

Attitudes of carers and the elderly occupants of residential homes to antimicrobial chewing gum as an aid to oral health

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Objective The aim of this study was to investigate the attitudes of elderly residents to using an antimicrobial chewing gum as an aid to oral health, and the opinion of their carers on such a procedure.

Design A cross-sectional, multi-centre survey using a structured interview/questionnaire conducted with elderly residents and their carers.

Setting In January 1998, 9 residential/nursing homes were chosen at random from all the homes in West Hertfordshire, 207 residents were asked to chew two pieces of gum twice daily for 7 days.

Subjects The participants, 148 women and 59 men, were aged between 53–100 years (mean age 82.23 ± 9.62 years). 47 carers, all female, were involved in distributing and collecting the gum.

Results 122 residents (58.9%) were edentulous and 85 (41%) of the participants were partially dentate. Of those with teeth 23 (27%) had 21 teeth or more. 73 (35.2%) residents found that chewing the gum was difficult with 37 (17.9%) of this group being unable to chew ($P < 0.0001$ for those residents with no teeth/dentures or dentures unopposed by teeth or other dentures). 32 (18.6%) subjects disliked the flavour of the gum. Of the 170 residents who chewed the gum 99 (57.2%) found it reduced oral dryness and 78 (45.1%) reported it made their mouth feel healthy. 34 (53.6%) of the dentate and 47 (40.9%) of the edentate residents wished to keep using the gum ($P < 0.05$). 35 (74.5%) of the carers found it easy to distribute the gum and 29 (61.7%) thought that chewing gum was an acceptable method of maintaining oral health for residents.

Conclusion The antimicrobial gum investigated in this study was acceptable to many elderly occupants and their carers, significantly improving perceived oral health and oral dryness of residents.

For the first time since records have been kept, half the British population aged 65 years and older are dentate,¹ yet high levels of oral disease exists in this age group.^{1–3} Comparisons of the oral health of

the institutionalised elderly with those living at home have shown considerably higher levels of dental disease in those living in institutions.^{1–4} There are many barriers to appropriate oral healthcare among the elderly occupants of residential homes, which include cost, the residents' restricted mobility, low levels of perceived need by residents and staff, number of teeth and the carer's lack of dental knowledge.⁵ Elderly occupants of residential homes are often dependent on their carers to perform all their daily care and thus carers play a pivotal role in dental disease prevention and in the maintenance of good oral hygiene. This may place considerable burdens on staff. It has been reported that the carers may not understand the importance of dental health or how to achieve it⁶ and that residents rarely receive more than emergency treatment for dental pain and discomfort.⁷

Solutions to these problems have included oral health education with elderly residents⁸ and training of carers^{6,9} but unfortunately these programmes have not always been successful.^{8–10} Difficulties with performing mechanical oral hygiene and the rather specific microbial aetiology of dental caries make it tempting to use chemical aids in the prevention of plaque related diseases among elderly people.¹¹ Preventive regimens with fluoride are as important among dentate adults as they are in children and the methods comprise local applications in the form of toothpaste, varnishes, gels, and rinses or tablets.¹¹ Regimens using chlorhexidine as the active agent¹² have been conducted with gels,¹³ mouthwashes, lozenges, varnishes,¹⁴ sprays¹⁵ and chewing gum.^{16,17} However, a preventive regime is only viable if it is acceptable to both the participants and to those who have to administer it.¹⁸ The success of a procedure depends on the cooperation of care staff and requires in-service training and frequent monitoring. Discernible non-compliance of care staff with chlorhexidine rinsing has been reported, as carers 'perceived' that the residents were not enjoying the procedure.¹⁸ Unacceptable taste, discolouration and soft tissue effects may also limit chlorhexidine usage.

