and own occupation for single women. Unscreened women were less likely to be of social classes 1 or 2 (23% compared with 30%) and this difference was significant ($\chi^2=12.08$, $P=0.05$).

Behavioural risk

Number of sexual partners and smoking habits reported by women are shown in Table 2. A significant association was observed between number of sexual partners and screening

Table 1 Percentages of screened and unscreened women in each age group by marital status and social class

	Age group (%)			All ages (%)
	20–34 (n=128)	35–49 (n=43)	50+ (n=136)	(n=307)
Marital status**				
Never screened				
Single	83	51	26	53
Married	15	42	51	35
Divorced/widowed/Sep	2	7	23	12
Screened				
Single	51	2	5	23
Married	45	75	82	66
Divorced/widowed/Sep	4	23	13	11
Social Class*†				
Never screened				
Class 1 and 2	18	30	24	23
Class 3	42	28	43	41
Class 4 and 5	10	28	30	21
Other	30	14	3	15
Screened				
Class 1 and 2	28	41	28	30
Class 3	40	34	44	41
Class 4 and 5	14	16	25	19
Other	18	9	3	10

Chi-square statistic significant at *P<0.05, **P<0.01
†Women were classified according to their own occupation if not married and according to their husband's occupation if married. Other principally comprises students, armed forces and unclassifiable responses
Sep=separated

Table 2 Percentages of screened and unscreened women in each age group by number of sexual partners and cigarette smoking

	Age group (%)			All ages (%)
	20–34 (n=128)	35–49 (n=43)	50+ (n=136)	(n=307)
Number of sexual partners in lifetime**				
Never screened				
None	48	33	23	35
One	21	46	49	37
Two to five	23	12	13	16
More than five	1	0	1	1
Unknown	7	9	15	11
Screened				
None	5	0	2	3
One	30	40	73	51
Two to five	53	37	13	33
More than five	9	9	1	5
Unknown	3	14	11	8
Cigarette smoking				
Never screened				
Never smoker	68	37	28	46
Ex-smoker	5	26	25	17
Current smoker	27	37	47	37
Screened				
Never smoker	47	44	37	40
Ex-smoker	16	14	30	22
Current smoker	37	42	37	38

Chi-square statistic significant at *P<0.05 **P<0.01

status (χ^2=110.55, P<0.01). Non-screened women were more likely than screened women to have never had sexual intercourse (35% versus 3%). Considering all ages together, 17% of unscreened women and 38% of screened women had had two or more lifetime sexual partners. The greatest proportion of women having had more than one sexual partner occurred in the 20–34 years age range. No association was found between social class and number of sexual partners.

No association was observed between screening status and cigarette smoking. Just over one-third of each sample reported currently smoking cigarettes (χ^2=3.28, P=0.19). When age specific rates of smoking were examined, unscreened women in the 20–34 years age group were more likely to be non-smokers (68%) than those who had been screened (47%) and this difference was significant (χ^2=14.14, P<0.01). The frequency of cigarette smoking was significantly associated with social class. Across all age groups 31% of those from classes 1 and 2, 39% class 3 and 50% of women from classes 4 and 5 were current smokers (χ^2=14.11, P<0.01).

There was a significant tendency for cigarette smoking to become more frequent as lifetime sexual experience increased. Twenty-one per cent of those who had never had sexual intercourse were current smokers, compared to 38% of those with one sexual partner and 49% of those with two or more partners (χ^2=42.23, P<0.01).

Attitudes and beliefs concerning cervical screening

Non-screened women were less likely to believe that they were at risk of cervical cancer or that they needed a test (χ^2=224.7, P<0.01) and also perceived their own level of risk as lower than that of other women their age [Table 3(a)]. The question that follows from this observation is whether the non-screened held realistic views of their own invulnerability compared to other women. The figures in Table 3(b), show that it is women who have never had sexual intercourse who believe they are at less risk than most women their own age, indicating realistic risk appraisal.

