Promoting early presentation of breast cancer in older women during the seasonal influenza vaccination campaign

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Abstract

Background

Older women are at high risk of presenting with late stage of breast cancer, which may be partly because of poor breast cancer awareness.

Aims

The aim of this project was to implement and evaluate a new way of delivering the Promoting Early Presentation (PEP) Intervention during flu vaccination appointments in primary care. The PEP intervention is a 1-minute intervention, accompanied by a booklet and delivered by primary care health professionals to provide older women with the knowledge, confidence and skills to present promptly on discovering symptoms of breast cancer.

Methods

Health professionals delivered the PEP Intervention to older women at six general practices in South London. We measured changes in breast cancer awareness after the intervention and interviewed practice staff about their experiences of the intervention.

Findings

Knowledge of breast symptoms and breast checking was greater in women aged 70+ after the implementation than before. Health professionals' found the intervention acceptable and feasible to implement.

Conclusion

This intervention is a novel way of increasing breast cancer awareness in older women, which could contribute to promoting earlier presentation and diagnosis of breast cancer in the UK.

Background

Almost half of all breast cancers are diagnosed in women over the age of 65 and when older women are diagnosed, the cancer is more likely to be at a more advanced stage of breast cancer than younger women in the UK (Cancer Research UK 2016; Lyratzopoulos et al. 2012). Low awareness of the symptoms of breast cancer symptoms, particularly non-lump symptoms, and the increasing risk of breast cancer with age can mean that women are less likely to check their breasts, leading to a higher probability of delayed presentation (Koo et al. 2017; Linsell et al. 2008; Ramirez et al. 1999).

We have developed the Promoting Early Presentation (PEP) Intervention, a scripted one-to-one interaction between a health professional and a woman which is supported by an information booklet for the woman to take home. The PEP intervention targets older women's knowledge, motivation, confidence and skills to present promptly with breast cancer symptoms (Burgess et al. 2008; Burgess et al. 2009). In a randomised controlled trial in the National Health Service (NHS) Breast Screening Programme, delivered after the final invited mammogram, the PEP Intervention increased older women's breast cancer awareness compared to usual care (Forbes et al. 2011; Kaushal et al. 2016). The PEP Intervention also increased breast cancer awareness to a similar degree in routine clinical practice, delivered by NHS radiographers in the NHS Breast Screening Programme and by practice nurses in primary care (Campbell et al. 2015; Dodd et al. 2017; Forbes et al. 2012). In 2013, the All Party Parliamentary Group on Breast Cancer recommended that the PEP Intervention should be rolled out more widely to assess its effect on survival and be tested in other settings (All Party Parliamentary Group on Breast Cancer 2013).

Aims

The aim of this project was to evaluate an adapted version of the PEP Intervention for use in a primary care setting using the seasonal flu vaccination campaign as a vehicle for delivery. Influenza vaccination for patients over the age of 65 is part of the Quality and Outcomes Framework (the incentive scheme for general practices) and therefore actively promoted by practices, leading to high uptake amongst patients over the age of 65 (Doran et al. 2008). We developed a shorter, 1-minute version of the PEP intervention to be used specifically in a primary care setting during flu vaccination appointments. By using the flu campaign, we were able to target a large proportion of women over 70, including those who had never attended breast screening. We evaluated the effect of the training on health professionals' breast cancer awareness and confidence to deliver the intervention, the effect of the PEP Intervention on women's breast cancer awareness, attendances and two week wait referrals for breast symptoms among older women. We also gathered the views of health professionals on the acceptability and feasibility of delivering the PEP Intervention in this setting.

Methods

Participants

Six general practices in South East London with a high proportion of female patients aged 70+ and a high uptake of the flu vaccination took part in the project. Women with a history of breast cancer or dementia were excluded from the study (377 out of 3,457 women).

The PEP Intervention

The intervention used in this study was based on the PEP, which is a scripted one-to-one interaction with a health professional, takes about one minute to deliver and is supported by

a booklet Intervention (Burgess et al. 2008; Burgess et al. 2009; Linsell et al. 2009). The script sets out the increasing risk of developing breast cancer with age, breast cancer symptoms and how to look for breast changes, and encouraged women to present promptly on noticing any breast change. The booklet, 'Looking after your breasts' also includes an action planning page (where the woman can write out her plans for breast checking and what she will do if she notices a change) and information on how to make an appointment for breast screening. The health professional refers to the booklet during the intervention and gives it to the woman to take home.

