Community Dent Oral Epidemiol 2007; 35: 12–17

COMMUNITY DENTISTRY AND ORAL EPIDEMIOLOGY

Testing the effect of including oral health in general health checks for elderly patients in medical practice – a randomized controlled trial

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Lowe C, Blinkhorn AS, Worthington HV, Craven R. Testing the effect of including oral health in general health checks for elderly patients in medical practice – a randomized controlled trial. Community Dent Oral Epidemiol 2007; 35: 12–17. © Blackwell Munksgaard, 2007

Abstract – *Aim:* To test the feasibility and effectiveness of an oral health referral process for elderly patients (aged 75 years or over) attending a preventive health check (PHC) with their general medical practitioner. *Objectives:* To evaluate the effectiveness of the process in increasing dental attendance at baseline and 6 months after the intervention. To identify key characteristics of those who accepted an oral health visit (OHV). To determine the proportion of people attending the OHV who required treatment and subsequently attended a dentist. *Setting:* Three general medical practices in east Cheshire, UK. *Design:* A randomized controlled trial. *Method:* Elderly patients attending their general medical practice for PHCs were randomly assigned to a test group, who were invited to attend for an OHV, and to a control group, who received no intervention. Six months after the PHC the effectiveness of the process was measured. *Results:* Some 50% of those invited for an OHV accepted. Those accepting were more likely to be edentulous, wear dentures or have a current oral health problem, than those declining. Regression analysis showed the best predictors of acceptance to be having a current dental problem or pain and not having a regular dentist. The mean time since their last dental visit was 8.1 years which was significantly longer than those declining the OHV. 63% of individuals attending the OHV were assessed as having a realistic treatment need and 70% of those referred went on to complete the course of treatment. In the test group a highly significant increase in reported dental visiting was found at sixth month evaluation. The primary care staff were happy to include the dental checklist and felt it was a valuable addition to the PHC. *Conclusions:* The offer of an OHV was taken up most readily by those with current oral problems, or pain and those with no regular dentist. The inclusion of a dental checklist within the PHC for elderly patients together with help with arranging a dental appointment shows promise as a way of ensuring the dental needs of this group are met.

Key words: aged; dental care; primary health care; RCT

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Submitted 22 February 2005;
accepted 10 August 2005

Background

Older adults are an increasing proportion of the population and meeting their dental needs presents a challenge for the dental team. Increasingly, more of this group will be dentate but many factors combine to put them at a high risk of developing new oral problems and some will not access

appropriate care. Regular dental checks are an opportunity at which preventive advice can be given and signs of oral disease can be spotted early and treated (1).

Many barriers to the receipt of dental care have been identified including cost, fear and a lack of perceived need (2). People from low socio-economic groups, ethnic minorities and frail older people are especially likely to not attend for dental treatment (3). While 60% of dentate adults over 75 years of age report attending for check-ups (4), the remainder are at a high risk of untreated disease eventually causing discomfort and disability, or even compromising general health (5).

It is important in planning strategies to target those at a risk of oral disease, to take account of the low perceived need and irregular visiting patterns that many elderly people report (5). Referral made by a familiar professional has been shown to promote attendance (6). For example, dental attendance was significantly improved after a healthcare member raised awareness and encouraged regular dental visits during the routine 75-year check in general medical practice (7).

This study introduced an oral health component into preventive health checks (PHCs) for older people. The aim was to test the feasibility and effectiveness of including an oral health referral process for elderly people within a general medical practice setting.

Objectives

- To evaluate the effectiveness of the process in increasing dental attendance at baseline and 6 months after the intervention.
- To identify key characteristics of those accepting an oral health visit (OHV).
- To determine the proportion of people attending the OHV who required treatment and subsequently attended a dentist.

Method

The study was carried out in three general medical practices in two small towns in rural east Cheshire, with a predominantly white, affluent population. The sample included all those individuals aged 75 years or more who were invited to attend for a medical PHC during the 18 months of the study. All were independently living and any patient unable to complete the questions because of cognitive impairment was excluded. The study was a randomized controlled trial and conducted in three stages (Fig. 1 and Table 1).

- *Stage 1 – the preventive health check.* All individuals attending the health check were randomly allocated into test or control groups prior to the check. A check list of questions about oral health was administered to both test and control group; however, only the test group were offered the option of an OHV. The nurse administering the PHC recommended that the patient attend for an OHV and if consent was given an appointment was organized.
- *Stage 2 – the oral health visit*. The OHV comprised a structured interview and a free clinical examination carried out in a room within the practice or in another healthcare facility within a short distance. The following data were recorded: age, gender, postcode (from which an area-based deprivation score was derived) smoking and drinking habits, self-perceptions of general health, any oral symptoms, perceived need for oral care, previous dental visiting pattern and postcode. Referral for a more detailed examination, with a view to treatment, was made in accordance with modified criteria based on realistic treatment need (8), taking into account subjects' wishes, the occurrence of symptoms and their general health.
- *Stage 3 – evaluation.* Six months after their PHC all individuals were mailed a questionnaire that determined their reported dental visiting during this period. Individuals who had completed the OHV received additional questions relating to the visit. A three-stage mailing was used to increase the response rate (9). Staff views were obtained at 6-monthly intervals, throughout the study, using small focus groups that were led by a senior nurse. These results are not reported here. Ethical approval was given by the Ethics Committees of South Cheshire Health Authority and The University of Manchester.

