

Health promotion at NHS breast cancer screening clinics in the UK

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SUMMARY

Suboptimal diets, sedentary lifestyles, overweight and obesity expose two-thirds of women in England aged over 50 to a heightened risk of lifestyle-related morbidities. The UK's NHS Breast Cancer Screening Programme now reaches 75% of all women aged 53–64 but provides only mammography screening. This cross-sectional survey of 413 women attending two NHS breast screening clinics in North Yorkshire found that the majority of women were interested in having diet and exercise advice at screening clinics and anticipated a neutral or positive effect on their future screening appointments. Interest was highest among older, less educated and overweight women suggesting that this may be a particularly effective medium for reaching higher risk subgroups. Women showed most interest in problem-solving advice, which provided short-term, life-enhancing benefits such as looking and feeling better, having more energy, losing weight and reducing menopausal symptoms, as well as

potentially reducing their disease risk. Most appeared to find doing sufficient exercise more problematic than eating healthily and this might be exacerbated by low awareness of exercise guidelines. Given a choice, preferences were to access advice in leaflets or one to one from an expert; however, many younger, professional women were also interested in computer access. Findings indicate the need first for flexible, multi-level access, combining some broad-based information dissemination with pathways to more personalized support and secondly for the relevant 'consumer benefits' associated with better diet and exercise to be promoted as well as longer-term disease prevention. Overall, this study indicates that the UK's NHS Breast Cancer Screening Programme may be uniquely placed to provide health-enhancing advice as well as mammography screening to the majority of women in England, throughout the course of their mid-life.

Key words: breast screening; diet and exercise

INTRODUCTION

A major UK health policy objective is to re-orientate the NHS from an essentially treatment or 'sickness' focused service to one that more effectively uses routine patient contacts to prevent disease, prolong life and promote health (Department of Health, 2004a). As sedentary lifestyles (Department of Health, 2004b), unhealthy dietary practices (Food Standards Agency, 2004) and obesity

(Department of Health, 2004c) continue to undermine the physical and psychological health of the majority of adults in England, public health interventions to improve these behaviours have now become a priority within UK health strategy (Department of Health, 2004a). During the last decade, the UK government has implemented a number of large-scale promotions to try and persuade the population to eat more healthily and do more exercise. These, however, have largely manifest as

passive, 'one size fits all' initiatives, now widely criticized (Crawford, 2000; Wanless, 2004) for their failure to address inherent population differences in individual's ability to access and use information to make healthier lifestyle choices (Nutbeam, 1998; Catford, 2003).

In England, as in most other developed countries, prevalence of chronic lifestyle-related disease shows marked socio-economic gradients (Moser and Majeed, 1999; Marmot and Wilkinson, 2006). Although this is inextricably linked to wider societal and environmental factors (Black, 1980; Acheson, 1998; Marmot, 2005), with many requiring policy rather than promotional intervention, reviews of individually focused diet and exercise strategies (Liang *et al.*, 1999; Jebson, 2000; Whitlock *et al.*, 2002; Hulscler *et al.*, 2003) have consistently concluded that initiatives aimed at individual behaviour change are more effective if they are age and gender-specific, address issues of personal relevance and demonstrate how improvements can be integrated into pre-existing lifestyles. Although age and gender are known to moderate some diet and exercise behaviours (Conner and Norman, 1996; Wardle and Griffith, 2001) as well as responses to interventions to improve these (Bennett and Murphy 1997, Annandale and Hunt, 2000), to date, health-promoting campaigns in the UK have been demographically non-specific. Current health policy does now, however, advocate differentially targeting high-risk population groups with diet and exercise advice and using routine NHS contacts whenever possible to communicate this (Department of Health, 2005a).