Training health professionals and evaluation of training

During September and October 2011, we trained 20 nurses and 20 General Practitioner (GP) to deliver the intervention during attendances for flu vaccination during the 2011/12 campaign. Training sessions took place in GP practices and were one hour long.

We measured the health professionals' knowledge of breast cancer and confidence to promote early presentation of breast cancer before training and up to one month after training. We asked female health professionals about their confidence to notice a change in their breasts. The questionnaire was based on a validated measure of breast cancer awareness we have previously developed (Linsell et al. 2009; Omar et al. 2010). Implementation began immediately after each practice's training and continued until the 31st of December 2011.

Measuring the effect on breast cancer awareness in older women

GP practices carried out a postal survey of their registered female population aged 70+ in September 2011 and repeated it in January 2012.

The questionnaire used in the survey contained ten questions which measured knowledge of breast cancer, confidence to detect breast symptoms and barriers to symptomatic presentation, adapting other measures and incorporating evidence from qualitative studies (Burgess et al. 2006; Linsell et al. 2010; Stubbings et al. 2009). It also asked for information on age, postcode and ethnicity.

Number of attendances for breast symptoms and urgent referrals

The practice managers collected data on the number of attendances for breast symptoms and the number of two week wait breast referrals, using Read codes, per quarter from January 2010 to June 2012.

Feedback from health professionals

A purposive sample of participating health professionals were interviewed about their views of the training, their experiences of delivering the intervention, the acceptability of the intervention to patients and the feasibility of implementing the intervention into routine practice. We selected a mixture of GPs and nurses from all practices who were highly involved in delivering the intervention at the end of the project.

Analysis

We examined change in health professionals' knowledge, confidence and breast checking behaviour by calculating medians and using the Wilcoxon matched-pairs and McNemar tests (Swinscow and Campbell 1997).

In older women registered with the practices, we examined change in knowledge of breast cancer symptoms between the first survey (September 2011) and the second survey (January 2012) using χ^2-squared tests (these data were not paired because we did not have data to

identify respondents)(Swinscow and Campbell 1997). We examined change in confidence to check breasts and reported barriers to symptomatic presentation using univariate logistic regression. All analyses were conducted using SPSS version 15.

We compared the number of breast symptom attendances and two week wait referrals made by the practice before and after the intervention (July to September 2011 and January to March 2012) and with the same time periods in the previous year.

Interviews with the health professionals were analysed qualitatively using thematic analysis to identify common patterns and themes (Braun and Clarke 2006).

Ethical approval

This project was a health service evaluation administered by the general practices and therefore did not require approval from an ethics committee.

Results

Effect of training on health professionals' knowledge and confidence

Response to the questionnaire about knowledge and confidence to promote early presentation of breast cancer was 100% before training and 73% after training. We found no significant differences between responders and non-responders to the second questionnaire by sex, profession (GP/Nurse) or baseline breast cancer awareness, confidence to promote early presentation of breast cancer or confidence to tackle barriers to symptomatic presentation. Health professionals' knowledge of breast cancer symptoms, knowledge that risk of breast cancer increases with age, reported breast checking, confidence to notice a

change in their breasts (women only), confidence to promote early presentation of breast cancer and tackle barriers to symptomatic presentation increased after training (Table 1).

Effect of the campaign on older women's breast cancer awareness

Response to the first survey was 36% (n=1102) and to the second survey was 39% (n=1249). Sixty percent of participants were aged between 70 and 79, and most were of White ethnic group (Table 2).

In the second survey, the median score for knowledge of breast cancer symptoms was higher than in the first survey (5/11 vs 4/11, p=0.005) and the median score for knowledge of non-lump breast cancer symptoms was also higher (3/9 vs 2/9, p=0.002). Knowledge of seven of the eleven symptoms was higher in the second survey (Table 3), in particular change in nipple position (+6.5%), pain in breast or armpit (+6.4%) and nipple discharge or bleeding (+5.6%).

The proportion of women reporting that they checked their breasts at least once a month was higher in the second survey (49% vs 43%, p=0.01) as was women's confidence to know which breast changes to look for and to remember to check their breasts. Knowledge of age-related risk was not significantly different between the two surveys (Table 4).

