Enhanced invitation methods and uptake of health checks in primary care: randomised controlled trial and cohort study using electronic health records

Lisa McDermott,[1] Alison J Wright,[1]* Victoria Cornelius,[1] Caroline Burgess,[1] Alice S Forster,[1] Mark Ashworth,[1] Bernadette Khoshaba,[1] Philippa Clery,[1] Frances Fuller,[2] Jane Miller,[2] Hiten Dodhia,[3] Caroline Rudisill,[4] Mark T Conner[5] and Martin C Gulliford[1,6]

[1]Department of Primary Care and Public Health Sciences, King's College London, London, UK
[2]Public Health Directorate, Lewisham Borough Council, London, UK
[3]Public Health Directorate, Lambeth Borough Council, London, UK
[4]Department of Social Policy, London School of Economics and Political Science, London, UK
[5]School of Psychology, University of Leeds, Leeds, UK
[6]NIHR Biomedical Research Centre at Guy's and St Thomas' Hospitals, Guy's Hospital, London, UK

*Corresponding author

Declared competing interests of authors: none

Published November 2016
DOI: 10.3310/hta20840

Scientific summary

Enhanced invitation methods and uptake of health checks in primary care

Health Technology Assessment 2016; Vol. 20: No. 84
DOI: 10.3310/hta20840

NIHR Journals Library www.journalslibrary.nihr.ac.uk

Scientific summary

Background

NHS Health Check is a national programme for the prevention of heart disease, stroke, diabetes mellitus and chronic kidney disease in England. Low uptake of health checks is a persistent problem. The question–behaviour effect (QBE) hypothesises that asking questions about people's views on a behaviour, or their current behaviour, increases the likelihood that individuals will later perform that behaviour. Previous studies suggest that the QBE may be used to increase the uptake of preventative medical services.

Aim

The primary purpose of the research was to evaluate the effectiveness of an enhanced invitation method that included a preliminary questionnaire about health checks, with or without the offer of a financial incentive to return the questionnaire, for increasing the uptake of health checks. We evaluated the feasibility of a rapid trial using electronic health records, with an automated randomisation procedure embedded into the Health Check programme management information system. In addition, we conducted a cohort study to compare the characteristics of participants receiving invited health checks with those of participants receiving 'opportunistic' health checks. We also evaluated the views of health-care professionals and patients concerning the uptake of health checks to identify factors that influence uptake and response to the trial interventions.

Methods

A randomised controlled trial was conducted at 18 general practices in two inner-London boroughs. Individual participants who were eligible to receive an invitation to the NHS Health Check programme were individually randomised to three trial arms between July 2013 and December 2014. The three trial arms were (A) standard invitation letter; (B) QBE questionnaire followed by the standard invitation letter; and (C) QBE questionnaire with the offer of a £5 voucher as an incentive to return the questionnaire followed by the standard invitation letter. The questionnaire focused on thoughts and feelings about attending for a health check. Recruitment and allocation were performed using electronic health records using two different methods: at 12 general practices, allocation was conducted by the research team at the general practices ('in-practice method'); at six general practices, random allocation was programmed into the software system that controlled participant selection for health checks ('automated method'). Outcome data were extracted from general practice electronic health records, including whether a NHS health check was conducted, the risk score obtained and body mass index (BMI) value recorded. The primary outcome was uptake of a health check at 6 months following the invitation. Risk differences were estimated using the method of generalised estimating equations. A p-value of < 0.0167 was used for significance to allow for multiple comparisons. Secondary analyses evaluated subgroups of gender, age (40–59 and 60–74 years), ethnicity and deprivation quintile. Questionnaire return was evaluated by trial arm. Questionnaire item responses were evaluated using the constructs of 'intentions', 'attitudes (instrumental and affective)', 'anticipated regret', 'perceived behavioural control' and 'subjective norms' in relation to health check attendance. A fixed-effects meta-analysis was employed to evaluate possible heterogeneity between subgroups of recruitment and randomisation method. In a cohort study of all participants completing a health check during the study period, we evaluated the case mix of participants receiving a health check through the population-based call–recall system with that of participants receiving an opportunistic health check during the same period. Qualitative interviews were conducted with

programme and general practice staff as well as with patients who responded, or who did not respond, to an invitation to receive a health check. The content of free-text questionnaire responses was analysed.