Population targets

In England, prevalence of female obesity is highest among women aged 55–74 (Department of Health, 2004c), with less than a quarter adhering to recommended levels of physical activity (Department of Health, 2004b) or consuming sufficient fruit and vegetables (Food Standards Agency, 2004). According to the World Health Report on Diet, Nutrition and the Prevention of Chronic Diseases (World Health Organisation, 2002), there is 'convincing evidence' that sedentary lifestyles, unhealthy dietary practices and obesity are major causal factors in the development of cardiovascular disease, diabetes and some cancers. Weight loss, regular physical activity and better nutrition

can, however, not only reduce the onset and seriousness of morbidities (Avenell *et al.*, 2004) but also confer many other health benefits to women in mid-life including healthier bones, muscles and joints, reduced feelings of depression and stress and generally better psychological well-being (Rosenfeld, 2004).

Three-quarters of the female population in England, aged 53–64 now attend NHS mammography screening and all women aged 50–70 are invited for routine screening every 3 years (Department of Health, 2005b). One and a half million women now attend annually (Department of Health, 2005c) but their socio-demographic profile is unknown. Some studies have suggested that attendees may not come from the most deprived areas (Banks *et al.*, 2002); however, prevalence of suboptimal nutrition, inactivity and obesity within this population group is sufficiently widespread to affect a sizeable proportion of them. At present, women are offered only mammography at routine appointments and this may be a missed opportunity to provide them with broader health-promoting advice to help minimize their exposure to breast cancer as well as other lifestyle-related diseases, i.e. postmenopausal obesity has been estimated to increase breast cancer risk by up to 50% and regular physical activity may help to reduce this risk (Key *et al.*, 2002). The absence of wider health advice at screening clinics may also be particularly disadvantageous to women in lower socio-economic groups who can be less 'health conscious' (Wardle and Steptoe, 2003) and may be more dependent on health professionals to maintain their health (Cockerham *et al.*, 1986; Blaxter, 1990). These women may, therefore, be more inclined to accept and act on advice that is provided in healthcare settings and 'sanctioned' by health professionals (Whitlock *et al.*, 2002).

Research objectives and rationale

The study objectives were to determine whether women attending routine NHS mammography would be interested in receiving diet and exercise advice at screening clinics, in what format and what effect they anticipated this might have on their future screening attendance. We also aimed to identify the potential health and lifestyle benefits that women found most appealing and their perceived barriers to making diet and exercise changes.

METHODS

Participants and procedure

The North and East Yorkshire Strategic Health Authority screen a similar proportion of eligible women (77.8%) as the NHS nationally (74.9%) (Department of Health, 2005c), and to maximize socio-demographic diversity, a static city-based and mobile rural screening clinics were included in the study. Radiographers were personally briefed and given a written protocol to explain the purpose of the research to all women attending during the 2-week data collection period in November 2004. A self-complete questionnaire was piloted among a convenience sample of 20 women aged 50–64 and study participants were given an information pack (study briefing, self-complete questionnaire and reply paid envelope with clinic code) to take away. Informed consent was given by completing and returning the questionnaire within 2–3 weeks in a pre-addressed, postage-paid envelope and patients were informed that £1 would be given to Cancer Research UK for each one received. No exclusion criteria were applied as all women were attending routine appointments.

Measures

Socio-demographic and health attitudinal data were also collected as these are not routinely available for attendees and the recent Million Women Study (1999–2001) (The Million Women Study Collaborative Group, 2001) collected only health behavioural data from this population. A survey questionnaire was used to collect data on a variety of socio-demographic and health-related measures. These included age, marital and work status, paid occupations, academic qualifications and age of leaving full time education, height and weight to calculate body mass index (BMI), knowledge of official recommendations for fruit and vegetable consumption and weekly exercise occasions as well as women's behaviours in relation to these. Interest in having advice and the anticipated effect of this on future breast screening appointments were assessed on 4-point Likert scales. Preferred formats for receiving advice were ranked in order of preference and potential benefits from and barriers to change were ranked in order of importance.

Statistical power

A power analysis was carried out to calculate the sample needed to enable comparisons between screening clinics, lower and higher socio-economic status (SES) groups and between overweight or obese and non-overweight women. Among women aged 55–64, prevalence of overweight or obesity was 67% and lower SES, defined by occupation, was 41%. As specific data were unavailable for screening attendees, sample estimation assumed that all non-attendees were overweight and in lower SES groups leaving a residual prevalence of 16 and 42%, respectively. The lower figure was used to calculate minimum sample for independent *t*-tests with 410 subjects providing sufficient statistical power ($\beta = 80\%$) to detect differences of 20% in levels of being 'very interested' in advice with 95% confidence (Norman and Streiner, 2000).