Table 3 **Women's beliefs concerning their need to be screened for cervical abnormalities**

	I think I personally need to have a smear test (%)	I think most women of my age need to have a smear test (%)
(a) Beliefs by screening status		
Screened	96	97
Unscreened	39	59
(b) Beliefs by sexual experience		
One sexual partner	77	82
Never had sexual intercourse	29	64
(c) Beliefs by smoking habit		
Current smoker	70	77
Ex-smoker	72	82
Never smoked	65	77

However, Table 3(c) shows that remarkably similar proportions of smokers and non-smokers considered they should have the test and women did not discriminate between their own risk and that of other women their age on the basis of their smoking status.

Table 4 **Women's beliefs about the cervical screening test: indicating whether each outcome is likely or very likely**

	Screened women (%)	Unscreened women (%)
I will find the test embarrassing	31	73
I will be very anxious	36	73
Early changes will be discovered*	21	21
Any problems found will be curable	80	74
The test will give me peace of mind	96	67

*This wording was chosen after pilot studies with 56 women

Table 5 **Women's evaluations of negative outcomes at screening: indicating whether each outcome would be likely or very likely to stop them attending**

	Screened women (%)	Unscreened women (%)
Embarrassment	3	43
Anxiety	3	42
Discovery of early changes	1	26

Women were also asked about their beliefs about the smear test (Tables 4 and 5). Unscreened women were more likely to anticipate embarrassment ($\chi^2=106.93$, $P<0.01$) or anxiety ($\chi^2=88.35$, $P<0.01$) during a future test. No association was found between age and expectations of distress.

Interestingly, screened and unscreened women did not differ in their expectations of receiving a positive test result if they were to attend for a test. Following the pilot studies amongst 56 women, the wording chosen for his question was 'how likely is it that early changes will be discovered?'. Amongst both groups, 21% of women felt a positive result was likely or very likely. This percentage is only slightly higher than the actual percentage of women receiving call-backs or suspicious results in Tayside (Robertson, personal communication, 1992).

Whilst beliefs concern the perceived *likelihood* that a particular outcome such as embarrassment or a positive result will occur if a woman attends for a test, the impact of this belief on her behaviour may depend to a large extent on the *value* she attaches to these outcomes. Table 5 shows that although a proportion of the screened women felt negative experiences were likely if they attended screening, they were less likely than unscreened women to attach significant value to these outcomes. These differences are clearly significant (all at $P<0.01$).

Overall, about three-quarters of women (77%) believed that any problems detected by screening would be curable and no significant difference was observed between screened and unscreened women. However, nearly all screened women felt the test would be beneficial in giving them peace of mind (96%), compared with unscreened women (67%). This difference was significant ($\chi^2=83.42$, $P<0.01$).

Practical difficulties

No differences were obtained between screened and unscreened women for five of the six practical barriers we investigated. Approximately 60% of both samples reported that they had paid employment. Difficulties with transport, a medical problem which makes it difficult to get out, lack of time and the cost of travel were each reported by approximately 10% of screened and unscreened women. Screened women, were, however, *more* likely (31%) than the unscreened (19%) to have dependents to care for ($\chi^2=11,81$, $P<0.01$). Practical difficulties were not associated with women's social class.

Social class and beliefs about the test

Finally, we investigated the association between social class and women's beliefs about the test. Amongst women of classes 4 and 5: 63% felt it was likely they would be embarrassed, compared with 52% of women from class 3

and 41% of women from classes 1 or 2. These differences were significant ($\chi^2=14.94$, $P<0.01$). These findings suggest that anticipated embarrassment and anxiety are the main factors accounting for persistent social class differences in uptake.

DISCUSSION

The response rate obtained in the present study was less than ideal. Although checks were made to ensure that response bias was not associated with age or social class, indicating that the sample was socio-demographically representative of the unscreened population, clearly some caution is required in the interpretation of findings. The methodology adopted to make contact with unscreened women was exhaustive[13], allowing for up to eight attempts to contact each woman before recording a refusal to participate. Since the population under investigation were women who had previously declined a series of invitations to cervical screening it seems unlikely that a higher rate of response than that obtained in the present study could be achieved. None the less, it is of course possible that non-respondents in the present study might include a proportion at relatively higher epidemiological risk than those who responded.