As long ago as 1948, Volker¹⁹ stated that chewing of gum was an extremely common habit and reported that chewing gum removed on average 80% of residual oral debris.¹⁹ Studies using xylitol chewing gum have shown a reduction in the incidence of dental caries.^{20–21} Studies with chewing gum in older populations have shown an 'oral health improving effect'²² and acceptability within this age group.¹⁶ Habitual use of sugar free chewing gums stimulates saliva, which, together with the antibacterial benefits of its xylitol content, may offer hope of a major new method of caries prevention.²³ The aim of dental

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services for the elderly occupants of residential homes is to maintain oral comfort, function and self-esteem, while avoiding distress, discomfort and pain.

Aim

This study aimed to assess the acceptability of an antimicrobial chewing gum among elderly occupants of residential homes. It also proposed to examine the views of the carers on the resident's usage of such a preventive regime and their acceptance or objections to the distribution, collection and disposal of the gum.

Method and materials

From a larger study involving the investigation of the oral health status of the elderly in 48 of the residential/nursing homes in West Hertfordshire, nine homes were chosen at random and offered an antimicrobial chewing gum containing chlorhexidine acetate/xylitol (CHX) to chew twice daily for 7 days. The managers of all nine homes that were approached wished to participate in the study, and ethical approval was obtained from West Hertfordshire Ethical Committee. The gum investigated was a CHX gum that was liquorice flavoured and produced by Fertin A/S, Denmark. It contained 5 mg of chlorhexidine per pellet and 80% of the polyol content was xylitol, 20% being sorbitol.

Details of the residents recorded included: their age, sex, length of time in the home, number of remaining teeth and type of dentures worn. A participant was recorded as wearing a denture if the denture was worn for more than 6 hours daily. The method of gum distribution that was easiest for the carers was adopted following discussion with the care managers and carers in all the homes. Two pieces of CHX gum were offered twice a day to every resident whom the carers felt were able to chew gum without causing confusion. The resident's consent to chew the gum was obtained by the carers and care managers and any resident who began chewing and wished to stop was completely free to do so. Those residents who wished to chew the gum included residents with full dentures.

The gum was distributed immediately after breakfast and after the evening meal while residents were still seated at the dining room tables. The gum was chewed for 10 minutes and then collected in disposable bags. A total of 207 residents consented to chew the gum and were willing and able to respond to a questionnaire. This was presented and completed in the form of an interview both before the chewing period and on the final day of gum chewing. Carers were also asked to complete questionnaires before the study began and after the residents had chewed for a week. The questionnaires provided information on the resident's and carer's attitudes to oral health and the chewing of gum. To eliminate bias and minimise the number of responses that were given 'to please', different dental staff, that neither the carers or residents had previously met, distributed and collected the questionnaires. Categorical data were compared using χ^2 test. Relationships between numerical data were determined using appropriate non-parametric tests. All data were analysed using the *Statistical Package for the Social Sciences (SPSS) version 8.0*.

Results

The nine residential homes provided accommodation for 294 residents; 16 beds were unoccupied and 71 residents were unable or unwilling to chew gum, either because of poor general health, inability to cooperate or refusal. The 207 residents who agreed to enter the study and to chew the gum were 148 women and 59 men, aged between 53–100 years (mean age 82.2 ± 9.6 years). The length of time spent in residential care was 25.8 ± 26.4 months. 122 residents (58.9%) were edentulous and 85 (41%) of the participants were partially dentate with 51 (24.5%) subjects having no dentures and 23 (11.1%) having 21 teeth or more. The combi-

Table 1 Denture wearing habits of the participants

Type of denture	Number of edentate participants with this denture	Number of dentate participants with this denture
F/F	84	
F/P		4
P/P		5
P/F		5
-/P		2
P/-		7
F/-	19	11
No dentures	19	51