Results

Main trial results

In total, 18 general practices were recruited into the trial. Trial practices generally had larger list sizes than non-trial practices in the same area but were similar in terms of area deprivation and proportion of ethnic minority patients. In total, 12,459 participants were allocated, 8571 through the in-practice recruitment method and 3888 through the fully automated recruitment method. The median age of participants was 45 (interquartile range 40–54) years, 33% were in the most deprived quintile of deprivation for England and 39% were of 'white' ethnicity, with no differences among trial arms.

Health check uptake was evaluated for 12,052 participants for whom outcome data were collected. Overall uptake of health checks among invited participants within 6 months of the standard invitation letter was low (1849/12,052, 15.3%). In the standard invitation trial arm, 590 out of 4095 participants (14.41%) were recorded as attending a NHS health check within 6 months of the first invitation. In the pre-notification QBE questionnaire trial arm, 630 out of 3988 participants (15.80%) attended for a health check within 6 months of the invitation. In the trial arm receiving the QBE questionnaire and the offer of a financial incentive to return the questionnaire, 629 out of 3969 participants (15.85%) attended for a health check within 6 months of invitation. The risk difference associated with the QBE questionnaire was 1.43% [95% confidence interval (CI) –0.12% to 2.97%; $p = 0.070$) and for the QBE questionnaire and offer of financial incentive was 1.52% (95% CI –0.03% to 3.07%; $p = 0.054$). The estimated difference in health check uptake between the QBE questionnaire and the QBE questionnaire with the offer of an incentive to return it was –0.01% (–1.59% to 1.58%; $p = 0.995$).

Questionnaire return, questionnaire item responses and health check uptake

Question–behaviour effect questionnaires were returned by 917 out of 3988 participants (23.0%) in the QBE questionnaire trial arm and by 974 out of 3969 participants (24.5%) in the QBE questionnaire and incentive trial arm. The questionnaire return rate was 1.42% (95% CI –0.4% to 3.26%; $p = 0.132$) higher in the trial arm that was offered an incentive to return the questionnaire. Questionnaire return was associated with female gender, older age and lower levels of deprivation. Compared with the standard invitation trial arm, health check uptake among questionnaire returners was 17.9% higher (95% CI 14.7% to 21.3%; $p < 0.001$) in the QBE questionnaire trial arm and 18.3% higher (95% CI 15.2% to 21.5%; $p < 0.001$) in the QBE questionnaire and incentive trial arm. In a complier average causal effect (CACE) analysis, the estimated health check uptake was 6.0% greater in the QBE arm than in the standard invitation arm (95% CI 0.8% to 11.3%; $p = 0.024$) and 5.9% greater in the QBE questionnaire and incentive arm than in the standard invitation arm (95% CI 0.8% to 10.9%; $p = 0.022$). Positive responses to QBE questionnaire items were associated with greater odds of attending for a health check. Among participants who returned the QBE questionnaire, the 'intentions' construct was most strongly associated with health check uptake.

Reliability of trial data

The reliability of the trial data was evaluated by comparison with routinely collected data from the NHS Health Check programme management information system. During the study period, the management information system recorded 12,453 patients being invited for a health check, compared with 12,459 in the trial data. Across the 18 general practices, the mean difference (95% CI) between the trial data and management information system data for the number of patients invited was 0 (95% CI –34 to 33; $p = 0.984$). Routinely collected data confirmed the low uptake of health checks in the 6 months following standard invitations. In total, 1690 health checks out of 12,453 (13.6%) invited health checks were recorded within 6 months of invitation in the management information system data up to the end of the trial recruitment period, with 1206 (71%) completed at general practices and 484 (29%) completed at third-party providers.

