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Final Report to NHSBSP

**An Intervention to Increase Breast
Screening Uptake**

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Summary

The purpose of this investigation was to test whether a cost-effective intervention to increase uptake in the NHSBSP could be set up. It used a simple procedure based on the concept of implementation interventions, and asked women to make specific *plans* for attending. The plans concerned organising their travel, arranging to take time off work if necessary, and changing the appointment if it was inconvenient. A randomised controlled trial with 2000 women was designed, including three conditions: an intervention condition in which women were sent a postal questionnaire that included the intervention; a non-intervention condition in which women received the same questionnaire but without the intervention; and a control condition in which women were sent nothing. The outcome measure was attendance in the current round of screening.

The results were as follows. (1) Attendance in the three conditions was almost identical when all 2000 women were included, and there was therefore no overall effect of the intervention. (2) Some of the women in the intervention condition, however, failed to write down their plans on the questionnaire and so did not carry out their instructions fully. When the initial analysis was repeated without them, a marked effect of the intervention was revealed: for all three planning activities, attendance in the intervention group was more than 10% higher than in the non-intervention and control groups. (3) The strongest and statistically most reliable effect was for women in their first round of screening who made plans: for all three activities: attendance was 15% higher than in the control group. (4) The intervention had more effect for women whose initial intention to attend was weak than for those whose intention was strong: the difference between low intention intervention women who planned and low intention women in the non-intervention condition averaged 7% across the three activities. The greatest difference, 11%, was for planning to take time off work.

The findings were extremely encouraging, not least because the high overall uptake for this particular screening procedure leaves relatively little room for interventions to have noticeable effects. Our recommendations are as follows. (1) An intervention based on implementation intentions is a cost-effective means of increasing uptake, and could readily be incorporated in the invitation for screening. (2) The NHSBSP should consider a "field trial" of the procedure, probably in a sample of areas for which uptake is low. (3) The key group to approach will be those invited to their first round of screening. Attendance in the second and subsequent rounds is very high in women who attend their first round, and encouraging women to plan for their first round will maximise their attendance thereafter. (4) The NHS should consider similar trials for other forms of screening.

Introduction

1. Background

In England in 2000/01, 1.3 million women were screened in the NHS Breast Screening Programme. National uptake was 75%. A considerable volume of research over the last ten years or so has investigated who attends and why (Godin et al, 2001; Sutton, Bickler, Sancho-Aldridge and Saidi, 1994) – and, more recently, who re-attends and why (Rutter, Calnan, Field and Vaile, 1997; Rutter, 2000). Much of the research, including our own, has concentrated on women's beliefs about breast cancer and screening, and on their experience of mammography and its possible effects on attendance in future rounds. A clear understanding has emerged. Uptake remains less than optimal, however, especially in deprived geographical areas and social groups, and helping just 1% of women to attend would mean a national increase of 15,000. The purpose of this project was to explore whether a simple, cost-effective way could be found of helping women to plan for their appointment, overcome perceived barriers, and so to increase uptake. The issue has received relatively little attention to date, and the investigation was designed to pilot one possible approach.

2. A New Approach to Changing Health Behaviours

Two main approaches to changing health behaviours can be identified. Traditional research concentrated on changing people's intentions, and so their behaviour, by modifying their beliefs about the behaviour. In the case of attendance for breast screening, the approach would try to persuade women that the personal benefits of attendance would outweigh the costs, that their family and peers would wish them to attend, and that imagined barriers to attendance would generally be easy to overcome. However effective the approach might be in principle, it was extremely costly in practice, for most purposes prohibitively so: examination of each *individual* woman's set of beliefs was necessary, and one-to-one persuasion was needed after that, tailored to each woman individually. Moreover, persuasion raises issues of ethics and choice.

