Pergamon

European Journal of Cancer, Vol. 34, No. 10, pp. 1598–1601, 1998

Printed in Great Britain
0959-8049/98/$—see front matter

PII: S0959-8049(98)00249-4

Original Paper

Organised Cervical Cancer Screening Still Leads to Higher Coverage than Spontaneous Screening in The Netherlands

A.B. Bos,[1] M. van Ballegooijen,[1] A.A.M.W. van Gessel-Dabekaussen[2] and J.D.F. Habbema[1]

[1]Department of Public Health, Faculty of Medicine, Erasmus University Rotterdam, P.O. Box 1738, 3000 DR Rotterdam; and [2]Statistics Netherlands (CBS), P.O. Box 4481, 6401 CZ Heerlen, The Netherlands

In The Netherlands, early detection of cervical cancer by programme and spontaneous screening has been common practice for more than two decades. Both types of screening are mainly performed by general practitioners. Therefore, the question is raised of whether programme screening still enhances screening uptake. To answer this question, we analysed the national health interview survey in the years 1992–1996. The coverage rate, defined as the percentage of women with at least one smear taken in the previous 5 years, was 91% for women invited for programme screening compared with 68% for women not invited. The performance of the organised programme in reducing excessive screening, i.e. smears taken in excess of the recommended age and interval range, was not clear and the effect seemed small. Furthermore, we found that half the non-attenders were 'protected' by a recent smear or a hysterectomy, and of the unprotected women, 72% showed a positive attitude towards the programme. We conclude that even after a long history of cervical cancer screening, an organised programme is still required to ensure a high coverage. © **1998 Elsevier Science Ltd. All rights reserved.**

Key words: cervical cancer, coverage, pap smear, spontaneous screening
Eur J Cancer, Vol. 34, No. 10, pp. 1598–1601, 1998

INTRODUCTION

SINCE THE 1970s, both programme screening and spontaneous screening have been used in the early detection of cervical cancer in The Netherlands. In programme screening, all women of the target population within a municipality are invited for a pap smear. This is usually seen as the most effective method of providing screening [1–3]. In spontaneous screening, preventive smears are taken on the initiative of the woman and/or her physician. The supposed superiority of programme screening concerns its achievement of a higher coverage and possibly also of a smaller number of smears taken in excess of the official age and interval guidelines. A counter argument could be that both physicians and women are well aware of the pap smears, and that the flexibility of spontaneous screening will lead to higher coverage, although not with constant intervals between screens.

Correspondence to A.B. Bos.
Received 23 Mar. 1998; accepted 8 Jun. 1998.

The long tradition of screening for cervical cancer in The Netherlands must have increased the awareness of guidelines for effective screening both in women and in physicians. Moreover, both systems of early detection are performed by the general practitioner. Therefore, the question is raised of whether an organised programme is still important. Our aim was to study coverage and excessive smear taking for programme and spontaneous screening. Furthermore, we studied the attitude of non-attenders to screening as a proxy for the maximum achievable participation rate.

We used data from the health interview survey of the years 1992–1996, in which questions about cervical smear uptake were included. These questions concerned attendance, reasons for non-attendance and attitude towards the programme. In this period, programme screening was running in approximately 80% of the municipalities.

MATERIALS AND METHODS

The national health interview survey is held yearly by Statistics Netherlands (CBS) and collects information on health, medical consumption and life-style of a random

sample of households. Part of the interview is personally obtained by an interviewer, the remainder, including the questions about mass screening, consists of a written questionnaire, filled in personally. The population interviewed in the health interview survey is standardised for the Dutch population according to gender, age, marital status and a combination of geographical region and urbanisation rate. Accordingly, all *n* values and percentages presented in this article are standardised. In the period studied, the non-respondent rate was 44%, and 9,857 women over the age of 16 years participated in the health interview survey.

There is no complete information available on which municipalities organised mass screening in the period studied (1992–1996). We considered a municipality as having an organised programme if at least one woman aged between 35 and 54 years reported that she received an invitation for cervical cancer screening in the year studied.

