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Original Research

A telephone reminder intervention to improve breast screening information and access



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ABSTRACT

Objectives: In the UK, women aged 50–70 are offered breast cancer screening every three years. Screening participation rates in London have been particularly low. Low rates have been associated with low socio-economic status, and some ethnic groups have been observed to be underserved by cancer screening. This paper reports on a telephone reminder intervention in London Newham, an area of high deprivation and ethnic diversity.

Study Design: Observational study of planned intervention.

Methods: Women invited for breast screening were telephoned to confirm receipt of the invitation letter, remind invitees of their upcoming appointment, and to provide further information. Aggregate data at general practice level on invitation to and attendance at breast screening and on numbers reached by telephone were analysed by logistic regression.

Results: For the 29 participating GP practices (10,928 invitees) overall uptake in 2010 was higher compared to the previous screening round in 2007 (67% vs. 51%; $p < 0.001$). On average 59% of invitees were reached by the reminder calls. A 10% increase in women reached resulted in an 8% increase in the odds of women attending their screening

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appointment (95% CI: 5%–11%), after adjusting for 2007 attendance rates. Practices with a higher proportion of South Asian women were associated with a larger uptake adjusted for 2007 uptake and population reached by the telephone intervention, (4% increase in odds of attendance per 10% increase in South Asian population, CI 1%–7%, $p = 0.003$) while practices with a higher proportion of black women were associated with a smaller uptake similarly adjusted. (11% decrease in odds of attendance per 10% increase in black population, CI 9%–16%, $p < 0.001$).

Conclusions: A language- and culture-sensitive programme of reminder calls substantially improved breast cancer screening uptake.

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Introduction

It is undisputed that mammographic screening prevents deaths from breast cancer, although there is disagreement over the extent of side-effects of the intervention, such as overdiagnosis.^{1–3} There is also general agreement that when a woman is offered screening, her decision as to whether or not to attend should be an informed one.⁴ The implications of this include that the invitation be accompanied by accurate information about the benefits and risks of screening. Also the decision to participate or not should be based on a decision informed by the likely clinical benefits and risks of screening rather than on whether the invitee remembers the appointment or on physical or organisational barriers to attendance.

The NHS Breast Screening Programme offers two-view mammography every three years to women aged 50–70. Women are invited by postal invitation. In some areas of London, there is concern at the lower-than-average uptake in screening. Screening uptake in London in 2007/08 and 2010/11 was 60.6% and 63.6% respectively, compared to 73.2% and 73.4% for England as a whole.⁵ Uptake rates have been shown to be affected by factors such as population mobility,⁶ socio-economic status^{7,8} and ethnicity^{8–10} and all these factors negatively affect uptake in parts of London, including Newham.^{11,12}

This paper reports on a telephone reminder intervention in Newham taking place in the context of the 2010 round of screening, in the NHS Breast Screening Programme.

Methods

In Newham, eligible women are invited by general practice with all women from each practice being invited every three years. NHS Newham commissioned Community Links, a Newham based community charity, to carry out telephone reminder interventions aimed at increasing screening uptake in 2010. Local women understanding the socio-cultural profile of the community in Newham and speaking combinations of the following languages spoken in Newham were recruited: Hindi, Urdu, Punjabi, Gujarati, Bengali, Somalian, French, Spanish and English. They attended one training programme covering a general overview on breast cancer and breast cancer screening, the benefits and risks of screening,

informed consent and information governance. Lists of women invited were obtained from the Central and East London Breast Screening Services (CELBSS) for each practice. Telephone numbers were those held by general practitioner (GP) practices, and for data protection reasons, reminder calls were made from practice premises. Women invited for breast screening were called not more than five days before the screening appointments with the aim of confirming receipt of the invitation letter, reminding invitees of their upcoming appointment, answering any basic questions, and to providing information on the benefits and risks of breast screening. The callers worked from a flowchart. The procedure was basically to first check that letter had been received. If it had been, and if the woman intended to attend, the caller would make sure she knew where to go. The caller would also provide number to call if she wished to change place or time. If she did not receive letter, the caller would check her address, and tell her verbally where and when the appointment was, again, providing a number to change the appointment if necessary. If she did not plan to attend, the caller would offer information and an opportunity to talk to a practice member. The caller was permitted to correct misapprehensions, but was instructed not to pressure the invitee.

Individual level data were not available. Aggregate data at general practice level on invitation to and attendance at breast screening for all Newham GP practices screened in 2007 and 2010 was obtained from CELBSS. Aggregate data on numbers contacted and reached in the telephone reminders campaign for the 29 Newham GP practices participating were obtained from Community Links. Ethnicity data for Newham women aged 50–70 registered with GP practices in July 2010 was provided by the Clinical Effectiveness Group (CEG) at Queen Mary, University of London who have been collecting GP practice based, self-reported ethnicity across the three former east London PCTs of Tower Hamlets, Newham and Hackney since before 2005 (Hull et al., 2011).¹¹ Ethnicity data was provided in five major groups: white, South Asian, black, mixed and other. The proportion of women reached by phone reminders, proportion of women in each ethnic group and uptake in 2007 and 2010 were recorded for each practice.