Case mix variables associated with health check uptake

Health check uptake was lower in men than in women [adjusted odds ratio (OR) 0.74, 95% CI 0.69 to 0.80; $p < 0.001$] and higher in participants aged ≥ 60 years (1.43, 95% CI 1.20 to 1.71; $p < 0.001$) than in those aged 40–59 years. Compared with participants of 'white' ethnicity, participants of black African or Caribbean ethnicity (adjusted OR 2.15, 95% CI 1.86 to 2.49; $p < 0.001$), Asian ethnicity (adjusted OR 2.03, 95% CI 1.63 to 2.67, $p < 0.001$) or mixed ethnicity (adjusted OR 3.09, 95% CI 2.07 to 4.62; $p < 0.001$) had a higher uptake of health checks. Deprivation tended to be associated with a lower uptake of health checks. The odds of health check uptake increased by 1.10 (95% CI 1.01 to 2.21; $p = 0.035$) per quintile decrease in deprivation.

Analysis by subgroups of gender, age group, ethnicity and deprivation showed that estimates for intervention effects were generally similar across subgroups but there was weak evidence for a greater effect of the intervention in men than women.

Evaluation as a 'rapid trial' with automated randomisation and recruitment

The trial was commissioned as a 'rapid trial' designed to provide evidence within policy-relevant time scales. The study start date was 1 May 2013 and the first patients were randomised in July 2013. The recruitment and randomisation of 12,459 participants from 18 general practices was completed in December 2014. Participant follow-up to 6 months was completed by June 2015, outcome data collection was completed in September 2015 and the final report was submitted in January 2016.

Strengths of the in-practice method for recruitment and randomisation were the short lead time before implementation, the retention of randomisation in the hands of the research team and the complete documentation of the randomisation process. Limitations were the labour-intensive requirements for monthly general practice visits to conduct the randomisation, as well as the higher proportion of participants [407/8588 (4.7%)] for whom outcome data could not be collected. In contrast, the automated method for randomisation and recruitment was less labour intensive and resulted in fewer missing outcome data, but control over randomisation was delegated to a third party and was less completely documented. A fixed-effects meta-analysis showed no evidence of heterogeneity between estimates of effect for subgroups of recruitment and randomisation method. This suggested that consistent results were obtained for the two randomisation methods.

Cohort study to compare 'invited' and 'opportunistic' health checks

During the study period 6184 health checks were completed at trial general practices, of which 2280 (37%) were in trial participants who received standard invitation letters to the NHS Health Check programme following invitation through the call–recall system. Cardiovascular risk scores were obtained for 5359 participants, including 2246 trial participants and 3113 (58%) participants who underwent a health check that did not follow a standard invitation. The proportion of non-invited health checks was found to be 49% in data from the routine management information system, varying between 27% and 79% at different general practices. Compared with trial participants who received health checks through the call–recall system, participants who received 'opportunistic' checks were more likely to be identified with a ≥ 10% cardiovascular disease (CVD) risk [invited 382/2246 (17%); opportunistic 692/3113 (22%); adjusted OR 1.70, 95% CI 1.45 to 1.99; $p < 0.001$]. The difference in risk between invited and opportunistic checks was greatest in the quintile of greatest deprivation (adjusted OR 1.94, 95% CI 1.37 to 2.74; $p < 0.001$). Similar, although less marked, disparities between invited and opportunistic checks were observed for ≥ 20% CVD risk (adjusted OR 1.46, 95% CI 1.12 to 1.91; $p = 0.005$) and overweight and obesity (adjusted OR 1.15, 95% CI 0.04 to 1.28; $p = 0.008$).

Qualitative interview study

Twenty-two general practice staff from 17 general practices and two public health leads responsible for implementing health checks were interviewed. Staff appeared broadly supportive of the idea of a health check programme but they expressed reservations centred on low uptake of the health check and about the likelihood of individuals responding to information about their cardiovascular risk in a meaningful way by changing their behaviour and adopting a healthier lifestyle.