The first aim of the study was to identify and compare the socio-demographic and behavioural risk characteristics of women remaining unscreened following an intensive regional campaign and call programme which has achieved 85% coverage. The findings showed that women remaining unscreened were concentrated in two age cohorts: under 30 years of age; and over 50 years of age. A small but significant social class differential existed even after the campaign, with non-screened women being more likely to be from lower social classes and this supports the results from previous studies[9,17,18]. These findings suggest that changes to patterns of service provision may not completely eliminate socio-demographic differences in screening uptake. The study was conducted in an area with an established call programme and women had been given multiple opportunities to attend for a smear test. Unscreened women in the present study did not report significantly more practical difficulties in attendance than women who had been screened. Further changes to patterns of service provision are not likely to produce changes in uptake rates. In general, the findings suggest that where a well organized call programme has been established with flexible service delivery, equity of *access* to services can be achieved.

The results also showed that the campaign had been quite successful in reaching women at risk of cervical cancer. The unscreened did not constitute an epidemiologically higher risk group than the screened population in terms of sexual experience or cigarette smoking. Many women who did not attend had never had sexual intercourse and felt they were not at risk of cervical cancer. These findings indicate that most women have quite accurate perceptions of the relationship between sexual intercourse and cervical cancer risk, suggesting that publicity campaigns have been quite successful.

None the less, the study showed that more than half of unscreened women are or have been sexually active and more than one-third of unscreened women were current cigarette smokers. Amongst women over 50 years of age, nearly 50% of the unscreened were current smokers. Further increases in uptake amongst this at risk group and amongst those from lower social classes requires that further attention be paid not simply to the delivery of the service, but to women's beliefs and attitudes towards cervical screening.

A proportion of unscreened women with sexual experience felt that they were not eligible for the test and believed that other women were at greater risk than they were. Importantly, the findings also indicated that women do not take smoking habits into account when assessing their own actual vulnerability or their relative vulnerability compared to other women. Although the campaign sought to advise all women that they were at risk of cervical cancer, it may be worthwhile emphasizing on letters of invitation and leaflets, that more than half of all women who go for screening have only had one lifetime sexual partner, but still consider the test to be worth while. Further educational efforts might also be made to advise women that smoking increases their vulnerability to cervical cancer, since at present women appear to be well informed only of the link between number of sexual partners and cervical cancer. Uptake amongst women over 50 years of age might be improved if they were better informed concerning smoking-related risk.

Screened and unscreened women alike appeared to be quite well informed of the preventive nature of cervical screening. Belief that the test would facilitate cure of any problems did not distinguish attenders from non-attenders. However, unscreened women differed from screened women in their expectation that the test would give them peace of mind and nonscreened women were more likely to report the possibility of a positive result as a barrier to attendance. The unscreened also felt the test was more likely to cause them embarrassment or anxiety. Clearly, for some women, the procedure itself and the possibility of treatment following the test represents a significant source of potential distress. In order to further reduce inequalities in screening uptake it may be necessary to understand why some women *expect* to be upset by the test more than others. An interesting aspect of the present results was that expectations of distress were not associated with a woman's age. Women from lower social classes, did, however, anticipate greater distress than women from higher social classes. One reason

why women from lower social classes view the procedure more negatively may be because they are less sure of the procedure and of the kind of treatment they might get if they receive a positive result. Uncertainty is a significant cause of anxiety and may be ameliorated by provision of leaflets explaining exactly what is going to happen, including information about what the woman will be required to do and what she will feel[19]. A second reason for distress might be socio-cultural. Women whose lives have been characterized by dependency may feel unable to exert control over their lives generally and feel threatened both by medical procedures and by the implication that they should act to control their risk status. However, it remains for further research to evaluate the effectiveness of these interventions in reducing anticipated distress and increasing uptake.

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