

Assessments of oral health care in dependent older persons in nursing facilities

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The number of dependent elderly with natural teeth is increasing dramatically. If these elderly persons do not receive proper oral health care, severe oral problems are likely to result. In conjunction with an oral health care education program for the staff of nursing facilities, oral health status was assessed and semi-structured interviews performed with residents and their relatives about oral health care. The assessments were made at baseline and at an 18-month follow-up. The project was conducted as a longitudinal, controlled study with an intervention and a control group. The aim of the study was to evaluate differences between the intervention and control group after oral health care intervention. At follow-up, it was shown that the intervention group had established more dental contacts. However, the results also indicated that the residents were not concerned about their oral health. Nursing staff therefore have to be responsible for oral health care if improved care for residents is to be realized. □ *Elderly; interviews; oral health care; nursing*

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Old age is frequently associated with being edentulous or partially edentulous. Hence, oral health care services signal low priority for many elderly people. Today, the profile of oral status in the industrialized world is changing toward preservation of natural teeth into old age (1). However, the conditions resulting from oral diseases affecting natural teeth may be difficult to treat in very old and frail people (2). The increasing group of dependent elderly (e.g. bedridden elderly persons, senile dementia patients, and physically weak elderly) with more natural teeth has therefore created an increasing need for oral health care in nursing (3).

Individuals with the most prevalent medical problems also tend to have the highest rates of dental disease. In addition, an association between poor oral health and adverse medical outcomes has been shown (4). Systemic infection in the elderly patient living in a chronic care setting places a significant burden on the health care system (5). While oral diseases may represent an infection risk, there is a lack of knowledge about oral health care among nursing personnel (6). Such an unfavorable condition may be traced to the fact that oral health care is often a neglected area with low priority in nursing (7, 8). Consequently, strategies need to be encouraged to enhance the integration of oral health care into the general medical care of the chronically ill in nursing homes and home health settings (9).

Oral function and dry mouth have consequences for the well being of nursing home residents (10); nonetheless, it is difficult to clarify the residents' self-conception about how oral health care influences their quality of life (11). As part of the evaluation of an oral health care education program for nursing staff, we assessed the oral health status of

residents and then interviews were conducted with residents and their relatives before and after intervention (12). The intention of the current study was to evaluate whether an education program, including special training for oral care aides, had created more positive and lasting oral health care effects for the residents relative to a traditional oral health care education program. In addition to oral health factors, the residents' self-conceptions about oral health care were examined and the nursing staff's attitudes toward oral health care were evaluated.

Materials and methods

Study design

This study was approved by the local ethics committee in 1998. The main study was designed as a longitudinal, experimental study with an intervention and control group. The nursing personnel in both groups were given basic oral health care training consisting of a 3-h lesson. However, additional to the basic training, the intervention group was given a support system with specially trained oral care aides from the nursing staff of the intervention group. The ward director selected the oral care aides, two nursing assistants and two nurses aides. Each oral care aide passed an auscultation period of 1 day/week for 4 weeks at a dental clinic. They followed both the dentists' and dental hygienists' work. After the auscultation period, they were assumed to be responsible for the oral health care work in their wards. Baseline assessments were made before intervention and follow-up data were collected after 6

and 18 months. In this article, only baseline and 18-month follow-up data are reported.

Study population

The study population consisted of both nursing staff and their elderly residents. The intervention and control groups were chosen to be as similar as possible in terms of demographic characteristics of the residents and type of facility. The same ward director who consented to participation administered all units.

The intervention group included two units at a nursing home with 24 beds each (i.e. 48 residents). One unit had mostly demented elderly. The other unit was largely made up of stroke patients. The control group came from another nursing facility in the same district with 12 beds for demented patients and 24 beds for residents with other diagnoses. The control group also included a closely situated apartment complex for 12 demented elderly. Thus, like the intervention group, the control group consisted of a total of 48 residents. The number of residents in the control and intervention groups was the same at baseline as at the 18-month follow-up, although some individuals in each group had dropped out and were replaced by other residents.