There being no control group without the intervention, the estimate of this effect of the intervention was based on the effect of completeness of contact in the telephone campaign on the uptake of screening at practice level. Data were analysed by logistic regression¹³ with outcome the attendance in

Table 1 – Mean number of women invited and screened, and mean uptake, in 2007 and 2010 and mean proportion of each ethnic group in 2010 in practices which were, and were not, included in the study (Data on proportions of ethnic groups in one practise included in the study not available).

	2007		2010	
	Participating	Non-participating	Participating	Non-participating
Mean number invited	365	150	386	159.8
Mean number screened	186.3	88.1	260.9	108.5
Mean uptake	37.67%	42.28%	66.5%	70.12%
Mean South Asian proportion			37.67%	42.28%
Mean black proportion			18.09%	20%
Mean mixed proportion			1.89%	1.04%
Mean white proportion			25.75%	21.03%
Mean other proportion			16.6%	15.66%

2010 corrected for 2007 attendance, and primary predictor variable the proportion of eligible women reached by the calling campaign, as follows. For each practice i , $i = 1, 2, \dots, 29$, let p_i be the 2010 uptake (number of women attending screening/number of women invited) and q_i the 2007 uptake. The value of

$$E_i = \log\left(\frac{p_i}{1-p_i}\right) / \left(\frac{q_i}{1-q_i}\right)$$

can be calculated for each practice. This value is a measure of the change in uptake between the two years, a value of zero representing no change and a positive value representing an improvement in 2010 over 2007. For convenience E_i has been referred as the ‘Adjusted log-odds of attendance (ALOA)’. This measure facilitates the use of linear logistic regression. The models of the form were fitted

$$E_i = a + b^T x_i,$$

where x_i is the proportion of eligible women in practice i reached by the telephone intervention (or a vector of this and other potential predictor variables, such as the proportion of black women registered with the practice). This yields odds-ratio estimates of the effect of factors such as proportion of women reached, ethnicity of the practice population, etc. on 2010 uptake, adjusted for 2007 uptake.

Results

A total of 12,451 women from 38 GP practices were invited for breast screening in the 2010 Newham screening round. Data from eight non-participating or non-reporting practices, and one practice not existing in 2007, were not used, leaving 29 practices (10928 women) which were used in the data analysis. Table 1 shows the mean number of women invited, and screened, and the mean uptake, in the participating and non-participating practices. Overall uptake in the participating practices was 51% in 2007 and 67% in 2010, a significant increase ($p < 0.01$). The uptake rates in 2010 are plotted against those in 2007 in Fig. 1. On average, 59% of eligible women were reached in the calling campaign. Table 2 shows the invitation and uptake data in 2007 and 2010 for those practices below and above this average. In those practices below the average contact rate of 59%, uptake increased by an absolute figure of

15%, from 52% to 67% ($p < 0.01$), whereas in those above the average it increase by 19%, from 49% to 68% ($p < 0.01$). The difference between these two increases was itself found to be statistically significant ($p < 0.01$).

In initial graphical examination of data, it was noted that 2010 uptake was positively associated with 2007 uptake (Fig. 1) and that the value of the ALOA increased with increasing proportion of women reached (Fig. 2).

In logistic regression analysis, there was a highly significant effect ($p < 0.001$) of proportion reached by a reminder call on ALOA-i.e. the improvement from 2007 to 2010 was higher in those practices which reached more women with reminder calls. Per 10% of eligible women reached there was an 8% improvement in odds of uptake adjusted for 2007 uptake (OR = 1.08, 95% CI 1.05–1.11). Some examples of what this could be expected to imply for practices with different uptake figures with no intervention and different percentages reached by the telephone intervention are shown in Table 3.

The model estimated that the ALOA for an individual practice with no successful contacts (i.e. no intervention) was 0.25. This would imply that with a 2007 uptake of 51% (as observed overall), the authors would expect a 2010 uptake of 57% without any intervention. In fact, with the intervention, with an average contact rate of 59%, the 2010 uptake was 67% (similar to the 68% which would be predicted by the model). The reasons for this increase are unclear and merit further study.