Up to 1996, screening was recommended every 3 years for women between the ages of 35 and 54 years. After 1996, the Dutch guidelines changed, recommending screening for women between the ages of 30 and 60 years every 5 years. The coverage rate was defined as the proportion of women aged between 35 and 54 years with at least one smear in the previous 5 years. As a proxy for the amount of excessive screening, we considered the proportion of women with at least three smears in the previous 5 years for women within the target age range (35–54 years), and the proportion of women under the age of 30 years that had been screened. We did not include women between the ages of 30 and 34 years in the analysis of excessive smears, because the starting age changed from 35 to 30 years during the study period.

Non-attendance was analysed in women who reported receiving an invitation. Women who did not attend were divided into protected and unprotected non-attenders, according to the reported reasons for not attending. Women who answered 'I have been treated or underwent surgery', 'I am under surveillance' or 'I recently had a smear taken' were considered as protected, and those 'I do not think it is necessary' 'I think the examination is unpleasant', or 'I did not have time' as unprotected.

Unprotected non-attenders were compared with protected women (both attenders and protected non-attenders) for age, level of income, marital status and level of education. The characteristics were studied in a multivariate model, of which the odds ratios (OR) and their 95% confidence intervals (CI) were calculated.

RESULTS

Coverage

Of the women between 35 and 54 years of age, 66% (3,827/5,773) reported receiving an invitation for cervical cancer screening (Table 1). Only 9% of the invited women had no smear taken in the 5 years prior to the study. Of the women who did not receive an invitation for mass screening, 32% had no smear taken in the previous 5 years. Hence, the coverage rate for women who were invited was 91% and for women not invited it was 68%.

A coverage comparison was also made on the municipality level. Of the women aged between 35 and 54 years living in municipalities with a screening programme (defined as municipalities with at least one woman who had received an invitation) 84% (4,500/5,336) had a smear taken in the preceding 5 years, compared with 68% (306/447) for women in municipalities without a screening programme.

Frequency of excessive smears

Of women between 35 and 54 years who received an invitation for cervical cancer screening, 16% had three or more smears in the previous 5 years compared with 12% for women who were not invited (Table 1). Of the women who had received at least one smear, 18% (612/3,483) had received at least three smears for programme screening and 17% (224/1,316) for spontaneous screening (Table 1). For the young (< 30 years) age group, 30% of the women in municipalities with programme screening had at least one smear taken in the 5 years prior to the study (Table 2). In municipalities without a screening programme, the proportion was higher at 39%.

Non-attendance

In the period 1992–1996, 72% of the invited women attended the programme screening (Figure 1). Fifty-five per cent of the non-attenders were protected by previous surgery or a recent smear. Thirteen per cent (490/3,887) of the invited women did not attend while unprotected; of this group, 72% reported that they planned to attend the next time, whilst the remaining 28% did not show this positive attitude to screening.

Characteristics of unprotected non-attenders

The characteristics of unprotected non-attenders compared with protected women (both attenders and protected non-attenders) are shown in Table 3. Older women (50–54 years) were less likely to be protected compared with younger women (OR 0.71, 95% CI 0.53–0.96). Women with a low income were over-represented in the unprotected group, but the difference was not significant (OR 1.39, 95%CI 0.96–2.01 for net income of < 25 000 dfl). Concerning marital status, we found that women who were never married were significantly more likely to be unprotected (OR 2.18, 95%CI 1.56–3.04). Women with only primary school education were more likely to be unprotected than the other categories.

Table 1. Smear frequency for women aged between 35 and 54 years with and without an invitation for mass screening (health interview survey 1992–1996)

Number of smears taken in the previous 5 years	Women invited for mass screening *n* = 3,827 (%)	Women not invited for mass screening *n* = 1,946 (%)
0	344 (9)	630 (32)
1–2	2,871 (75)	1,092 (56)
≥ 3	612 (16)	224 (12)

Table 2. Smear frequency for women aged between 16 and 30 years in municipalities with and without an invitation programme (health interview survey 1992–1996)

Number of smears taken in the previous 5 years	Municipalities with programme screening *n* = 3,770 (%)	Municipalities without programme screening *n* = 314 (%)
0	2,635 (70)	192 (61)
≥ 1	1,135 (30)	122 (39)