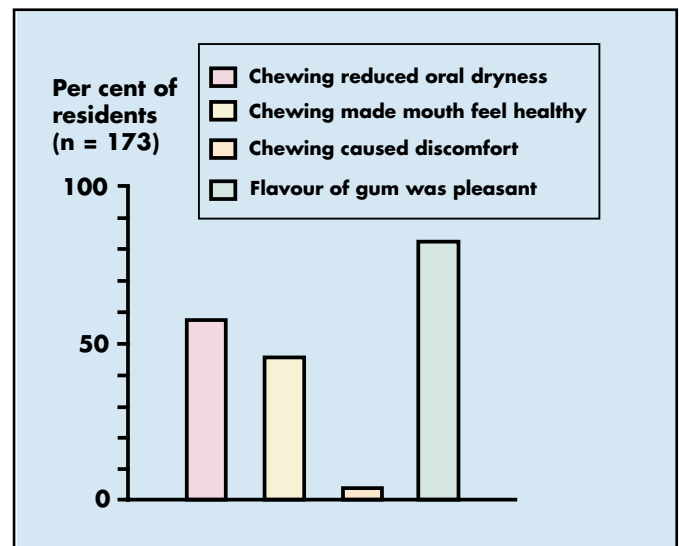


Fig. 1 Residents attitudes to chewing gums

nation, of teeth and dentures, observed in this study group are shown in Table 1.

Forty-four (21%) residents stated at baseline that they found chewing difficult, this problem was significantly greater for the edentulous residents ($P < 0.001$), with 39 edentate residents experiencing problems; 35 (17%) residents experienced problems with speech; 35 (17%) had problems with taste and 54 (26.1%) experienced a dry mouth, which was not related to presence of teeth. Forty-two (20%) residents had problems looking after their own mouths and although 66 (33.8%) of all the subjects wished carers to clean their teeth/dentures only 29 (14.8%) registered that their carers did so. Only 57 (27.5%) residents cleaned their teeth/dentures twice daily, this activity was significantly higher for those with teeth ($P < 0.0001$).

Thirty-seven (17.9%) residents found chewing the gum difficult and were unable to chew. This problem was significantly greater ($P < 0.0001$) for those residents with no teeth/dentures or unopposed full dentures. Of the remaining 170 residents who chewed the gum for the entire 7 days of the study, 100 (58%) were edentate and 70 (42%) partially dentate. The resident's attitude to chewing the gum can be seen in Figure 1. Of those residents who were able to chew, 36 (20.8%) still stated that chewing the gum was difficult, all but one of these residents reported problems chewing foods at baseline. Significantly more men than women ($P < 0.05$) had chewed gum before and also the younger residents had more experience of chewing gum (Table 2). Of the residents who wished to keep chewing the gum, 34 (53.6%) were dentate and 47 (40.9%) were edentate; this showed that even those people with no teeth still perceived a benefit from using the gum. None of the 170 residents who chewed the gum reported oral ulceration, discomfort or staining of teeth, soft tissues or dentures on chewing the gum for 7 days.

Table 2 Residents previous gum chewing experience and wishes to continue

Age group	Number and % of all the participants in this age group	Number and % of this age group who had chewed gum before	Number and % of this age group who wished to continue to chew gum
< 65	13 (6.3)*	10 (76.9)*	6 (46.2)
65-74	29 (14)*	12 (41.4)*	15 (51.7)
75-84	72 (34.8)*	9 (12.5)*	25 (34.7)
85+	93 (44.9)*	8 (8.6)*	35 (37.6)

*Significant difference between the groups $P < 0.0001$

Forty-seven carers in the nine homes, all female, aged 35.9 ± 13.8 years, were involved in distributing and collecting the chewing gum. Of the carers, 72.3% had received no formal training in the care of elderly people but had trained 'on the job', 15% had attended a college course/NVQ and 12.7% were registered nurses. The carers had worked in residential homes for a range of 4-370 months and each put to bed/woke up between five to eight residents a day. All carers thought it important to clean resident's teeth and 78.2% thought teeth should be cleaned twice daily. The attitudes of the carers towards chewing gum can be seen in Figure 2. The findings were not significantly different between the different homes, age of carer or previous training. Twenty-nine (61.7%) carers thought that chewing gum was an acceptable method of maintaining oral health for residents. This was significantly related to the carer's past experience of chewing gum and to their view on seeing others chew gum ($P < 0.05$).