The alternative approach has emerged only recently, and it is this that we adopted for our investigation. Again it focuses on intentions, but this time not their formation but their *execution*. In a recent paper, we reported that more than half the non-attenders in our sample had said when questioned at the time of their invitation that they *would* attend (Rutter, 2000). That is, they had *intended* to attend, but had then failed to execute their intention. The

questions are why they failed, and whether an intervention can be designed to help them keep to their intention. According to recent research in health psychology, what characterises people who intend to carry out a health-enhancing behaviour but then do not is their lack of what have been called “implementation intentions” – strategies that help them to reinforce their intention and keep to it. In the case of a simple routine such as taking regular tablets, implementation intentions might consist of structured “action plans” as to how, when and where to take them – with a glass of water, in the bathroom, on the way to bed, for example. We know from our previous research that the reasons and expectations women give for not attending include being unable to arrange time off work, difficulties with transport, and problems with changing an inconvenient appointment. These became the focus for the intervention. For the NHSBSP, the clear advantage of a successful intervention with this approach over traditional approaches would be the lack of expense, since a manipulation to promote implementation intentions can be included as part of the invitation letter. So far as we know, there has to date been no intervention using the approach in breast screening – though encouraging results have been reported from related areas of health. The purpose of our investigation was to mount a pilot study.

The Investigation

1. The Intervention

The intervention was very simple, and followed the approach of (Orbell, Hodgkins and Sheeran, 1997). They were concerned to encourage young women to do breast self-examination. They first sent the participants a short questionnaire about their beliefs and expectations, and at the end they included a short paragraph, designed to provide and strengthen implementation intentions.

You are more likely to carry out your intention to perform BSE if you make a decision about where and when you will do so. Many women find it most convenient to perform BSE at the start of the morning or last thing at night, in the shower or bath, or while they are getting dressed in the bedroom or bathroom. Others like to do it in bed before they go to sleep or prior to getting up. Decide now where and when you will perform BSE in the next month and make a commitment to do so.

Women were asked to read the paragraph and write on the questionnaire where and when they would do BSE in the next month. They followed the women up a month later, and found that many more of those in the intervention condition reported carrying out BSE than those in the

control condition. Furthermore, they had generally done it where and when they had said they would, indicating that the intervention had genuinely helped with planning.

For our own intervention, we adapted Orbell's procedure, and provided a paragraph for each of the three behaviours: arranging time off work, changing an inconvenient appointment, and arranging transport. The intervention paragraphs were included at the end of an initial questionnaire about beliefs and expectations (Appendix1), sent out by the University team shortly before the invitation to screening was due to arrive. The three paragraphs read as follows, and respondents were asked to write their plans in spaces provided below them in the questionnaire.

Travelling to the Screening Unit

If you need to *arrange* your transport, it will help to plan how you will do it. For example, if you are relying on another person to take you, please decide exactly *whom* you will ask and when you will ask them if your invitation arrives. If you are driving or walking, you might like to plan *how* long it will take you to get to the screening centre or mobile unit so that you can arrive on time. Write your own plans below and make a commitment to stick to them.

Arranging Time off Work

You are more likely to attend for breast screening if you make all the necessary arrangements *before* your appointment. If invited, decide when and how you will negotiate the necessary time off work, and make a commitment to do so. For example, you might decide to put in a written request, or speak to the relevant person *on the day the appointment arrives*. List your own plans below.

Changing your Appointment

Your appointment to attend for breast screening may be inconvenient for you, or you may have to change it if you are unwell on the day or if anything important crops up. Decide now how you can make this easier – for example, by leaving the telephone number of the screening unit in a prominent location or writing yourself a note to do so.

2. Design and Procedure

A total of 2082 women in two screening batches from Kent were followed through the 2000/2001 round of the Programme, and objective attendance details were noted from the screening centre's records. A prospective, randomised controlled design was employed, and the women were assigned to one of three conditions: approximately 50% of the sample (1024)

to an intervention condition; 30% (633) to a non-intervention condition; and 20% (425) to a control condition. The first and second groups were sent a postal questionnaire measuring their beliefs about attending for breast screening, an adapted and shortened version of the one we used in our earlier research. The intervention group were asked to formulate implementation intentions to overcome the three potential obstacles to attending, but the non-intervention group did not receive these instructions. The questionnaires were otherwise identical. The control group were not sent the questionnaire, to control for the possibility that merely receiving a questionnaire may itself influence attendance. The outcome in each condition was attendance at breast screening.