Data analyses

All data were analysed using SPSS (v.11). Pearson chi-square (χ^2) tests were used to compare study proportions with population estimates. Mean differences in outcome between groups were compared with independent *t*-tests and Mann-Whitney *U* tests. Group differences in interest in having advice, preferences for accessing it and potential benefits from it were indicated with Mann-Whitney *U* and Krushal-Wallis tests. Linear associations between socio-demographic variables and diet and exercise behaviours were then estimated with Spearman's rank-order correlation, and a multiple logistic regression model was used to assess the independent impact of variables on interest in and preferences for different types of advice and interactions between variables.

RESULTS

From radiographers' records, 678 patient information packs were distributed with 413 completed questionnaires received back giving a 61% response rate. There were no significant differences between clinic response rates [$\chi^2(1) = 0.409$; $p = < 0.05$] or any of the study findings discussed in this paper.

Sample characteristics

Sample mean age was 57.0 (SD 5.2), 92% of women were aged 50–64, and within this population, distribution was no different to wider regional [$\chi^2(2) = 0.963$; $p = > 0.05$] or national [$\chi^2(2) = 0.189$; $p = > 0.05$] female populations. The sample differed significantly from the national population in having more participants who were married [$\chi^2(4) = 13.01$; $p < 0.05$], graduates [$\chi^2(3) = 17.63$; $p < 0.001$] and managers [$\chi^2(4) = 18.4$; $p < 0.001$] and fewer in supervisory or routine occupations [$\chi^2(4) = 19.5$; $p < 0.001$].

BMI, diet and exercise knowledge and behaviours

The sample's mean BMI was [25.6 kg/m² (SD 4.21)] with both overweight and obesity (48%) significantly less prevalent [$t(412) = -190$, $p < 0.001$] than among women aged 45–64 in the wider population (65%). Compared with the wider population of women, significantly fewer participants aged < 54 were overweight or obese [$\chi^2(4) = 53.7$; $p < 0.001$] and among those aged 55–64, significantly fewer were obese [$\chi^2(4) = 30.8$; $p < 0.001$]. Women who had left school before aged 18 had a significantly higher BMI [$t(411) = 2.7$; $p < 0.01$], and after controlling for age in a logistic regression model, this independently increased the odds of being overweight by 70% (adjusted OR = 1.7, $p < 0.01$; 95% CI = 1.09–2.6). Nearly all (90%) women with a BMI of 25–30 kg/m² perceived themselves as 'overweight' but only a quarter (24%) of those with BMI > 30 kg/m² perceived themselves as 'obese'.

Compared with the wider population, women in the study consumed significantly more

portions of fruit and vegetables [$t(412) = 14.5$, $p < 0.0001$] and women who had left full time education aged 18 or older were more than twice as likely to eat five or more portions of fruit and vegetables daily [adjusted OR = 2.22, $p < 0.001$; CI: 1.34–3.47]. All age groups reported exercising more frequently than the wider population [<55 years: $\chi^2(3) = 227.6$, $p < 0.001$; 55–64 years: $\chi^2(3) = 330$, $p < 0.001$; over 65 years $\chi^2(2) = 40.1$, $p < 0.001$]. However, overweight and obese women ($r = -0.146$, $p < 0.01$), those in paid work ($r = 0.131$; $p < 0.05$) or in less skilled occupations ($r = 0.116$; $p < 0.05$) reported doing less physical activity.

Most participants (84%) correctly recalled that they should be eating five portions of fruit and vegetables a day but only 11% recalled that five, 30-minute sessions of moderate physical activity a week were recommended (Sallis and Owen, 1998). Giving the correct or higher estimates was associated with eating more portions of fruit and vegetables ($r = 0.157$, $n = 413$, $p < 0.001$) and doing more exercise ($r = 0.247$, $n = 413$, $p < 0.0001$).