There was no significant difference in the proportion of women reporting barriers that might put them off going to a doctor between the two surveys (median number of barriers reported 2/11 vs 2/11). The most commonly identified barrier was "Worrying about any treatment I might have to have" (43%).

Attendance for breast symptoms and emergency referrals

Between July and September 2011 (the quarter before the seasonal flu campaign), 5/3338 (0.15%) registered women aged 70+ attended one of the six practices with breast symptoms; between October and December 2011 (the quarter of the seasonal flu campaign), 11/3432 (0.32%) women attended, and between January and March 2012, 12/3324 (0.36%) women attended. However, for the same period the year before, between January and March 2011, 15/3296 (0.46%) of women aged 70+ attended with breast symptoms.

There were similar findings for rates of two week wait referrals for breast symptoms, which for every quarter from October to December 2010 and January to March 2012 was between 0.30% and 0.52% of women per quarter with no clear increase during or after the campaign.

Health professionals' perceptions of the intervention

We interviewed three practice managers, three GPs and four nurses. Health professionals thought the key messages of the intervention were important and that it would help increase breast awareness in this group of women.

> *"I thought it was an excellent idea, because it makes older people more aware of breast cancer… I think they forget to check their breasts and they forget to look after their bodies as they get older" Nurse*

> *"The booklet is brilliant because it was actually a tool to go through and it was a prompt [to go through with the patient]…… having those pictures, the little graph showing risk going up and what to do and how to phone the practice I thought was very clear" GP*

Health professionals reported that women valued the content on the risk of breast cancer increases with age, breast cancer symptoms, and how to promote early presentation of breast cancer.

> *"There were some other women who actually when you asked them 'what do you think your risk of breast cancer is as you get older?' They were shocked to find that their risk just carried on going up." GP*

> *"The majority of them [the women] were very positive and quite a few were quite pleased and shocked to find that they could actually phone the phone number and book themselves on [for breast screening] if they wanted to. Not a lot of people realised that, so that's nice having the number at the back of the book. And the book is very visual. They liked the book" Nurse*

Most health professionals reported that the intervention was easy to deliver, that they covered all the areas of the script in the time allowed and that it did not slow down flu vaccination clinics.

> *"In the beginning I thought 'are we really going to be able to do this within the five minutes [for the flu vaccination appointment] that we've got?' but it was surprising how easy it was to actually bring it up [the intervention] while you are getting it [the vaccination] out of the cupboard." Nurse*

It was reported that the intervention sometimes took longer than one minute if women asked questions and some opportunities to deliver the intervention were missed because of busy days and not having the booklets available. Practice managers did not report any negative effect on waiting times.

Discussion

Summary of main findings

Training health professionals to deliver a brief intervention to promote early presentation of breast cancer among older women increased their knowledge and confidence to promote early presentation of breast cancer.

We found evidence that the intervention increased knowledge of breast cancer symptoms, confidence to check their breasts and frequency of breast checking among older women registered with the practices. The intervention did not increase knowledge of age-related risk of breast cancer nor reduce barriers to symptomatic presentation.

The intervention was considered worthwhile and feasible by health professionals and practice managers. There were no reports of disruption to clinics or any complaints from staff or patients. We found some evidence of a small increase in the number of women attending for breast symptoms or two week wait referrals for breast symptoms in the short term, suggesting that it would not raise an unnecessary burden on the health service.

Strengths and limitations of the study

This study is, to our knowledge the first of its kind to evaluate an intervention to promote early presentation of breast cancer among older women in primary care using the seasonal influenza campaign as a vehicle. We had good uptake of training from health professionals and response to the second survey in the evaluation of their knowledge and confidence was reasonable.

The sample size for the evaluation of the effect on breast cancer awareness among older women was large. The response, was relatively low, but comparable to similar NHS postal surveys (Campbell et al. 2009). Therefore we did not have any data about non-responders as we were unable to access these data. Therefore the results of the survey may not be representative of all the women aged 70+ registered at the practices. We were unable to identify whether the same women responded to the first and second survey; however, that the age and ethnic distribution of the survey participants was similar to the two surveys suggests that it is unlikely that there was major bias introduced by different women responding to each survey.

Because this was an uncontrolled study, we cannot say with certainty that the increase in breast cancer awareness was due to the intervention; however, there were no other national or local campaigns to increase breast cancer awareness during the period that could have been responsible. We were also unable to evaluate the quality of the delivery of the intervention. It is likely that the quality would have varied by health professional.