After attendance details were received at follow-up from the screening co-ordinator, 137 women were excluded from analysis because they were withdrawn from the screening round – that is, they were currently undergoing related medical investigations or they had self-referred for screening, and for a further 51 women, attendance details were not recorded. This left 1894 women whose attendance details were monitored: 926 in the intervention condition, 582 in the non-intervention condition, and 386 in the control condition.

Results

1. Overall Results of the Intervention

The first analysis examined attendance by condition. A total of 79.8% of the 1509 women attended, and there was no difference between conditions: 78.9% for the intervention group, 80.2% for the non-intervention group, and 80.3% for the control group ($\chi^2 (2), n = 1894) = 0.5, ns$) (Table 1). There was thus no *overall* effect of the intervention.

Table 1 Attendance for whole sample

	Attended (%)	Did not attend (%)	Total
Intervention	731 (78.9)	195 (21.1)	926
Non-intervention	467 (80.2)	115 (19.8)	582
Control	310 (80.3)	76 (19.7)	386
Total	1508 (79.6)	386 (20.4)	1894

$\chi^2 (2), (n = 1894) = 0.5, ns$

We next examined attendance according to the women’s screening status. This was to test for the possibility that first-timers’ responses to the intervention differed from those of other women. For this purpose, three groups were identified: women receiving their first-ever invitation for screening (labelled *first timers*); women receiving a routine invitation to their second or subsequent round of screening (labelled *recall*), and women receiving a subsequent invitation for a first screen because they had never previously attended (labelled *defaulters*). Table 2 shows attendance for these three groups by experimental condition. There were no effects of the intervention for any of the three groups. Caution is necessary, however, in interpreting these particular results because of two shortcomings in the records on which the labelling of the women was based. First, the batch records did not distinguish between first timers and the other groups, and we had to base the decision as to who was a first-timer on age, using 54 as a conservative cut-off. Second, it is possible that some of the women we have called defaulters had been screened privately, but again the batch records did not say. In both cases, there may be some limited inaccuracy in our labels, but it is unlikely that the results have been affected significantly. Our conclusion remains: for first-timers, recall women, and defaulters alike, there was no overall effect of the intervention.

Table 2 Attendance for whole sample by screening status

	Attended (%)	Did not attend (%)	Total
First-timers			
Intervention	188 (69.6)	82 (30.4)	270
Non-intervention	91 (65.5)	48 (34.5)	139
Control	80 (74.8)	27 (25.2)	107
Total	359 (69.6)	157 (30.4)	516
Recall			
Intervention	537 (88.3)	71 (11.7)	608
Non-intervention	365 (89.7)	42 (10.3)	407
Control	227 (89.4)	27 (10.6)	254
Total	1129 (89.0)	140 (11.0)	1269
Defaulters			
Intervention	6 (12.5)	42 (87.5)	48
Non-intervention	11 (30.6)	25 (69.4)	36
Control	3 (12.0)	22 (88.0)	25
Total	20 (18.3)	89 (81.7)	109

NB: All differences non-significant

2. The Role of Planning

The intervention was not a straightforward 'implementation intentions' procedure, because we asked women to form planning strategies *in the service of* attending for breast screening, rather than to plan attendance itself. The first analyses had examined *all* women in the intervention condition, including those who had not carried out the instruction to write out their plans in the spaces provided in the questionnaire. Since these women may not in fact have made plans, or one or more of the three planning activities were not relevant (for example, retired women did not need to arrange time off work) we went on to a second set of analyses in which we retained in the intervention condition only those women we knew had made plans – that is, those who had written their plans in the spaces provided. Table 3 shows the number of women who planned / did not plan for each of the three activities.

Table 3 Women in the intervention condition who planned, did not plan, or for whom planning was not relevant: frequencies and percentages

	Appointment	Travel	Work
Did make plans	539 (86.9%)	596 (96.2%)	288 (46.4%)
Did not make plans	66 (10.6%)	13 (2.1%)	131 (21.1%)
Not relevant	15 (2.4%)	11 (1.7%)	201 (32.4%)
Total	620 (100%)	620 (100%)	620 (100%)

We first examined each of the three activities separately for all status groups combined: first-timers, recall, and defaulters together. Those women in the intervention condition, who had carried out the planning instructions, were compared with the non-intervention group and the control group. For all three activities, the results were highly significant statistically: for women in the intervention group who made plans, attendance was over 90%, against around 80% in the non-intervention and control conditions. In other words, when the intervention succeeded in encouraging women to plan for their attendance, attendance was more than 10% higher than among women not exposed to the intervention. The detailed analyses follow (Tables 4 to 6).