Analyses of residents

1. Gender, age and oral status (i.e. whether the respondents were edentulous, had natural teeth and/or removable prostheses).
2. The mucosal-plaque (MPS) score was used to assess the oral health care status of the residents (13). This index measures the degree of inflammation of the gingival and palatal mucosa, as well as the amount of plaque and debris present on teeth and dentures. It is designed to assess the sequelae of long-standing oral hygiene deficiencies and current oral hygiene status in the elderly. The MPS measures both mucosal and plaque indices, each on a scale from 1 to 4 and is summarized as *acceptable* (2–4), *unacceptable* (5–6), or *poor* (7–8). A value of 5 has served as a manageable “signal value”, indicating that an institution or ward should be further observed or that oral health programs should be instituted or repeated. The index is suitable for measuring changes over time in groups, but it is not deemed appropriate at the individual level.
3. An oral health care semi-structured questionnaire was used for interviewing residents about their views on oral health care before and after the intervention.
4. Registration as to whether the residents were able to answer the questions themselves or if advocates were used.

Student's *t* test and χ^2 or the Fisher exact test were used to test differences between groups on the variables measured at baseline and at the 18-month follow-up. The binomial test was used to test differences in groups on

the variables measured at baseline and at the 18-month follow-up. Statistical significance was set to $P < 0.05$.

Analyses of nursing staff

1. Dental coping beliefs scale (DCBS) (12). This scale consists of 24 items representing 4 dimensions (*Internal Locus of Control*, *External Locus of Control*, *Self-Efficacy*, and *Oral Health Care Beliefs*). The respondents rated each item on a 5-point scale, where 1 signifies positive beliefs and 5 denotes negative beliefs.
2. Two open-ended written questions, which accompanied the DCBS scale, were used:

Question 1: How would you describe the present oral health care work in your ward?

Question 2: If you were able to choose, how would you like the oral health care work in your ward to be organized?

The DCBS data were analysed using confidence intervals for differences between medians; statistical significance was accepted at the 95th percentile ($P < 0.05$). Due to anonymity, we considered the staff to be separate groups at baseline and follow-up.

The qualitative analysis of the open written questions was done using content analysis (14) in three steps. The first step was an open coding, by which concepts were identified and developed. Similar concepts were labeled and grouped to form categories. In the second step, connections were made between a category and its subcategories. Finally, a more integrated understanding of events, processes, and interactions was sought.

Procedure

All residents were examined at their facilities either lying comfortably in bed or sitting in a chair. Examinations were carried out in normal daylight conditions, and, when necessary, a flashlight was used to provide additional illumination. The intra-oral visual inspection was carried out with a mirror and the total examination time per individual lasted about 5 min.

The same dental hygienist administered the MPS index for all examinations. An inter-examiner test was performed for 23 of the examinations. Another dental hygienist measured the MPS index immediately after the first assessment. Of the 23 examinations tested for inter-examiner reliability, 20 (90%) were the same: the 3 measurements that were not the same differed in one step.

The interviews were conducted by one of the authors (IW) and took between 15 and 30 min. The interviewer wrote down the residents' responses during the interviews. When dealing with demented or other residents who were incapable of responding, relatives, close friends, or in some cases a contact person from the nursing staff who was familiar with the resident, was asked to act as the residents' advocate. All responses were dichotomized into *yes* or *no* categories.

Table 1. Distribution of natural and false teeth as a function of group (intervention vs control) and intervention (pre- vs post-intervention)

	Interv Pre <i>n</i> = 28	Interv Post <i>n</i> = 30	Control Pre <i>n</i> = 38	Control Post <i>n</i> = 35	Total Pre <i>n</i> = 66	Total Post <i>n</i> = 65
Only natural teeth	13 45%	14 47%	13 34%	14 40%	26 39%	28 42%
Natural teeth and removable prostheses	7 26%	5 17%	10 26%	6 17%	17 25%	11 17%
Edentulous with removable prostheses	5 24%	10 36%	11 29%	14 40%	16 18%	24 33%
Edentulous	3 11%	1 3%	4 11%	1 3%	7 11%	2 3%

Eighteen months after baseline assessments, follow-up assessments were made using the same MPS index and semi-structured interviews. New residents replaced residents who had deceased or had moved before the follow-up.

The DCBS questionnaire and the two open-ended questions were administered to the nursing staff and answered before initiation of the oral health care education program. Eighteen months after the baseline assessments, the nursing personnel were asked again to rate each item on the DCBS, as well as answer the two open-ended questions.

Results: residents

General and oral status

At baseline, 28 (58.3%) residents in the intervention group and 38 (79.2%) in the control group were willing to participate. In the intervention group, the mean age was 79.9 years ($SD \pm 6.7$, range 67–99 years); in the control group the mean age was 79.7 years ($SD \pm 11.9$, range 56–97 years). The percentages of women in the intervention and control groups were 63 and 61, respectively. Those who did not participate at baseline or follow-up were

mostly demented persons for whom we could not find someone to act as their advocate.