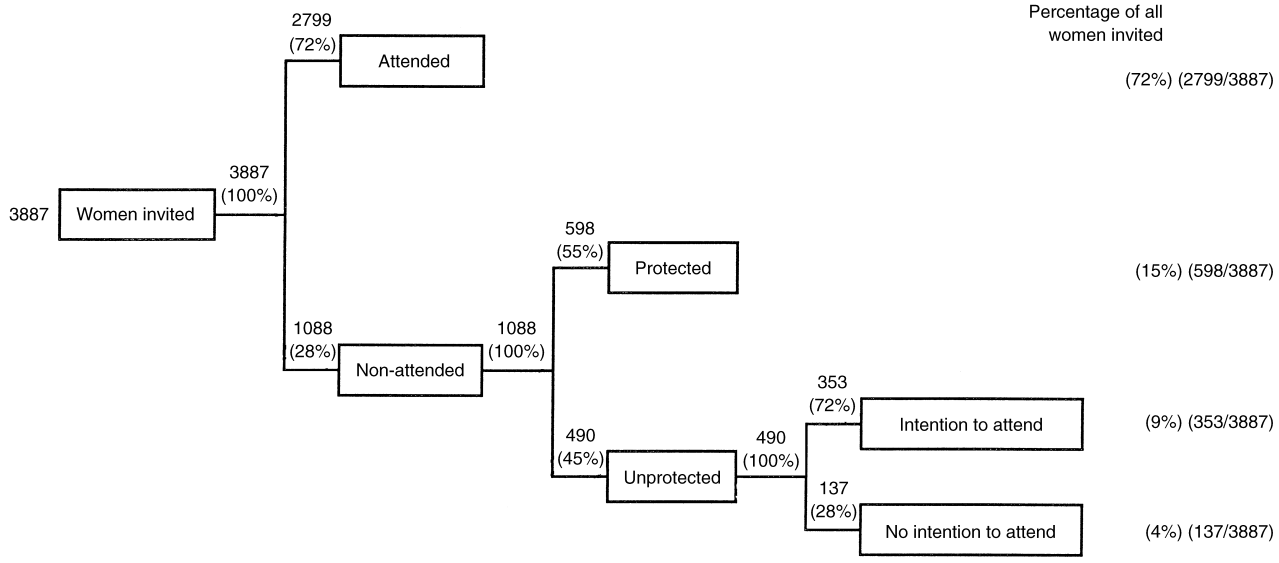

Figure 1. Attender rates and reasons for non-attendance for responding women between 35 and 54 years of age who were invited for mass screening (health interview survey 1992–1996).

DISCUSSION

The non-response rate in the health interview survey was 44%. Usually, this creates a bias by which screening attendance is overestimated in interviews [4]. We therefore think that the absolute level of coverage will also be overestimated in our study. However, the comparison made between programme screening and spontaneous screening will be less influenced by the non-response rate.

We found a higher coverage in women aged between 35 and 54 years invited for screening (91% had a smear taken in the previous 5 years) compared with non-invited women (68%). This difference in coverage could be an overestimate, if attenders are more likely to remember receiving an invitation than non-attenders. Therefore, we also compared the coverage rate at the level of municipalities with and without organised screening, defined as a municipality in which at least one woman reported receiving an invitation. This approach will, to some extent, result in an underestimate of the difference, due to municipalities which started the programme shortly before or during the period studied. The coverage for women in municipalities with a screening programme was 84% compared with 69% for municipalities without a screening programme. In view of the importance for the (cost-)effectiveness of cervical cancer screening [2, 5, 6], the difference in coverage is still high.

Table 3. *A comparison of unprotected and protected womens: odds ratios and* 95% *confidence intervals (CI) (health interview survey* 1992–1996*)*

Variables Categories	Number	Being unprotected Odds ratio*	95% CI
Age (years)			
35–39	1165	Reference	
40–44	1107	0.74	0.57–0.95
45–49	904	0.93	0.72–1.22
50–54	763	0.71	0.53–0.96
Education			
Primary school	689	Reference	
Junior education	1304	0.56	0.42–0.74
Senior eduction	1264	0.67	0.51–0.89
Vocational college	562	0.75	0.53–1.06
University	120	0.63	0.35–1.14
Net income (dfl)			
< 25 000	414	1.39	0.96–2.01
25 000–40 000	892	1.00	0.73–1.36
40 000–55 000	934	Reference	
> 55 000	1078	1.15	0.85–1.54
Unknown	721	0.94	0.68–1.31
Marital status			
Married	3222	Reference	
Divorced	376	1.26	0.90–1.75
Widowed	89	1.52	0.85–2.71
Never married	252	2.18	1.56–3.04

*Odds ratio estimated in a multivariate model.