Randomization and allocation concealment

Randomization was carried out using prenumbered question checklists, the practice receptionists were responsible for allocating a sheet to each individual as their name appeared within the appointment diary. This enabled the allocation

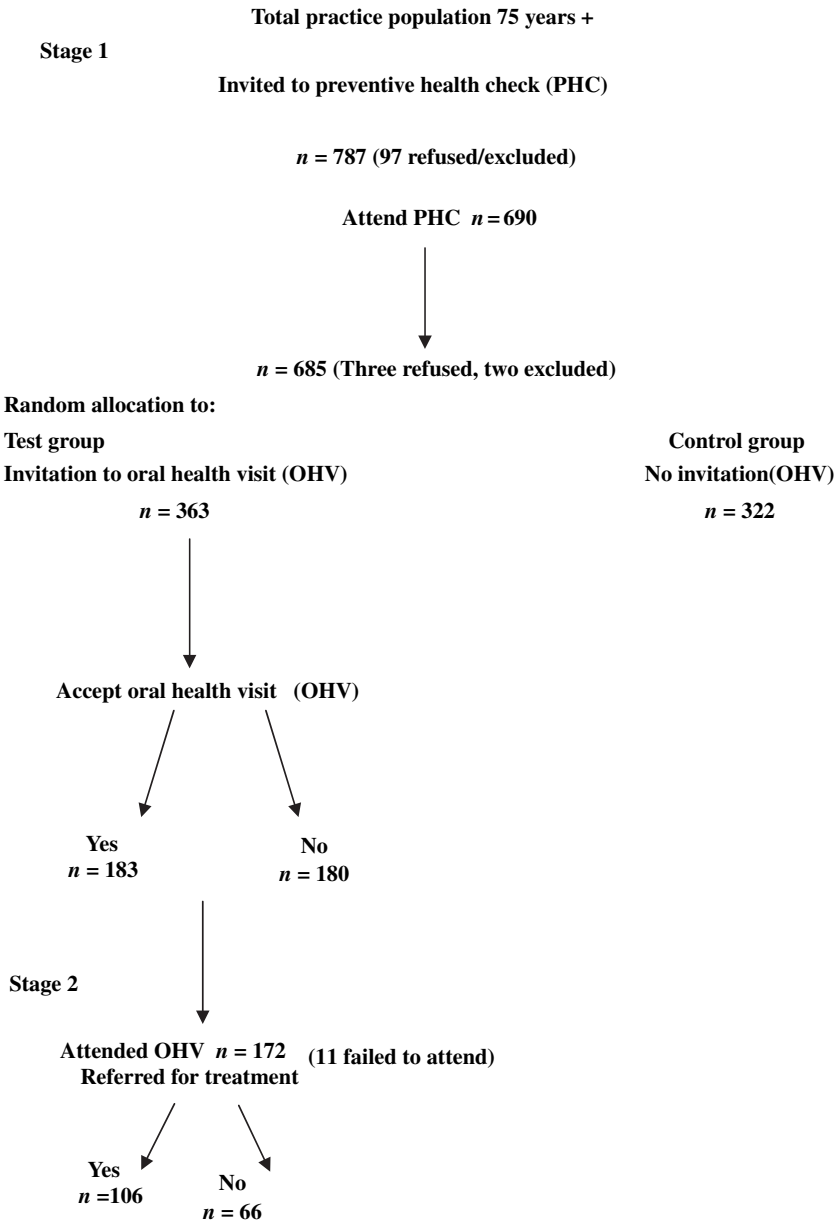

Fig. 1. Plan of the study.

process to be independent of the staff conducting the PHC. Individuals failing to attend the PHC were offered a further appointment.

Sample size

The study was designed to detect significant differences in the proportion of individuals who reported dental visiting from 50% at baseline to 63% after the OHV (odds ratio of 1.67) in the test group when the sample size in each group was 329. This enabled a 25% increase based on the control group proportion, or a 13% change in absolute terms to be measured. The names and identity numbers of those who refused to complete the dental checklist at stage 1 were excluded from the study, as was any individual judged unable to complete the interview because of cognitive impairment.