At the 18-month follow-up, 30 (18 women) residents in the intervention group and 35 (18 women) in the control group participated. The mean ages for residents in the intervention and control groups were 80.8 years ($SD \pm 6.7$, range 64–96 years) and 80.3 years ($SD \pm 12.2$, range 51–99 years), respectively. In the intervention group, 14 of the original participants were still present at the 18-month follow-up. Nine of these had only natural teeth, two had natural teeth and removable prostheses and three had removable prostheses. In the control group, 17 of the original participants were present. Six of these had only natural teeth, three had natural teeth and removable prostheses and eight were edentulous with removable prostheses. No differences in oral health values were noticeable between edentulous and dentate residents, but no totally edentulous residents were still present at follow-up in either the intervention or the control group. For distribution of natural and false teeth in the whole material at both baseline and follow-up, see Table 1.

Semi-structured interviews

The semi-structured questionnaire was answered by 47% of the residents without help from others before

Table 2. Interview assessment of oral health care factors ('yes') among residents and/or their advocates. Pre- and post-intervention data are given. Statistical significance ($P < 0.05$) indicated by * (within group) and § (between group). Statistics are given in the text

	Interv Pre <i>n</i> = 28	Interv Post <i>n</i> = 30	Contr Pre <i>n</i> = 38	Contr Post <i>n</i> = 35	Tot Pre <i>n</i> = 66	Tot Post <i>n</i> = 65
Oral conditions						
My teeth are good	18	20	27	28	45	48
I can eat without problems	25	23	37	33	62	56
Oral care						
I can manage my oral hygiene	10	8	6	12	16	20
I want oral hygiene help	10	3§	4	0	14*	3
Staff concerns about my teeth	7	11	17	14	24	25
I know who to contact about oral problems	21	24	26	29	47	53
Dental care						
I have a dental contact	5*	14	15	14	20	28
I know the cost for dental care	2	9	4	12	6	21
I want dental care	17	15§	13	7	30	22

Table 3. Mean MPS values as a function of group (intervention vs control) and intervention (pre- vs post-intervention)

	Interv Pre <i>n</i> = 28	Interv Post <i>n</i> = 30	Control Pre <i>n</i> = 38	Control Post <i>n</i> = 35
Mean of MPS	3.4	2.6	3.4	2.8
	SD $\pm$ 1.3	SD $\pm$ 0.7	SD $\pm$ 1.6	SD $\pm$ 0.7

intervention and by 85% after intervention, indicating that a much larger proportion of residents answered the questions after the intervention without help.

With regard to self-assessment of oral conditions, 68% of all residents at baseline judged their teeth to be in good condition and only a few reported that they had any eating difficulties. Only 24% of the residents, however, reported that they could manage oral hygiene without assistance (Table 2). Almost a third of the residents reported that they knew of no one to ask about issues related to oral care and 70% had no remaining dental contacts. Nine percent of the residents felt they had some knowledge about dental care cost and understood their rights about subsidized dental care. The wish to receive dental care was expressed with greater frequency than the desire to obtain help with oral hygiene, but there were significantly more individuals in the intervention group who wanted to get help with oral hygiene ($\chi^2 = 6.11$; $P < 0.05$) and with dental care ($\chi^2 = 4.57$; $P < 0.05$).

At follow-up, the frequency of residents who were aware of costs and possibilities to get subsidized dental care increased from 9% to 32%. The follow-up results indicated that a significant number of dental contacts had been established in the intervention group (binominal test; $P = 0.002$) but not in the control group. The wish to have dental care was also higher in the intervention group compared to the control group ($\chi^2 = 6.49$; $P < 0.05$). No other improvements were noted; in fact, interest in oral hygiene help was lower at follow-up compared with interest at baseline in both the intervention and control groups (binominal test; $P = 0.008$) (Table 2). Five more residents in the whole material complained about eating difficulties.

MPS index

Table 3 shows the MPS values as a function of group (intervention versus control) and intervention (pre- versus post-intervention). At baseline, no differences between the groups were found. At the 18-month follow-up, however, decreased MPS values were observed in both the intervention and control groups. When the cut-off score was set below 5, 8 of 18 residents who received oral hygiene help in the intervention group got this value pre-intervention compared to 12 of 22 residents post-intervention. In the control group, 16 of 32 residents who received oral hygiene help got the value below 5 pre-intervention compared to 10 of 23 residents post-intervention. When excluding replaced individuals, no different results were achieved.