The questionnaire itself may have led to greater breast cancer awareness in the second survey (an effect known as the 'mere measurement' effect) (Godin et al. 2008). This is unlikely to explain our findings as women in the usual care group of a randomised controlled trial of the PEP Intervention completed this questionnaire at multiple time points resulting in limited changes in breast cancer awareness (Forbes et al. 2011).

<u>Comparisons with other literature</u>

Systematic review of interventions to promote cancer awareness and early presentation of symptoms (search date 2008) found that few interventions (in breast or other cancers) have been rigorously tested and therefore there is limited evidence of their effectiveness (Austoker

et al. 2009). Since then, there have been significant developments in this field. A randomised controlled trial of the PEP Intervention in the NHS Breast Screening Programme found that it increased knowledge of breast cancer symptoms, knowledge that the risk of breast cancer increases with age, and reported breast checking two years later (Forbes et al. 2011). Implementation of this intervention during routine clinical practice in the NHS Breast Screening Programme and primary care have shown similar effectiveness (Campbell et al. 2015; Dodd et al. 2017; Forbes et al. 2012).

Unlike previous studies of the PEP Intervention, we found that delivering the adapted PEP Intervention during the seasonal flu campaign did not increase knowledge of age-related risk. However, we did find an increase in knowledge of breast cancer symptoms and breast checking. It may be that there is insufficient time during the 1-minute intervention to deliver this message effectively, or that health professionals were not sufficiently equipped to deliver it. A similar one-to-one intervention to promote early presentation of lung cancer symptoms in general practice found that it reduced time to consultation after symptom onset and an increase in consultations for lung symptoms (Smith et al. 2013).

Since this study, the Department of Health and NHS implemented regional cancer awareness media campaigns (‘Be Clear on Cancer’) in 2012 to promote early presentation of breast cancer among older women. These led to an 8% increase in the number of two week wait referrals for breast symptoms which prompted roll-out of national campaigns across England in 2014 and 2015 (National Cancer Registration and Analysis Service 2016). However, it is not clear whether media campaigns lead to sustained changes in breast cancer awareness.

Conclusions

We found it was feasible and effective to train health professionals to deliver a 1-minute intervention to promote early presentation of breast cancer, which is likely to have led to increased breast cancer awareness in older women. The seasonal flu campaign provides an opportunity to promote earlier presentation of breast cancer among older women in primary care that does not lead to excessive demand on health services. Approaches of this kind could contribute to promoting early presentation of breast cancer and improving breast cancer awareness among older women. Although this work was conducted a number of years ago, we have no reason to believe that the conclusions are not applicable to current practice as early diagnosis of breast cancer is still a public health priority (NHS England 2017).

Declarations

Ethics approval and consent to participate

This research project was a health services evaluation and so ethics approval and consent were not required. All patient contact was via health professionals and the research team at no point had access to personal patient information.

Consent for publication

Not applicable.

Availability of data and material

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

AK contributed to the co-ordination of the project, entered, analysed and interpreted the data, and drafted the manuscript. KM had the idea for the project, secured funding, contributed to the co-ordination of the project including recruiting practices, and commented on the manuscript. FW contributed to the analysis and commented on the manuscript. CB contributed to the co-ordination of the project, including recruiting the practices, and commented on the manuscript. AJR designed the intervention, trained the health professionals and provided comments on the manuscript. LJF led the implementation of the project, trained the health professionals, designed the evaluation, interpreted the data and revised the manuscript.

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Keywords

- Primary Health Care
- Breast cancer awareness
- Health promotion

Key points

- Breast Cancer Awareness among older women is low and may be associated with delayed presentation and later stage of diagnosis.
- The Promoting Early Presentation intervention (PEP), which has been found to increase breast cancer awareness, was adapted for use in primary care and delivered during in conjunction with the flu vaccination campaign.
- GPs and nurses from six GP practices in South London were trained to deliver the PEP intervention, utilising the opportunity of flu vaccinations to reach older women.
- Knowledge of breast symptoms increased after the intervention but no impact was found on emergency referrals, and interviews with health professionals deemed the intervention feasible and acceptable.
- This study presents a novel way to increase breast cancer awareness which could contribute to promoting earlier presentation and diagnosis of breast cancer in the UK.