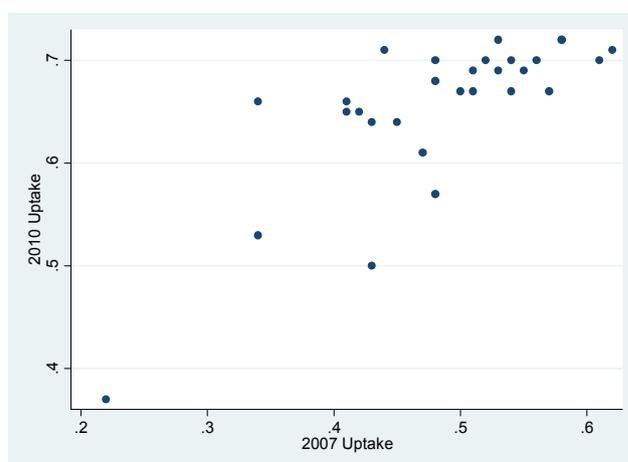


Fig. 1 – Uptake in 2010 plotted against uptake in 2007.

Table 2 – Invitation and attendance data in 2007 and 2010 by percentage of women contacted in the 29 participating practices.

Percent of eligible women contacted	2007		2010	
	Invited	Attended (%)	Invited	Attended (%)
<59%	4925	2583 (52)	5456	3630 (67)
59% or more	5396	2655 (49)	5472	3719 (68)

Individual data on ethnicity was not available, but the proportions of female patients self-reported as black (median 24%), white (24%), south Asian (37%) and mixed ethnicity (1%), registered with each of 28 of the 29 practices were available. Table 1 shows the mean proportion of each ethnic group in the participating and non-participating practices. The results of logistic regression of the ALOA were considered against the proportion of each ethnic group, adjusting for proportion reached in the telephone intervention. These effectively fit 2010 uptake against each ethnicity proportion, adjusted for 2007 uptake and proportion reached. Performing such regressions, there was a significant decrease in the ALOA in practices with increasing proportions of black patients (11% decrease in odds of attendance per 10% increase in black population, CI 9%–16%, $p < 0.001$) and a significant increase in the ALOA in practices with increasing proportions of registered South Asian patients (4% increase in odds of attendance per 10% increase in South Asian population, CI 1%–7%, $p = 0.003$) (see Figs. 3 and 4). Thus, amongst practices with a similar 2007 uptake, practices with a higher South Asian population tend to have a higher 2010 uptake whilst practices with a higher black population tend to have a lower 2010 uptake.

Discussion

Retrospective analysis of a reminder call intervention carried out in London Newham found that screening uptake was statistically significantly positively associated with proportion

Table 3 – Projected uptake in practices with practices without intervention and different percentages of women reached, using the observed effect of proportion reached on uptake.

Uptake without intervention	Percentage of women reached		
	40%	60%	80%
40%	47.7%	51.6%	55.4%
55%	62.5%	66.1%	69.5%
70%	76.1%	78.8%	81.3%

of women reached. There was an 8% increase in the odds of uptake (corresponding to an absolute increase in uptake of around 3%) per 10% of women reached by the calling campaign. (There is always the possibility of bias due to unobserved confounding in studies with only aggregate data—there might be factors which influence both the proportion reached and the uptake rate. While this cannot be ruled out 100%, instead it has some insurance against it in the form of the 2007 rates, since considering changes from 2007 adjusts for the underlying uptake tendencies in the practices. It is worth noting that there was no association between uptake in 2007 and proportion reached (correlation coefficient 0.10, $p = 0.6$) whereas there was a significant positive association with 2010 uptake (correlation coefficient 0.44, $p = 0.02$)).

There is a precedent for this finding. A systematic review of randomised trials of different strategies for increasing screening participation found that an invitation letter plus a phone call, as was the case here, was the most effective approach.¹⁴ Even though these trials were carried out in the 1990s in the USA, the target populations had similarly high proportions of low socio-economic status and large ethnic minority population. A whole systems approach in the deprived borough of Tower Hamlets in the London East End, which also has a large minority ethnic population, resulted in an increase of uptake from 44.5% in 2005 to 63.4% in 2008/09.¹⁵ They used a community organisation to specifically work with Bangladeshi women and set up a different campaign for white

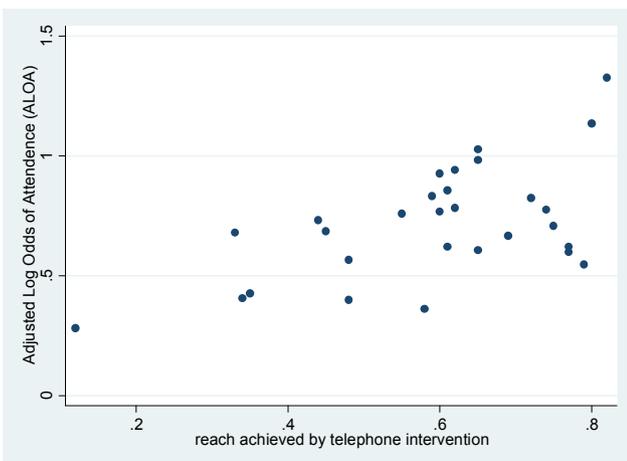


Fig. 2 – Adjusted Log-Odds of Attendance (ALOA) plotted against proportion reached.