Results: nursing staff

DCBS index

At the start of data collection, 31 nursing staff members in the intervention group (mean age 38.5 years, SD $\pm$ 10.3) and 32 staff members in the control group (mean age 39.3 years, SD $\pm$ 9.7) agreed to participate. On average, staff in the intervention and control groups had been in nursing care for 13.7 and 16.7 years, respectively. Of the 63 participants, 1 was male (in the intervention group) and 62 were female. The staff members who participated had permanent employment and were working daytime schedules—criteria for entering the study. In that respect all available staff participated.

In the intervention group, 31 nursing staff members participated at the 18-month follow-up assessment. Two of the 31 nursing staff members at follow-up served as replacements. In the control group, only 18 nursing staff members agreed to participate at the 18-month follow-up. There were no differences between groups in the pre- or post-intervention DCBS values, except for a small, though statistically significant, negative change in *Internal Locus of Control* in the intervention group (Table 4).

Table 4. Pre- and post-intervention differences between medians for the Dental Coping Beliefs Scale in the intervention and control groups. 95% confidence intervals are given in parentheses

	Interv Pre <i>n</i> = 31	Interv Post <i>n</i> = 31	Control Pre <i>n</i> = 32	Control Post <i>n</i> = 18
Nursing staff groups				
Internal locus of control	1.33 (1.17–1.67)	1.60 (1.30–1.67)	1.33 (1.17–1.67)	1.30 (1.00–1.50)
External locus of control	1.83 (1.50–2.00)	1.60 (1.33–1.67)	1.50 (1.33–2.00)	1.33 (1.00–1.50)
Self-efficacy	1.83 (1.50–2.00)	1.67 (1.50–2.00)	1.67 (1.50–2.00)	1.50 (1.33–1.67)
Oral health beliefs	1.83 (1.50–2.00)	1.50 (1.33–1.67)	1.67 (1.33–2.00)	1.50 (1.17–2.17)

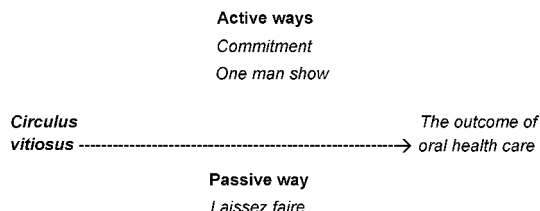


Fig. 1. Nursing staff strategies towards solving the problem of the low oral health care interest of residents.

Qualitative analysis

All respondents had answered the open-ended questions. The same oral health care strategies appeared as in the former analysis of qualitative nursing staff data from the 6-month follow-up (12); *Commitment*, *One man show* and *Laissez faire*. The nursing staff experienced that the residents expressed little concern in matters related to oral health care, which created the core category *Circulus vitiosus*. "Tooth brushing may not always be done daily because of non-cooperative elderly residents—their integrity. The gums will hurt and bleed and the brushing becomes even more unpleasant".

Two categories, the *active* and *passive* ways, showed how the nursing staff solved this problem differently (Fig. 1). The active way could be referred to *Commitment* or *One man show*.

Commitment described a collective oral health care engagement in the interventions group. "This oral work is good. When new residents arrive, they are offered a free oral examination and we follow the oral care cards. If the residents don't want to eat because of denture problems or teeth that hurt, the dentist or the dental hygienist is contacted."

One man show described an individual oral health care engagement but cooperation difficulties in the control staff group. "Myself I follow the new recommendations, but everybody ought to do so."

The active staff sought to do the best they could with the oral health care. "Sometimes you try again when they are in a better mood". The passive way could be referred to *Laissez faire*, which described a situation among some nursing personnel in which oral health care improvements were of little interest. "Some of us are more careful than others while some staff are not very oral health care oriented."

The passive staff leave a difficult oral health care situation. "Sometimes when the elderly refuse oral hygiene care, they'll be left without assistance".

Drop-outs

Drop-out rate among residents was high in both the intervention and the control groups. Fourteen residents in the intervention group and 21 in the control group moved or died during the time of the project. In the intervention group, some residents moved when a change to interim living occurred, but the main proportion of drop-outs went ad mortem. These were the frailest individuals and

probably among these, the totally edentulous. New residents entered consecutively during the time of the project, but as available nursing facilities were limited the entry criterion was dependency in daily activities, and in that respect the new residents were similar.