Discussion

In a previous study involving 53 subjects, (mean age 79.5 ± 7.7 years), we found that on completion of the trial, 52% of the participants asked to continue to chew gum as an aid to oral health.¹⁶ However, all those participants had close contact with one dentist and one dental health educator who organised the trial and subjective questionnaires. The main objective of this study was to investigate the acceptability of chewing gum as an aid to oral health in a larger number of people who had no intimate contact with the dental team. Using a varied team of people in the organisation of the trial was intended to eliminate bias in responses from residents and carers. In addition the role of the carers in distribution/collection of a gum needed to be examined. A placebo gum and a no-gum group were not included, as the aim was not to examine the effects of a particular gum but to view the acceptability of any chewing gum in this group of people. A CHX gum was chosen as it has proved beneficial to oral health in other trials¹⁶⁻¹⁷ and is known to have a distinctive

taste and so analysis of its acceptability is very important before it could be routinely recommended.

Although all of the carers thought that it was important to clean resident's teeth and 78.2% felt tooth cleaning should be conducted twice daily, the residents reported that the incidence of twice-daily tooth and denture cleaning was much lower at 27.5%. Clark *et al.* investigating chlorhexidine gel in a high-risk elderly population found that care staff were unwilling to provide effective oral hygiene on a regular basis.²⁴ They investigated a 1% chlorhexidine gel placed in custom made trays and found that carers did not use it because the residents objected to the unpleasant taste. The authors suggested that the carers were more likely to provide a service that was easy to administer and similar to management of other medical problems. Other studies have also shown that the method of chlorhexidine application not only effects clinical results but also long-term usage of a product by care staff.¹⁸ We should not lose sight of the reality of the situation in nursing and residential homes where qualified nurses are in short supply and the majority of services are undertaken by carers who have little or no qualifications, are poorly paid and where staff turnover is high.²⁵ Attempts to improve oral hygiene and reduce sugar consumption require intensive effort and this may explain why attempts are often unsuccessful and why there was a discrepancy between the importance carers gave to twice daily toothbrushing and the recorded level of toothbrushing reported by residents in this study.

Chewing gum would be an excellent vehicle for delivering therapeutic agents as it can be used without water and can be administered anytime, anywhere. If a drug can be incorporated into the chewing gum base and released from that gum at a rate that provides the desired therapeutic level over a suitable length of time, chewing gum has potential as a successful drug delivery system.²⁶ Caries prevention and xerostomia are two conditions where the use of chewing gum as a drug delivery system has had practical application. Chewing alone promotes salivary flow and a drug can be