Interest in advice and effect on future screening

Interest in having diet and exercise advice at screening clinics is summarized in Table 1 and subgroups significantly more likely to be 'very interested' were women aged over 55 [$\chi^2(1) = 4.8$, $p < 0.05$], overweight participants [$\chi^2(2) = 5.9$, $p < 0.05$] and those who had left school before aged 18 [$\chi^2(3) = 15.3$, $p < 0.01$].

Responses to the question 'How do you think this would make you feel about attending breast screening in future?' are summarized in Table 2. Women who left school before aged 18

Table 1: Interest in diet and exercise advice at screening clinics

	% Level of interest				<i>n</i>
	Not at all	A little	Quite	Very	
Total sample	14.6	23.2	37.3	24.9	413
Under 55 years	13.0	27.2	41.0	18.8	162
55–64 years	15.7	21.1	36.3	26.9	223
64+ years	14.3	17.9	25.0	42.8	28
Left education <18 years	11.0	21.0	39.0	29.0	251
Left education >18 years	21.3	27.7	34.8	16.2	162
Not overweight	19.7	24.9	34.3	21.1	215
Overweight	6.6	21.3	40.0	32.1	136
Obese	14.5	22.6	42.0	20.9	62

Table 2: Anticipated effect of advice on future appointments

% Participants saying	Total sample (%)	Age (years) (%)		Education level (years) (%)		BMI (kg/m ²) (%)		
		<55	>55	<18 ^a	>18 ^a	<25	25–35	>30
A lot less likely to attend	0.2	—	0.4	0.4	—	—	—	1.6
A little less likely to attend	0.5	0.6	0.4	—	1.4	0.5	—	1.6
No difference	90.8	90.7	90.8	89.7	92.9	93.0	88.2	88.7
A little more likely to attend	2.9	2.5	3.2	2.6	3.5	1.9	2.9	6.5
A lot more likely to attend	5.6	6.2	5.2	7.3	2.2	4.6	8.8	1.6
<i>n</i>	413	162	251	272	141	215	136	62

^aAge of leaving full time education.

were significantly more likely to say they would be ‘a lot’ more likely to attend future breast screening appointments [$\chi^2(1) = 4.8$, $p < 0.05$] if diet and exercise advice was also provided.

Preferred benefits

Table 3 shows the potential benefits women were most interested in from healthier diets and doing more exercise.

Many responses varied as a function of women’s age and BMI. For example, younger women (<55 years) were significantly more likely to be ‘very interested’ in advice to help them ‘look better’ ($r = -0.372$, $n = 413$, $p < 0.01$) ‘reduce menopausal symptoms’ ($Z = -6.42$; $p < 0.0001$) and to give them

Table 3: Interest in potential benefits from diet and exercise advice

	% Sample very interested
Have more energy	56.4
Look better	48.9
Reduce risk of getting a serious disease	47.2
Lose weight	46.0
Feel happier	44.3
Reduce menopausal symptoms	39.7
Measure healthiness of own diet	38.5
Eat healthily without spending more money	36.1
Be more active within lifestyle	34.4
Overcome depression	27.4
<i>n</i>	413

% Participants ‘very interested’ in healthy eating and exercise advice that might help them.

‘more energy’ ($Z = -2.56$; $p < 0.05$). Overweight and obese women (66.2%, 131/198) were significantly more interested in advice to help them ‘lose weight’ ($Z = -8.1$; $p < 0.0001$) and almost one-third (31.3%) of these women were also very interested in advice to help them ‘overcome depression’.

Main barriers to change

Women’s main barriers to diet and exercise change are summarized in Table 4 and these were similar across subgroups. However, overweight or obese women were significantly less likely to say that they already did enough exercise [$\chi^2(1) = 6.35$; $p < .05$], more likely to say that they did not ‘enjoy exercise’ [$\chi^2(1) = 13$; $p < 0.0001$] or were ‘too lazy’ [$\chi^2(1) = 9.9$; $p < 0.01$] to do more. Obese women in the sample were also significantly more likely than those with BMI < 30 kg/m² to give lack of willpower as a main barrier to change [$\chi^2(2) = 8.5$, $p < 0.01$].