Data analysis

Data entry was undertaken by a research assistant by double entry to ensure accuracy. The programme SPSS version 10.1 was used for the analysis. Data were analysed on the basis of intention to treat following random allocation. A logistic regression model was fitted to the dependent variable of acceptance of OHV. Comparisons of reported dental visiting at baseline and at 6 months for both study and control groups were made using McNemar tests.

Table 1. Stages of the study – interventions

Stage 1: preventive health check (PHC)
- Individuals accepting a PHC were randomly allocated into test and control groups prior to the visit (using prenumbered question sheets).
- All individuals completed a baseline questionnaire and were asked oral health questions by the nurse/health visitor completing the PHC
- Test group – invited to an OHV
- Control group – no invitation given to the OHV

Stage 2: Oral health visit
- (1) Structured interview
- (2) Clinical examination
- (3) Referral to dentist if realistic treatment need present

Stage 3: evaluation
- (1) Postal questionnaires to all individuals at 6 months after their PHC using a three-stage mailing
- (2) Staff views were obtained at 6-monthly intervals using small focus groups

Results

At the first level of the study, at PHC acceptance, those who refused were sent a questionnaire that sought to record age, presence of natural teeth and reported time since last dental visit. Those who attended the PHC had a significantly shorter time since their last dental visit ($P < 0.001$), and were more likely to have natural teeth ($P = 0.037$). There was no significant difference in age between those attending or refusing the PHC.

Across the three practices 787 individuals were invited for a PHC, 685 individuals (87%) attended and were accepted into the study. Their mean age was 82 years, 61% were female and 49% had some natural teeth. Ethnicity was not formally assessed but subjects were predominantly white British. Of the 587 subjects, who responded to the question regarding health status, most reported that their general health as good (51%) or fair (45%). Some 183 (50%) of the individuals who were invited accepted the OHV invitation.

There was no significant difference in age, gender or deprivation score based on residence between those who accepted or declined the OHV.

The acceptance rate ranged from 36% to 58% between the three practices. Self-reported oral problems ($P < 0.001$), pain ($P < 0.001$) and perceived treatment need ($P = 0.001$) were significantly more prevalent among those accepting the OHV when compared with those declining. Edentulous subjects ($P < 0.001$) and those wearing dentures ($P < 0.05$) were also more likely to accept the OHV. Significantly fewer individuals accepting the OHV ($P < 0.01$) reported having a dentist, 83 (47%) compared with 126 (72%) of those declining. Those attending the OHV had a worse dental attendance pattern than those refusing (Table 2). The mean reported time since the last dental visit was 8.1 years for those accepting which was significantly greater ($P < 0.05$) than the 5.9 years reported by those declining.

Table 2. Reported time in years since last dental visit by individuals responding to the baseline questionnaire

	Test group			
	Attended OHV *n* (%)	Refused OHV *n* (%)	Control, *n* (%)	Total sample, *n* (%)
<1 year	52 (31)	77 (50)	137 (46)	267 (43)
1 to <5 years	29 (16)	31 (20)	62 (21)	121 (20)
5 to <10 years	30 (17)	11 (7)	34 (12)	73 (12)
>10 years	64 (36)	36 (23)	62 (21)	156 (25)

$\chi^2 = 18.9$, d.f. $= 3$, $P < 0.001$.

Table 3. Results of logistic regression for the dependant variable acceptance of visit

Independent variables	*P* – value	Odds Ratio	95% Confidence interval for odds ratio
Problems	0.021	2.33	1.14–4.78
Pain	<0.001	3.84	2.07–7.11
Dentist	<0.001	0.35	0.22–0.56

The following independent variables were tried but did not enter into the model using forward conditional entry criteria: gender, smoking, alcohol use, presence of natural teeth or denture, interval to last dental visit exceeds mean value, treatment needed, Townsend score (measure of deprivation).

The results of a logistic regression for the acceptance of the OHV are shown in Table 3. Many variables were tried in the model (see footnote) but only the following variables were found to predict whether or not the person accepted the offer of a visit: having current oral problems, pain or having no dentist. The highest odds ratio was found for pain.

At the sixth month evaluation, 636 of the original individuals were still registered with the same general medical practices. 485 individuals responded to the follow-up questionnaire and a further 91 individuals completed the condensed reminder questionnaire. This provided a response rate of 84% overall, or 91% of those still registered as patients, eligible for care, with the practices. When comparing the number of individuals reporting a dental visit in the previous 6 months at baseline (time of PHC) with the number

Table 4. Comparison (McNemar test) of reported dental attendance among test and control groups at baseline and at 6 months after the preventive health check (PHC)

	Test group ($P < 0.001$)	Control group ($P = 0.05$)
Recent dental visit at baseline	37% (106)	42% (121)
Recent dental visit 6 months after PHC	56% (162)	47% (130)

reporting attendance during the 6 months following the intervention, a highly significant increase ($P < 0.001$) was found in the test group from 37% at baseline to 56% at follow-up (Table 4).