(a) Planning to change an inconvenient appointment

For planning how to change an inconvenient appointment (Table 4), the difference was highly significant: 93.3% (503) of women from the intervention condition who made plans attended,

compared to 80.2% (466) of the non-intervention group, and 80.3% (310) of the control group ($\chi^2(2), n=507) = 46.1, p < 0.001$).

Table 4 Changing an inconvenient appointment

	Intervention: Made Plans	Non-Intervention	Control
Attended	503 (93.3%)	467 (80.2%)	310 (80.3%)
Did not attend	36 (6.7%)	115 (19.8%)	76 (19.7%)
Total	539	582	386

$\chi^2(2), (n=1507) = 46.1, p < 0.001$

(b) Planning how to travel to the screening unit

For planning travel arrangements to the screening unit (Table 5), the difference was again highly significant: 91.9% (548) of women who made plans attended compared to 80.2% (466) of the non-intervention group, and 80.3% (310) of the control group ($\chi^2(2), n=1564) = 38.9, p < 0.001$).

Table 5 Making travel arrangements

	Intervention: Made Plans	Non-Intervention	Control
Attended	548 (91.9%)	467 (80.2%)	310 (80.3%)
Did not attend	48 (8.1%)	115 (19.8%)	76 (19.7%)
Total	596	582	386

$\chi^2(2), (n=564) = 38.9, p < 0.001$

(c) Planning to arrange time off work

For planning to arrange time off work (Table 6), the difference was once again highly significant: 95.5% (275) of women who made plans attended compared to 80.2% (467) of the non-intervention group, and 80.3% (310) of the control group ($\chi^2(2), n = 1256) = 37.8, p < 0.001$).

Table 6 Arranging time off work

	Intervention: Made Plans	Non-Intervention	Control
Attended	275 (95.5%)	467 (80.2%)	310 (80.3%)
Did not attend	13 (4.5%)	115 (19.8%)	76 (19.7%)
Total	288	582	386

$\chi^2 (2), (n = 1256) = 37.8, p < 0.001$

(d) Planning by first-timers

The question we now considered was whether the intervention had had the same effect on all three status groups: first-timers, recall, and defaulters. In our earlier work, we had drawn attention to the apparent importance of habit and routine in breast cancer screening. Attendance is highest in recall women who have attended previous rounds, suggesting that, if a woman chooses or is persuaded to attend the first round, she is likely to attend again. The key group to examine now was first-timers, for an especially strong effect here would have significant implications for policy and practice. We therefore repeated the analyses reported in Tables 4 to 6, this time breaking down the groups by screening status. The results are reported in Tables 7 to 9.

For all three activities, the results are clear: the intervention *did* have its strongest and most reliable effect on first-timers. For making travel arrangements, 85.7% of first-timers in the intervention condition attended, against 65.5% in the non-intervention condition and 74.8% in the control condition. For arranging time off work, the figure for the intervention group was 90.3%, and for changing the appointment it was 88.1%. In all three activities the χ^2 value was highly significant. The difference between the intervention group and the control group was 10.9% for travel arrangements, 15.5% for time off work, and 13.3% for changing appointments. There was less advantage for recall women - largely because their uptake is extremely high and there was little room for an intervention to have a noticeable effect – but the differences were still statistically reliable. For the defaulters, the numbers were too small to draw reliable conclusions.