Significantly more participants gave having a healthy enough diet as a main barrier to change than those saying they already did enough exercise [$t(412) = -1573.3$; $p < 0.001$]. Not wanting to give up enjoyable foods (50.4%) and lacking willpower (40.7%) were statistically related barriers to dietary change [$\chi^2(2) = 36.5$; $p < 0.001$]. Women who said that their diet was already healthy (56.2%) were statistically more likely to report eating the recommended daily portions of fruit and vegetables ($r = 0.197$; $p < 0.001$) but saying they already did enough exercise was not significantly associated with recommended levels of physical activity ($r = 0.030$; $p = 0.540$).

Table 4: Barriers to diet and exercise change

Diet	%	Exercise	%
Diet healthy enough	56.2	Not enough time	52.8
Giving up enjoyable foods	50.4	Do enough already	38.7
Lack willpower	40.7	Do not enjoy exercise	18.4
Irregular working hours	16.7	Too lazy to exercise	17.4
Family do not want to	13.6	Do not want to do more	17.4
Too busy to change	13.3	Cannot afford facilities	12.8
Little choice at work	9.4	Family/friends	11.6
Do not know how	8.7	Do not know what to do	11.1
Cannot afford better food	3.9	No facilities nearby	8.0
<i>n</i>	413		413

% Participants choosing as one of their three most important barriers to change.

Preferred formats for receiving advice

Participants ranked five possible ways to receive advice in order of preference, and summary results are given in Table 5. Obese women were significantly less likely than non-obese women to select leaflets as their first choice [$\chi^2(1) = 5.5$; $p < 0.01$]. Subgroups significantly more likely to want computer-accessed information were women who left school aged 18 or over ($Z = -2.1$, $p < 0.05$), in professional or managerial occupations [$\chi^2(4) = 11.9$; $p < 0.05$] and who had left school aged 18 or more [$\chi^2(3) = 9.6$; $p < 0.05$].

DISCUSSION

Principal findings

The majority of women (85.5%) were interested in having diet and exercise advice at NHS screening clinics and the vast majority (99.3%) believed this would either have no

effect (90.8%) or make them more likely (8.6%) to attend future screening appointments. Older, less educated and overweight women were significantly more likely to be 'very interested' and to say that having this advice would make them more likely to re-attend screening, suggesting that the NHS Breast Cancer Screening Programme may provide an appropriate framework for reaching higher risk groups of women. Preferences for accessing advice varied with almost half the sample (47%) wanting leaflets and one-third (34%) via one-to-one interviews with 'an expert'. A minority of women (<10%) preferred group discussions, video or computer/Internet-accessed advice, respectively. Younger (<55 years) more educated, professional women were more likely to favour computer-accessed advice. As there is evidence that receptiveness to advice can be influenced by methods of access (Bennett and Murphy, 1997), these findings indicate the need for

Table 5: Preferred method of receiving advice at screening clinics

Options	Total sample (%)	Age (years)		Education level (years) (%)		BMI (kg/m ²) (%)		
		<55	>55	<18 ^a	>18 ^a	<25	25–35	>30
Leaflets	46.7	44.4	48.2	44.5	51.0	50.7	44.9	37.0
Group discussion	6.3	5.6	6.8	8.1	2.8	4.2	10.3	4.8
Video/DVD to take away	7.3	5.6	8.4	8.5	5.0	6.5	9.6	4.8
Computer/Internet	7.7	8.0	7.6	5.1	12.8	7.4	6.6	11.3
Individually by an expert	34.1	38.9	31.1	35.7	31.2	30.2	33.8	48.4
<i>n</i>	413	162	251	272	141	215	136	62

% Participants ranking each first out of five options.

May add up to more than 100% as some participants gave more than one first preference.

^aAge of leaving full time education.

choice of access to be provided to this population.