Content analysis was conducted of 648 (33%) questionnaires with comments made in free text. Comments concerning health checks included the view of some individuals that such checks might not represent good value for money. There was a perception that having a health check at a time that was convenient would be a challenge or that arranging an appointment to have a health check might be difficult. Twenty-seven non-trial participants were included in a patient interview study. The findings suggest that some people found it difficult to arrange an appointment at their general practice. These individuals may have held positive attitudes towards having a health check and fully intended to have one, but then found it challenging to fit it into their busy lives. Increasing the accessibility and flexibility of the service design by expanding the availability of 'drop-in' health checks at community venues and at times outside standard working hours could make access easier for some people.

Conclusions

In this trial, overall uptake of health checks in the first 6 months following a standard invitation letter sent through the population-based call–recall system was 15%, with a high proportion of health checks being performed opportunistically in non-invited patients. An enhanced invitation method using the QBE was not associated with an increased uptake of health checks overall but, among the 23% of intervention trial arm participants who returned the QBE questionnaire, uptake of health checks was 32%. The offer of a financial incentive was not associated with a greater return of the QBE questionnaire, or with increased uptake of heath checks. In the context of low service uptake, it is possible that our intervention lacked the potency to overcome barriers to attendance. Rather than focusing interventions on individuals, it may be more effective to focus on service delivery factors to improve the ease with which people can obtain a health check.

This trial was conducted as a rapid trial with participant recruitment, randomisation and outcome assessment being completed using primary care electronic health records. The trial demonstrated the feasibility of an automated randomisation procedure in which 100% of participants who were eligible for a service were randomised into the trial over a period of 12 months. Similar approaches might now be extended to other contexts and services.

Analysis of data from the health check management system suggested that approximately half of health checks were performed opportunistically by health check providers. This was confirmed through data extracted from trial general practices. Delivery of opportunistic health checks was associated with deprivation, but invited and opportunistic checks were similar with respect to age group, gender and ethnic group. Participants receiving an opportunistic check were more likely to have an elevated CVD risk and be overweight or obese than participants who received an invited health check.

Qualitative evaluations found that most people expressed positive views about having their health checked and recognised the value of prevention. Some of these individuals expressed scepticism about being able to obtain an appointment at their general practice, especially at a time that was convenient to them, given other priorities such as work and caring responsibilities. However, they may not object to being offered a health check opportunistically when they attend the general practice for another reason.

Trial registration

This trial is registered as ISRCTN42856343.

Funding

Funding for this study was provided by the Health Technology Assessment programme of the National Institute for Health Research.

Health Technology Assessment

HTA/HTA TAR

ISSN 1366-5278 (Print)

ISSN 2046-4924 (Online)

Impact factor: 4.058

Health Technology Assessment is indexed in MEDLINE, CINAHL, EMBASE, The Cochrane Library and the ISI Science Citation Index.

This journal is a member of and subscribes to the principles of the Committee on Publication Ethics (COPE) (www.publicationethics.org/).

Editorial contact: nihredit@southampton.ac.uk

The full HTA archive is freely available to view online at www.journalslibrary.nihr.ac.uk/hta. Print-on-demand copies can be purchased from the report pages of the NIHR Journals Library website: www.journalslibrary.nihr.ac.uk

Criteria for inclusion in the *Health Technology Assessment* journal

Reports are published in *Health Technology Assessment* (HTA) if (1) they have resulted from work for the HTA programme, and (2) they are of a sufficiently high scientific quality as assessed by the reviewers and editors.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA programme

The HTA programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The journal is indexed in NHS Evidence via its abstracts included in MEDLINE and its Technology Assessment Reports inform National Institute for Health and Care Excellence (NICE) guidance. HTA research is also an important source of evidence for National Screening Committee (NSC) policy decisions.

For more information about the HTA programme please visit the website: http://www.nets.nihr.ac.uk/programmes/hta

This report

The research reported in this issue of the journal was funded by the HTA programme as project number 11/129/61. The contractual start date was in May 2013. The draft report began editorial review in January 2016 and was accepted for publication in June 2016. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The HTA editors and publisher have tried to ensure the accuracy of the authors' report and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this report.

Published by the NIHR Journals Library (www.journalslibrary.nihr.ac.uk), produced by Prepress Projects Ltd, Perth, Scotland (www.prepress-projects.co.uk).