Table 7 Making travel arrangements: first-timers, recall, and defaulters

	Attended (%)	Did not attend (%)	Total
First-timers			
Intervention	132 (85.7)	22 (14.3)	154
Non-intervention	91 (65.5)	48 (34.5)	139
Control	80 (74.8)	27 (25.2)	107
Total	303 (75.8)	97 (24.3)	400
$\chi^2 (2, n=400) = 16.4, p < 0.001$			
Recall			
Intervention	413 (94.7)	23 (5.3)	436
Non-intervention	365 (89.7)	42 (10.3)	407
Control	227 (89.4)	27 (10.6)	254
Total	1005 (91.6)	92 (8.4)	1097
$\chi^2 (2, n=1097) = 9.1, p < 0.01$			
Defaulters			
Intervention	3 (50.0)	3 (50.0)	6
Non-intervention	11 (30.6)	25 (69.4)	36
Control	3 (12.0)	22 (88.0)	25
Total	17 (25.4)	50 (74.6)	67
$\chi^2 (2, n=67) = 4.8, ns$			

Table 8 Arranging time off work: first-timers, recall, and defaulters

	Attended (%)	Did not attend (%)	Total
First-timers			
Intervention	93 (90.3)	10 (9.7)	103
Non-intervention	91 (65.5)	48 (34.5)	139
Control	80 (74.8)	27 (25.2)	107
Total	264 (75.6)	85 (24.4)	349
$\chi^2 (2, n=349) = 19.9, p < 0.001$			
Recall			
Intervention	180 (98.4)	3 (1.6)	183
Non-intervention	365 (89.7)	42 (10.3)	407
Control	227 (89.4)	27 (10.6)	254
Total	772 (91.5)	72 (8.5)	844
$\chi^2 (2, n=844) = 14.2, p < 0.001$			
Defaulters			
Intervention	2 (100.0)	0 (0.0)	2
Non-intervention	11 (30.6)	25 (69.4)	36
Control	3 (12.0)	22 (88.0)	25
Total	16 (25.4)	47 (74.6)	63
$\chi^2 (2, n=63) = 8.7, ns$			

Table 9 Changing an inconvenient appointment: first-timers, recall, and defaulters

	Attended (%)	Did not attend (%)	Total
First-timers			
Intervention	118 (88.1)	16(11.9)	134
Non-intervention	91 (65.5)	48 (34.5)	139
Control	80 (74.8)	27 (25.2)	107
Total	289 (76.1)	91 (23.9)	380
$\chi^2 (2, n = 380) = 19.3, p < 0.001$			
Recall			
Intervention	381 (95.5)	18 (4.5)	399
Non-intervention	365 (89.7)	42 (10.3)	407
Control	227 (89.4)	27 (10.6)	254
Total	973 (91.8)	87 (8.2)	1060
$\chi^2 (2, n = 1060) = 11.6, p < 0.01$			
Defaulters			
Intervention	4 (66.7)	2 (33.3)	6
Non-intervention	11 (30.6)	25 (69.4)	36
Control	3 (12.0)	22 (88.0)	25
Total	18 (26.9)	49 (73.1)	67
$\chi^2 (2, n = 67) = 7.9, p < 0.05$			

3. The Role of Intention

The concept of implementation intention, as we pointed out in the Introduction, is seen as a way of bridging the gap between intention and behaviour. People say that they intend to do a particular behaviour, but sometimes they fail to carry the intention through. By developing a plan, the argument goes, they move from *goal* intention to *implementation* intention, and the bridge to action is formed. There are, however, two further possibilities. The first is that the people who form implementation intentions, apparently as a result of an intervention like ours, are very high in goal motivation, and it is that and not the intervention that leads them to attend. In other words, perhaps the people who plan are the people who have high goal intentions, and our results are attributable to that and not the intervention. The second possibility is that the initial theoretical assumption may be wrong: interventions of this sort may be of greatest benefit to people with *lower* intentions, not higher. If this were to be the case, the theoretical basis of the intervention would be in question, but the practical benefits would be greater. The intervention's effect would have been to strengthen not implementation intention but *goal* intention – and the people to have been influenced most would be those whose initial intention to attend was weak. Our final set of analyses tested these two suggestions.

The two groups of women for whom we had measures of intention were the intervention group and the non-intervention group. The most direct measure read “I intend to go for breast screening, if invited”, and was scaled 1 (“Strongly Disagree”) to 5 (“Strongly Agree”). The distribution of scores was highly skewed, in that 71.6% of women scored 5, 24.6% scored 4, and only 3.8% scored 3 or below. We therefore dichotomised respondents into high intenders (score 5) and low intenders (4 or below), and examined attendance in the following groups: low intention + plan in the intervention group, high intention plus plan in the intervention group, low intention in the non-intervention group, and high intention in the non-intervention group. A separate analysis was conducted for each of the three planning activities (Tables 10 to 12).