A quarter of participants (24.9%) were very interested in the general idea of having diet and exercise advice at screening clinics. Considerably more were, however, very interested in diet and exercise advice that addressed specific issues, such as having more energy (56.4%), looking and feeling better (48.9%), reducing the risk of serious disease (47.2%), losing weight (46%) and feeling happier (44.3%). Over half (58.6%) of all participants aged <55 ($n = 162$) were also very interested in advice to help reduce menopausal symptoms. These findings are consistent with other studies (Olivier-Vasquez *et al.*, 2002; Wen *et al.*, 2002) which have found women to be more motivated to make lifestyle changes if potential benefits are both short term and life-enhancing as well as longer term and disease preventing.

Barriers to dietary improvement were similar to those identified in a recent pan-European study (Kearney and McElhone, 1999) with the majority of women saying that they thought their existing diets were healthy enough already. Although most of those who gave this reason also reported eating sufficient fruit and vegetables, over one-third of women said they wanted help to better assess the overall 'healthiness of their diets' and this might help them to identify other areas for improvement. Moreover, overweight or obese women were most likely to say that they 'lacked willpower' and particularly to give up 'enjoyable foods', and may be more motivated by advice that more explicitly communicates how healthy eating and 'enjoyable foods' are not necessarily mutually exclusive.

Taking sufficient exercise appeared altogether more problematic for most women than eating healthily. Significantly fewer thought they already did enough (39%) and lack of time (53%) was given as the main reason for this. As only one-tenth of participants (11%) correctly recalled current NHS exercise targets to be 'moderately active at least five times a week' (Department of Health, 2004d), perceived barriers such as lack of time may be based on misconceptions of the type and level of activity required. Current NHS physical activity guidelines may also be too non-specific to be informative and unlikely to facilitate goal setting and regular self-monitoring, both of which have been found to

be important precipitators of increased physical activity (Brawley *et al.*, 2003; Bennett and Murphy, 1997). Women might feel less time constrained and more determined to include physical activity in their daily lives if they realized that many 'normal' everyday activities, such as housework, gardening or walking, could provide them with adequate exercise levels (Sallis and Owen, 1998).

Conclusions and recommendations

The NHS Improvement Plan (Department of Health, 2004a) emphasizes the need for greater focus on preventative health and the Department of Health's Food and Health and Physical Activity action plans (Department of Health, 2005) both stress the need to investigate 'innovative ways' of encouraging better diet and exercise behaviours, particularly among women in lower socio-economic groups. Overall, this study suggests that NHS breast screening clinics may be ideally placed to provide credible and potentially persuasive diet and exercise advice for most women and particularly those in higher risk groups. Variation in women's preferences for how they wish to access advice as well as the most interesting potential benefits from it suggests the need for a flexible, multi-level approach combining widespread distribution of issue-orientated, problem-solving leaflets, together with clear pathways to obtain more personalized advice and support.

Between the age of 50 and 70, most women undergo a period of major biological change and increased risk from chronic illness. Although diet and exercise can help to reduce disease exposure and increase the likelihood of a healthier older age (Rosenfeld, 2004), few healthcare services in the UK focus on women's health in mid-life. The NHS Breast Cancer Screening Programme is at present the only health service dedicated to women's health throughout their middle years. As such, it provides not only extensive coverage of this population but may also be perceived by them as having inherently greater credibility and relevance as a provider of wider health-promoting advice. As this study suggests that attendees would welcome having diet and exercise advice at screening clinics, there would seem to be some compelling reasons for now developing intervention prototypes for women to evaluate.

Strengths and weaknesses of the study

The cross-sectional methodology was appropriate for survey purposes and high participation rates would have helped reduce sample bias. Generalization of the results is limited by having a non-random sample with somewhat different socio-demographic and health behavioural profile to the wider population. Self-reporting may have led to some response bias and overestimating positive health behaviours and preferences; interests and intentions are based on theoretical concepts and predicted rather than actual behaviours. Despite these limitations, the study suggests that providing diet and exercise advice at NHS breast screening clinics would be well received, not adversely affect screening appointments and provide a pre-existing channel for the NHS to promote better health behaviours among almost one-third of the female population who are undergoing biological change and increased risk from chronic diseases.

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CONFLICT OF INTEREST

None declared.

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