Reflective questions

- What is your own awareness of the symptoms of breast cancer and increasing risk with age?
- Do you think this intervention described would be feasible in your own practice?
- Do you think written information materials are helpful for communicating health messages to patients?

List of abbreviations

PEP Intervention: Promoting Early Presentation Intervention

NHS: National Health Service

GP: General practitioner

References

All Party Parliamentary Group on Breast Cancer. 2013. Age is just a number: the report of the parliamentary enquiry into older age and breast cancer.

Austoker J, Bankhead C, Forbes LJ, Atkins L, Martin F, Robb K, Wardle J, Ramirez AJ. 2009. Interventions to promote cancer awareness and early presentation: systematic review. British journal of cancer. 101 Suppl 2:S31-39.

Braun V, Clarke V. 2006. Using thematic analysis in psychology. Qualitative research in psychology. 3(2):77-101.

Burgess CC, Bish AM, Hunter HS, Salkovskis P, Michell M, Whelehan P, Ramirez AJ. 2008. Promoting early presentation of breast cancer: development of a psycho-educational intervention. Chronic illness. 4(1):13-27.

Burgess CC, Linsell L, Kapari M, Omar L, Michell M, Whelehan P, Richards MA, Ramirez AJ. 2009. Promoting early presentation of breast cancer by older women: a preliminary evaluation of a one-to-one health professional-delivered intervention. Journal of psychosomatic research. 67(5):377-387.

Burgess CC, Potts HW, Hamed H, Bish AM, Hunter MS, Richards MA, Ramirez AJ. 2006. Why do older women delay presentation with breast cancer symptoms? Psycho-oncology. 15(11):962-968.

Campbell J, Pyer M, Rogers S, Jones J, Ramirez A, Forbes L. 2015. Promoting early presentation of breast cancer in women over 70 years old in general practice. Journal of Public Health.fdv125.

Campbell J, Smith P, Nissen S, Bower P, Elliott M, Roland M. 2009. The GP Patient Survey for use in primary care in the National Health Service in the UK–development and psychometric characteristics. BMC family practice. 10(1):57.

Breast cancer incidence (invasive) statistics. 2016. [accessed 12th May 2016]. http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/breast-cancer/incidence-invasive#heading-One.

Dodd RH, Forster AS, Sellars S, Patnick J, Ramirez AJ, Forbes LJL. 2017. Promoting early presentation of breast cancer in older women: sustained effect of an intervention to promote breast cancer awareness in routine clinical practice. BMC Health Services Research. 17(1):386.

Doran T, Fullwood C, Kontopantelis E, Reeves D. 2008. Effect of financial incentives on inequalities in the delivery of primary clinical care in England: analysis of clinical activity indicators for the quality and outcomes framework. The Lancet. 372(9640):728-736.

Forbes LJ, Forster AS, Dodd RH, Tucker L, Laming R, Sellars S, Patnick J, Ramirez AJ. 2012. Promoting early presentation of breast cancer in older women: implementing an evidence-based intervention in routine clinical practice. Journal of cancer epidemiology. 2012:835167.

Forbes LJ, Linsell L, Atkins L, Burgess C, Tucker L, Omar L, Ramirez AJ. 2011. A promoting early presentation intervention increases breast cancer awareness in older women after 2 years: a randomised controlled trial. British journal of cancer. 105(1):18-21.

Godin G, Sheeran P, Conner M, Germain M. 2008. Asking questions changes behavior: mere measurement effects on frequency of blood donation. Health psychology : official journal of the Division of Health Psychology, American Psychological Association. 27(2):179-184.

Kaushal A, Ramirez AJ, Warburton F, Forster AS, Linsell L, Burgess C, Tucker L, Omar L, Forbes LJ. 2016. “Promoting Early Presentation” intervention sustains increased breast cancer awareness in older women for three years: A randomized controlled trial. Journal of medical screening.0969141316667408.

Koo MM, von Wagner C, Abel GA, McPhail S, Rubin GP, Lyratzopoulos G. 2017. Typical and atypical presenting symptoms of breast cancer and their associations with diagnostic intervals: Evidence from a national audit of cancer diagnosis. Cancer Epidemiology. 48:140-146.

Linsell L, Burgess CC, Ramirez AJ. 2008. Breast cancer awareness among older women. British journal of cancer. 99(8):1221-1225.