For all three analyses, the findings were once again highly reliable statistically. In each case, planning in the intervention condition added little to high intention: the results for the high intention plus plan group from the intervention condition were almost identical to those for the high intention women in the non-intervention condition, around 95% attendance throughout. For the low intention women, however, there was a considerable difference, and it was most marked for arranging time off work: 92.4% of women in the intervention condition attended who had a low intention but planned, against 81.2% with low intention in the non-intervention condition. The corresponding figures for making travel arrangements were 84.2% against 81.2%, and for changing appointments they were 86.7% against 81.2%. Analyses of first-timers alone revealed no clear pattern, in part because the numbers of women in some of the subgroups were small.

Table 10 Attendance by intention and planning: making travel arrangements

	Attended (%)	Did not attend (%)	Total
Low Intention + Plan	133 (84.2)	25 (15.8)	158
High Intention + Plan	406 (95.3)	20 (4.7)	426
Low Intention Non-Intervention	95 (81.2)	22 (18.8)	117
High Intention Non-Intervention	269 (94.7)	15 (5.3)	284

$$\chi^2 (3), (n=985) = 39.3, p < 0.001$$

Table 11 Attendance by intention and planning: arranging time off work

	Attended (%)	Did not attend (%)	Total
Low Intention + Plan	61 (92.4)	5 (7.6)	66
High Intention + Plan	209 (96.8)	7 (3.2)	216
Low Intention Non-Intervention	95 (81.2)	22 (18.8)	117
High Intention Non-Intervention	269 (94.7)	15 (5.3)	284

$\chi^2 (3), (n=683) = 30.3, p < 0.001$

Table 12 Attendance by intention and planning: changing an inconvenient appointment

	Attended (%)	Did not attend (%)	Total
Low Intention + Plan	111 (86.7)	25 (13.3)	128
High Intention + Plan	384 (95.5)	20 (4.5)	402
Low Intention Non-Intervention	95 (81.2)	22 (18.8)	117
High Intention Non-Intervention	269 (94.7)	15 (5.3)	284

$\chi^2 (3), (n=931) = 34.0, p < 0.001$

Conclusions and Recommendations

The purpose of the investigation was to test whether a cost-effective intervention to increase uptake in the NHSBSP could be set up, using the concept of implementation interventions. A randomised controlled trial with 2000 women was designed, including three conditions: an intervention condition in which women were sent a postal questionnaire that included the intervention; a non-intervention condition in which women received the same questionnaire but without the intervention; and a control condition in which women were sent nothing. The intervention was aimed at three activities: planning travel arrangements; planning time off work; and planning to change an inconvenient appointment. The outcome measure was attendance in the current round of screening. Our conclusions and recommendations are as follows.

Conclusions

1. Attendance was almost identical in the three conditions when all 2000 women were examined, and there was therefore no overall effect of the intervention.

2. Some of the women in the intervention condition did not carry out their instructions fully: they failed to write down their plans on the questionnaire. When the initial analysis was repeated without them, a marked effect of the intervention was revealed. For all three planning activities, attendance in the intervention group was more than 10% higher than in the non-intervention and control groups.
3. The strongest and statistically most reliable effect of the intervention was for first round women who made plans. For all three activities, attendance was 15% higher than in the control group. This is a very encouraging finding, not least because the high overall uptake for this particular screening procedure leaves relatively little room for interventions to have noticeable effects.
4. The intervention had more effect for women whose initial intention to attend was weak than for those whose intention was strong. The difference between low intention intervention women who planned and low intention women in the non-intervention condition averaged 7% across the three activities. The greatest difference, 11%, was for planning to take time off work.

Recommendations

1. An intervention based on implementation intentions is a cost-effective means of increasing uptake, and could readily be incorporated in the invitation for screening.
2. The NHSBSP should consider a “field trial” of the procedure, probably in a sample of areas for which uptake is low.
3. The key women to include are those being invited to their first round of screening. Attendance in the second and subsequent rounds is known to be very high in women who attend their first round. Encouraging women to plan for their first round will maximise their attendance thereafter.
4. The NHS should consider similar trials for other forms of screening.

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