The influence of the screening programme on excessive smear taking was studied by looking at the frequency of smear taking. For women within the target age group (35–54 years), we found a higher proportion of women with at least three smears in the previous 5 years in women who were invited for mass screening. However, of those women who received a cervical smear, the same proportion of woman had received at least three smears in the programme screening (18%) and spontaneous screening (17%). For the age group under the target age range (< 30 years), the percentage of screened women was lower (30%) in municipalities with an organised programme compared with municipalities without an organised programme (39%). A possible explanation is an effect of organised programmes that start screening at a specific age, resulting in less screening under the starting age. Overall, the influence of the screening programme on the reduction of excessive screening is not clear-cut. The favourable influence, if any, was probably small. According to the data in this study, the proportion of excessive screening in The Netherlands is still high: approximately 16% of women between 35 and 54 years of age had three or more smears in the previous 5 years and 30% of women between 16 and 30 years of age had already had a smear taken.

We found that more than half the non-attenders to the screening programme were women who were protected by a

previous hysterectomy or a recent smear. Of the unprotected non-attenders, 28% showed a negative attitude towards the programme. The last group may be considered as 'hardline refusers': it is unlikely that many of these women will be persuaded by additional information on the benefits of screening for cervical cancer. To increase the coverage rate, the unprotected women with a positive attitude are of special interest. According to our data, this corresponds to 72% of the unprotected women.

We tried to characterise the unprotected non-attenders. Similar to other studies, we found that women who were never married, with a low income and low education were over-represented in the unprotected group, and that older women were usually less protected [7, 8]. For a proportion of the never married group, this could be justified in view of low risk. The 'unprotected women' are a specific proportion of the 'non-attenders', which are usually studied [7–9]. Women with a high level of education were less likely to be unprotected (OR 0.63; 95% CI 0.35–1.14), but they were also more likely to not attend (OR 1.37; 95% CI 0.90–2.07, comparison of attenders with non-attenders; results not shown). An explanation is that these women use spontaneous screening. Although both differences were not significant, it shows that unprotected women can differ from non-attenders.

From our data, the presence of a screening programme was accompanied by high coverage, which is the main factor for high (cost-)effectiveness. Therefore, we conclude that despite a long tradition of cervical cancer screening in The Netherlands and despite the fact that both organised and spontaneous screening are performed by the general practitioner, an organised programme is still required to achieve high coverage.

1. Coleman D. European guidelines for quality assurance in cervical cancer screening. *Eur J Cancer* 1993, **29A**, s1–s38.
2. Laara E, Day NE, Hakama M. Trends in mortality from cervical cancer in the Nordic countries: association with organized screening programmes. *Lancet* 1987, **i**, 1247–1249.
3. Gibson L, Spiegelhalter DJ, Camilleri-Ferrante C, Day NE. Trends in invasive cervical cancer incidence in East Anglia from 1971 to 1993. *J Med Screen* 1997, **4**, 44–48.
4. Whiteman S, Lacey L, Anseel D, Chen EH, Dell J, Phillips CW. Do chart reviews and interview provide the same information about breast and cervical cancer. *Int J Epidem* 1993, **22**, 393–397.
5. Koopmanschap MA, Oortmarssen GJ van, Agt HMA van, Ballegooijen M van, Habbema JDF, Lubbe KThN. Cervical-cancer screening: attendance and cost-effectiveness. *Int J Cancer* 1990, **45**, 410–415.
6. IARC Working Group on Evaluation of Cervical Cancer Screening Programmes. Screening for squamous cervical cancer: duration of low risk after negative results of cervical cytology and its implication for screening policies. *Br Med J* 1986, **293**, 659–664.
7. Harlan LC, Bernstein AB, Kessler LG. Cervical cancer screening: who is not screened and why? *Am J Public Health* 1991, **81**, 885–891.
8. Katz SJ, Hofer TP. Socioeconomic disparities in preventive care persist despite universal coverage. *JAMA* 1994, **272**, 530–534.
9. Murray M, McMillan C. Social and behavioural predictors of women's cancer screening practices in Northern Ireland. *J Public Health Med* 1993, **15**, 147–153.