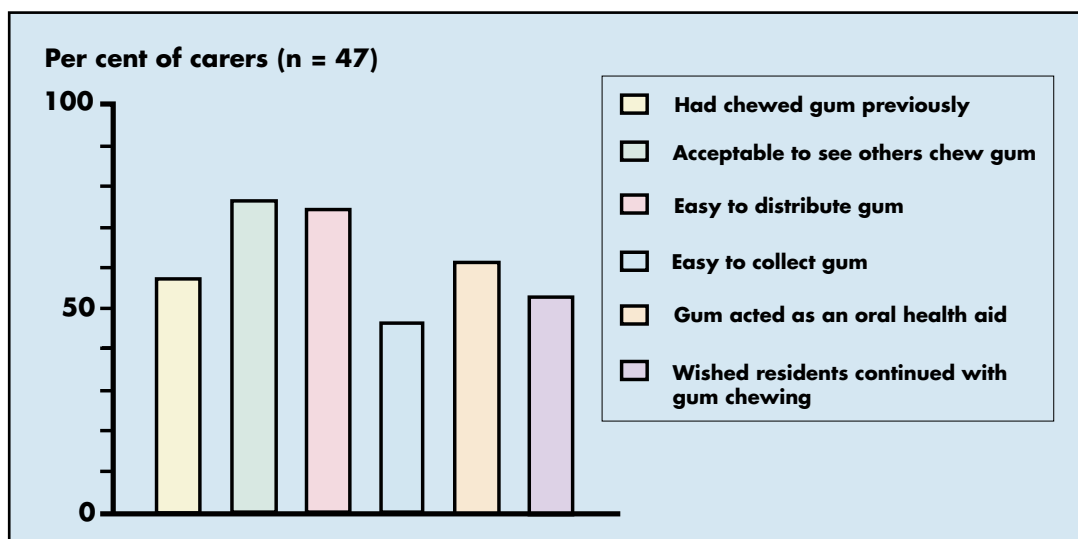


Fig. 2 Carers attitudes to chewing gum

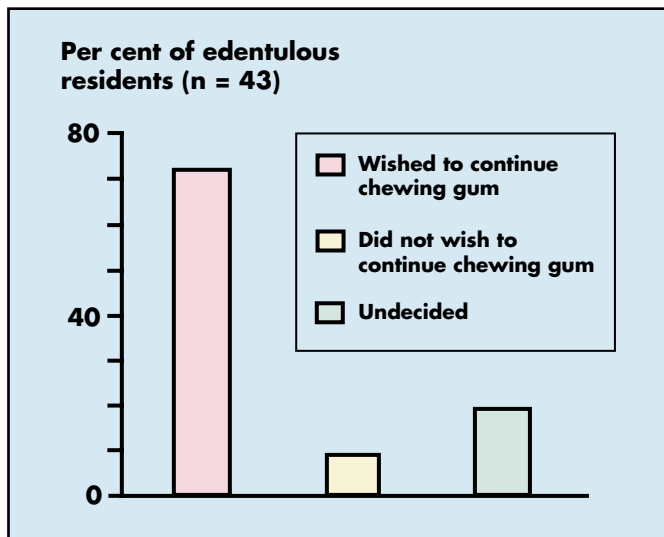


Fig. 3 Attitudes of those 43 edentulous residents who felt chewing gum relieved their dry mouth

released into the oral cavity providing prolonged therapy. Chlorhexidine is the gold standard as an antiseptic agent and specifically chlorhexidine would seem to be of most value to patients in whom the ability to perform adequate oral hygiene procedures has been compromised.²⁷ The bitter taste of chlorhexidine has been reported to be less pronounced when delivered via a chewing gum²⁶ and in this trial only 32 (18.6%) found the gums' flavour unpleasant.

Elderly persons might not be expected to favour the use of chewing gum, however in this study 81 (47.6%) of those who were able to chew the gum wished to keep using it. Previous studies with 50- and 63-year-olds^{28,29} also found chewing gum was acceptable and exerted beneficial effects if participants suffered with a dry mouth. Despite having full dentures, 47 (40.9%) of the edentate residents in this study still wished to continue to chew the gum and this was significantly related ($P < 0.0001$) to the 43 edentate residents who felt the gum alleviated oral dryness. Figure 3 shows the attitudes to continuing to chew gum of those 43 edentulous residents who thought chewing alleviated their dry mouth. Thirty-eight edentate residents also reported that it improved oral health. Twenty-five (53.2%) of the carers stated that they would be happy for their residents to keep chewing the gum even though collecting the gum could be difficult.

Conclusion

The CHX gum investigated in this study was acceptable to many elderly occupants and their carers and since there is a potential role for a CHX chewing gum in preventing oral disease in this age group its clinical effectiveness needs to be evaluated. However, the support of the carers appears to be a major deciding factor in the acceptance of the regime, consideration needs to be given to the carers' past experiences and views on chewing gum before its use can be suggested. Appropriate training programmes aimed at carers may be required to improve the acceptability and use of the gum among residents.

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