Characteristics and self-reported oral problems among OHV attenders

Detailed questionnaire and clinical data were obtained for the 172 individuals attending the OHV. The mean age of the individuals was 82 years and 37% were male. Some 40% of the individuals had natural teeth, 27% had 21 or more natural teeth. Caries was detected in 30% (21) of the dentate individuals and 49% ($n = 34$) had periodontal disease. The most commonly reported problems were discomfort or pain (44%), problems chewing (30%) and oral dryness (27%).

Yield

A total of 172 (93%) of the individuals who accepted the invitation subsequently attended the OHV and completed the interview and clinical examination. Sixty-three per cent (106/169) of individuals completing the OHV were referred for further examination and treatment.

Sixty-nine per cent (116/169) of the individuals attending the OHV were advised to register with a dentist. Under the UK National Health Service system this would ensure routine examinations at intervals of not longer than 15 months. Treatment was completed by 70% (66/94) of the individuals who replied to the follow-up questionnaire. Reasons for noncompletion of treatment included no perceived need, access and cost.

Discussion

Some 50% of those individuals invited accepted the offer of an OHV and 93% of these went on to complete the clinical examination and interview. The subjects who were having oral problems, who were edentulous, who had a denture or who had not attended a dentist for many years were more likely to accept the offer of an OHV. The logistic regression shows the relative impact of individual factors and identifies current oral problems or pain and not having a regular dentist as the best predictors of acceptance of the OHV offer. Thus it would seem that the process was successful in reaching those with poor dental visiting habits and poor levels of oral health. It should be noted that 13% of the target population aged 75 or more were not entered into the study because they did not attend the initial general health check (PHC). Different approaches will be needed for this group that includes the cognitively impaired and housebound.

Improvements in the level of tooth retention will have important implications for future treatment needs; the presence of gingival recession increasing the number of exposed root surfaces, when combined with poor oral hygiene may predispose to root caries (10) and complex clinical problems. Oral dryness (xerostomia), which is clearly associated with caries progression, was reported by 27% of the individuals. Poor levels of oral hygiene were also prevalent, further highlighting the need for an effective oral hygiene advice and preventive measures (11).

Although 47% of those attending the OHV reported a dental visit during the previous 5 years, a further 36% had not attended for over 10 years. The percentage reporting no attendance for over 10 years may be inaccurate as research indicates that individuals tend to underestimate the time since their last dental visit (12). However, a prospective study by Gilbert et al. (13) in America found good agreement (K 0.68–0.81) over the short term between the self-report of dental visits during the previous 6-month period and actual patient records. Although the authors acknowledged the possibility of some method effect, there are grounds for confidence that the association still holds between accepting the OHV invitation and not having attended a dentist recently.

Among the whole sample, control and test groups, there were 37% who had not attended in the last 5 years. Set against current recommendations for yearly checks, this shows the scope for improvement among this accessible population who were already attending for PHCs. The dental checklist revealed that many individuals who reported that they had a dentist were unaware that to remain registered with a NHS dentist they must be examined within 15 months to maintain

their registration status. Hence some of these subjects trying to make an appointment may well find that their registration has lapsed and experience some extra difficulty in accessing dental care. Proposed alterations to the contract for General Dental Practitioners may well see the end of the registration system and the restrictions that have been imposed.

The acceptance rates and attendance for OHV varied between practices. Not surprisingly, the highest results were achieved where the dental clinic was housed within the practice. Other factors must play a part especially the enthusiasm with which the invitation is given. Inevitably this will vary among staff members and over time. A number of individuals failed to attend a dentist following referral, the reasons given for nonattendance included no felt need and cost, which highlighted the difficulty of translating a perceived need into demand for treatment (14). Subjects received their treatment in the usual way following the initial assessment offered in this study. For some this would mean state subsidized or free care, depending on their means, but cost continued to be offered as a reason for not accessing dental care.

The challenge of encouraging nonattenders into becoming dentally motivated is apparent, particularly in the older age groups where there still exists a core of edentulous individuals who have made very little use of dental services. The study found that 36% of people attending the OHV had not visited a dentist for over 10 years, suggesting that the oral health referral process may be a way to address this problem. Randomized trials are difficult to organize but in this research project the practice staff were enthusiastic and keen to be involved. Regular feedback was provided which ensured the staff recognized the important contribution they were making through this research project that would potentially improve services for their patients.

Conclusions

This Oral Health Referral Process was successfully incorporated into the routine PHC in medical practice. A large increase in dental visiting was reported and the process would appear to be successful in reaching those with dental problems, the edentulous and those with no regular source of care.

Acknowledgements

The study was funded by the Department of Health (England) through its National Primary Dental Care R&D Programme. The views expressed are solely those of the authors. The authors would like to thank the staff at the three medical practices for helping with the project.

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