Linsell L, Forbes LJ, Burgess C, Kapari M, Thurnham A, Ramirez AJ. 2010. Validation of a measurement tool to assess awareness of breast cancer. European journal of cancer (Oxford, England : 1990). 46(8):1374-1381.

Linsell L, Forbes LJ, Kapari M, Burgess C, Omar L, Tucker L, Ramirez AJ. 2009. A randomised controlled trial of an intervention to promote early presentation of breast cancer in older women: effect on breast cancer awareness. British journal of cancer. 101 Suppl 2:S40-48.

Lyratzopoulos G, Abel GA, Barbiere JM, Brown CH, Rous BA, Greenberg DC. 2012. Variation in advanced stage at diagnosis of lung and female breast cancer in an English region 2006-2009. British journal of cancer. 106(6):1068-1075.

National Cancer Registration and Analysis Service. 2016. Be Clear on Cancer: National breast cancer in women over 70 awareness campaign: February/March 2014: Interim evaluation results. Public Health England.

NHS England. 2017. Achieving World-Class Cancer Outcomes: A Strategy for England 2015-2020 – Progress Report 2016-17.

Omar L, Burgess C, Tucker L, Whelehan P, Ramirez A. 2010. Can radiographers be trained to deliver an intervention to raise breast cancer awareness, and thereby promote early presentation of breast cancer, in older women? Radiography. 16(2):101-107.

Ramirez AJ, Westcombe AM, Burgess CC, Sutton S, Littlejohns P, Richards MA. 1999. Factors predicting delayed presentation of symptomatic breast cancer: a systematic review. Lancet. 353(9159):1127-1131.

Smith S, Fielding S, Murchie P, Johnston M, Wyke S, Powell R, Devereux G, Nicolson M, Macleod U, Wilson P et al. 2013. Reducing the time before consulting with symptoms of lung cancer: a randomised controlled trial in primary care. The British journal of general practice : the journal of the Royal College of General Practitioners. 63(606):e47-54.

Stubbings S, Robb K, Waller J, Ramirez A, Austoker J, Macleod U, Hiom S, Wardle J. 2009. Development of a measurement tool to assess public awareness of cancer. British journal of cancer. 101 Suppl 2:S13-17.

Swinscow T, Campbell M. 1997. Study design and choosing a statistical test. Statistics at Square One London: BMJ Publishing Group.

Table 1. Health professionals' knowledge of breast cancer and confidence to promote early presentation

	Before training	After training	p for difference[a]
Number of breast cancer symptoms recognised (median out of 11)	8	11	<0.001
Number of non-lump breast cancer symptoms recognised (median out of 9)	7	9	0.001
Identified a 70 year old at most risk of breast cancer rather than a younger woman or a woman of any age (%)	52	85	0.012
Knew that risk of breast cancer increases after the age of 70 rather than decreases or stays the same (%)	66	97	0.004
Confident to promote early presentation (median out of 50[b])	40	45	<0.001
Confident to tackle barriers to presentation (median out of 40[c])	35	36	0.008
Reported checking breasts at least once a month (% of 22 women)	32	68	0.008
Confident to notice changes in breasts (% of 22 women)	73	100	0.031

[a] Analysis of 29 health professionals who had responded to the follow-up questionnaire.

[b] An aggregate score based on 5 questions about confidence to promote early presentation (symptom awareness, risk of developing cancer, breast checking, prompt presentation of symptoms and delivering the intervention in a positive and motivational style). The individual questions were scored from 1 to 10 with 10 being the most confident.

[c] An aggregate score based on 4 questions about confidence to tackle barriers to presentation (embarrassment, worry about wasting the doctor's time, being too busy to see the doctor and worrying about what the doctor might find). The individual questions were scored from 1 to 10 with 10 being the most confident.