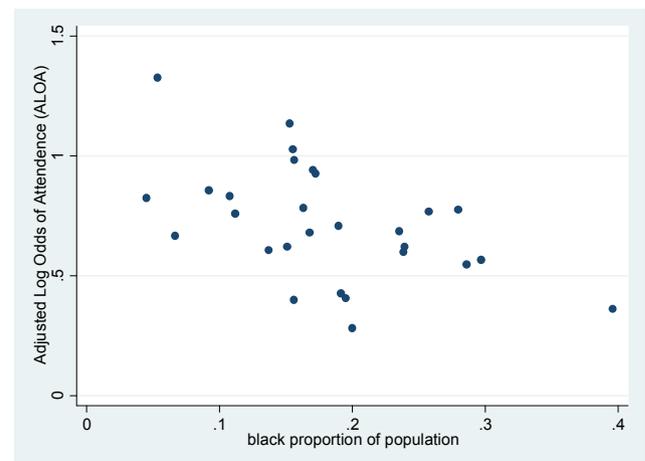


Fig. 3 – Adjusted Log-Odds of Attendance plotted against the proportion of black women registered with practice.

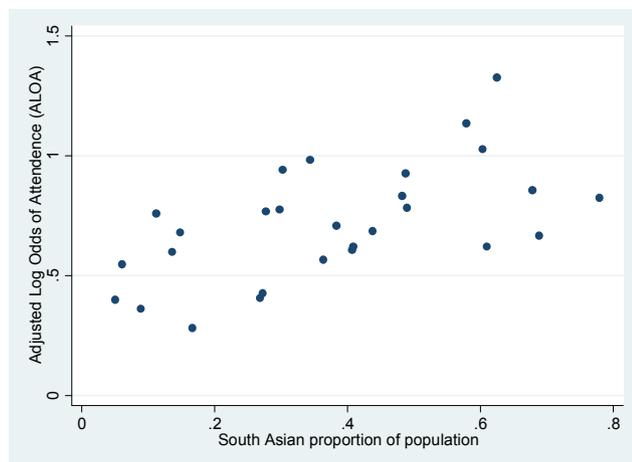


Fig. 4 – Adjusted Log-Odds of Attendance (ALOA) plotted against the proportion of south Asian women registered with the practice.

women. As a large number of interventions were carried out at the same time, however, it is difficult to determine which interventions were the most effective and provided best value for money. During the time the Community Links project was carried out in Newham no other interventions took place which allowed analysis of the impact of this specific intervention on screening uptake. Due to data protection issues reminder phone calls had to be made from GP practice premises, which might have increased the impact of the calls, in that the effect is confounded with what might be interpreted by the invitee as a GP endorsement. Endorsement by GP has been found to be associated with greater uptake of breast and bowel screening in the past.^{16–18}

As only aggregate data by GP practice was available it was not possible to directly determine the impact this intervention had on screening uptake of different ethnic groups common in Newham. There were, however, some striking findings with respect to general practice ethnic profiles. For GPs with a high proportion of South Asian women registered, the increase in uptake was higher compared to GPs with a lower proportion of South Asian women. This association was reversed for GP practices with high proportions of black women. This reversal should be interpreted cautiously, due to potential confounding. For example, GP practices which have high proportions of South Asian women will necessarily have lower proportions of white and/or black women. These results might indicate that telephone reminders work particularly well for South Asian women, but individual data would be required to conclude this with certainty. When analysing breast screening uptake patterns for UK South Asian and non-Asian women over 15 years Szczepura and colleagues found that breast screening uptake was initially lower for South Asian women but improved faster than for the majority of the population.¹⁰

One limitation of this study is that measures of socio-economic status were not available. Screening attendance has been shown to be highest in the most affluent socio-economic groups and falls with increasing deprivation.^{7,8}

The area in this study is characterised by high levels of deprivation, so it certainly appears that the intervention is effective in a population of low socio-economic status.

It should again be emphasised that the aim of the telephone intervention was to remind women off their appointment and to provide information rather than to actively encourage. Furthermore, it should be pointed out that both of the screening rounds considered in this study were completed before the 2013 revision of the NHS information leaflet offering advice to women being offered breast screening, so that the effect of this change on the conclusions is unknown.

In conclusion, a programme of reminder calls carried out by local women speaking a combination of languages spoken locally and understanding the socio-cultural profile of the community significantly improved breast cancer screening uptake in an area of high deprivation and ethnic diversity.

Author statements

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Ethical approval

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Competing interests

None.

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