Table 2. Age and ethnicity of women aged 70+ taking part in the baseline and follow-up surveys

	Baseline n (%)	**Follow-up n (%)**
Total number of participants	1102	1249
Age	Data available for 1089 participants	Data available for 1222 participants
70-79	647 (59.4)	732 (59.1)
80+	442 (40.6)	506 (40.9)
Ethnicity	Data available for 1053 participants	Data available for 1173 participants
White	926 (87.9)	1018 (86.8)
Mixed	17 (1.6)	21 (1.8)
Asian	24 (2.3)	35 (3.0)
Black	79 (7.5)	88 (7.5)
Other	7 (0.7)	11 (0.9)

Table 3. Change in knowledge of breast cancer symptoms

	First survey (%) n=922	Second survey (%) n=1055	Difference (%)	*p* (χ^2)	Odds ratio (95% confidence interval
Change in nipple position	365 (39.6)	486 (46.1)	+6.5	0.004	1.30 (1.09 to 1.56)
Pain in breast or armpit	516 (56.0)	658 (62.4)	+6.4	0.004	1.30 (1.09 to 1.56)
Nipple discharge or bleeding	543 (58.9)	680 (64.5)	+5.6	0.01	1.27 (1.06 to 1.52)
Lump or thickening in the armpit	648 (70.3)	794 (75.3)	+5.0	0.01	1.28 (1.06 to 1.57)
Skin puckering or dimpling	376 (40.8)	480 (45.5)	+4.7	0.04	1.21 (1.01 to 1.45)
Nipple rash	134 (14.5)	199 (18.9)	+4.4	0.01	1.37 (1.08 to 1.74)
Skin redness	157 (17.0)	220 (20.9)	+3.9	0.03	1.28 (1.02 to 1.61)
Nipple pulling in	436 (47.3)	540 (51.2)	+3.9	0.08	1.17 (0.98 to 1.40)
Changes in shape of breast or nipple	479 (52.0)	574 (55.4)	+3.4	0.13	1.15 (0.96 to 1.37)
Change in size of breast or nipple	362 (39.3)	439 (41.6)	+2.3	0.29	1.10 (0.92 to 1.32)
Lump or thickening in the breast	824 (89.4)	923 (87.5)	-1.9	0.23	0.83 (0.63 to 1.10)

Table 4. Change in confidence to check breasts, knowledge of age-related risk and barriers to symptomatic presentation

	Baseline n (%)	**Follow-up n (%)**	***p* (χ^2)**	**Odds ratio (95% confidence interval**
Breast Checking				
Checks breasts at least once a month	471/1085 (43.4)	602/1228 (49.0)	0.01	1.25 (1.06 to 1.48)
Confident to know what breast changes to look for	730/1033 (70.7)	899/1184 (75.9)	0.005	1.31 (1.08 to 1.58)
Confident to know how to check breasts	730/1015 (71.9)	889/1178 (75.5)	0.06	1.20 (0.99 to 1.45)
Confident to remember to check breasts	590/1010 (58.4)	754/1151 (65.5)	0.001	1.35 (1.14 to 1.61)
Age-related risk				
A 70 year old woman	129/1057 (12.2)	138/1200 (11.5)	0.63	0.94 (0.73 to 1.21)
After the age of 70 a woman is more likely to get breast cancer	240/1052 (22.8)	245/1200 (20.4)	0.16	0.86 (0.71 to 1.06)
Emotional barriers				
Worrying about any treatment they might have to have	421/984 (42.8)	486/1120 (43.4)	0.79	1.02 (0.86 to 1.22)
Worrying about what the doctor might find	384/993 (38.7)	460/1122 (41.0)	0.28	1.10 (0.93 to 1.31)
Not feeling confident talking to the doctor about a symptom	163/975 (16.7)	183/1102 (16.6)	0.95	0.99 (0.79 to 1.25)
Embarrassed to go and see the doctor	134/1001 (13.4)	130/1121 (11.6)	0.22	0.85 (0.66 to 1.10)

Service barriers				
Not being able to see their usual doctor	339/971 (34.9)	381/1111 (34.3)	0.77	0.97 (0.81 to 1.17)
Finding it difficult to make an appointment	299/982 (30.4)	369/1115 (33.1)	0.19	1.13 (0.94 to 1.36)
Worrying about wasting the doctor's time	243/997 (24.4)	267/1117 (23.9)	0.79	0.97 (0.80 to 1.19)
Finding the doctor difficult to talk to	118/973 (12.1)	148/1096 (13.5)	0.36	1.13 (0.87 to 1.46)
Practical barriers				
Too many other things to worry about	157/956 (16.4)	159/1097 (14.5)	0.23	0.86 (0.68 to 1.10)
Finding it difficult to arrange transport	128/973 (13.2)	153/1101 (13.9)	0.63	1.07 (0.83 to 1.38)
Too busy to make time to go to the doctor	77/964 (8.0)	80/1081 (7.4)	0.59	0.91 (0.66 to 1.27)