Concerning the nursing staff, two replacements were introduced at follow-up in the intervention group. In the control group, 14 individuals had dropped out and no replacements were made. Those who did not participate related that they were free to interrupt their participation in the project and no new staff were interested in being included.

Discussion

The primary purpose of this study was to evaluate an oral health care intervention program for nursing staff. The results indicated that no significant differences in the oral hygiene of residents were visible at follow-up compared to baseline. Only about half of those who received oral hygiene assistance showed an acceptable oral hygiene. Similar studies have shown that preventive programs have failed to decrease plaque indices (15, 16). Furthermore, the present study did not reveal any differences in oral hygiene between patients with natural teeth or removable prostheses. This finding is not consistent with earlier reports indicating that poor oral hygiene in nursing home residents is largely related to natural teeth (17). Because it has been suggested that the common Plaque Index is unsuitable for recording changes in large accumulations of plaque (15), we used the MPS index, an index that is also useful when dealing with edentulous and uncooperative residents. Our small study material probably also showed too inflated values at baseline for indicating differences in MPS values at follow-up.

The measurable change at the 18-month follow-up was that the residents in the intervention group had established more dental contacts and were more interested in dental treatment than the control group relative to the measurements at baseline. The reason for this can be that the control group had more dental contacts from the beginning, but it can also be sought in the oral care aides' cooperation with the dental team, especially the dental hygienist. In that way the intervention group also better fulfilled the obligations of the new dental remuneration (18) than the control group. The result can be compared with another study in which the only measurable improvement in the oral health of residents after carer training was an increase in filled coronal surfaces (16).

Despite the fact that over 60% of the residents did not deal with their own oral care, little interest in obtaining oral hygiene help was observed. When the nursing staff received oral health care education, the interest even decreased. The answers from the open-ended questions indicated that the nursing staff had difficulty in obtaining permission from residents to assist in oral health care. It has been reported that only 10% of nursing home

residents aged 65 years and over are completely independent (19), which suggests that this is a serious problem in nursing homes care. More dental contacts can be a possible solution for the staff when it is difficult to perform oral health care. The staff in the intervention group exhibited mainly unchanged values on the DCBS at follow-up. However, the *Internal Locus of Control* decreased. The intervention program included that oral care issues should be delegated to the oral care aides, who then decided whether to contact the dental profession. In that way the staff's personal responsibilities decreased, even though they were still committed to the oral health care program. It should be pointed out that it was probably the most interested staff who participated in the control group at follow-up, which makes interpretations of the results difficult.

The intervention wards changed to interim living arrangements during the project time, which occurred because of a policy change within the community. This may explain the high drop-out rate. The control group remained as the permanent living, but nevertheless many residents died or moved to other nursing facilities. Similar difficulties have earlier been reported to complicate research in nursing environments (3). New residents arrived that had to be informed about the oral health care work. The nursing staff had difficulty in acquiring the consent of relatives/advocates living far from the nursing homes, especially in the intervention group. At least at follow-up, the interim living could result in decisions by the elderly residents or their advocates to delay not obvious oral matters until more permanent living was arranged. Another explanation is the resident's low awareness of subsidized dental costs because of the new dental remuneration (18).

The low oral health care values observed in our study, especially at follow-up, might be related to the fact that many residents answered the interview questions without the aid of others. The perceived need of oral treatment decreases with age and nursing home residents seldom talk about a poor oral situation (10). The dental interest has been said to associate with having natural teeth (20, 21). The present study, however, did not reveal any differences in oral values between edentulous and dentate residents.

Conducting interviews with long-term care residents can be beset with difficulties, although it has been shown that persons with moderate cognitive impairment are able to articulate their preferences and choices (22). At follow-up, it seemed as if the residents were capable of answering our questions by themselves. Probably the reason was that advocates had now become aware of the new dental remuneration and left the issue to the nursing staff. When an advocate was needed for consent or for responding to the questions in the present study, a relative, close friend, or a member of the staff had to serve as intermediate. The results can be biased by some residents having an advocate at baseline but not at follow-up. The relatives of elderly residents have been found to consider that the primary purpose of the mouth is for social behaviour and

communication, while the care providers give priority to the patient's ability to enjoy eating (23). Only a few of our residents, but more at follow-up than at baseline, complained about eating difficulties. Numerous sources indicate that there is a significant risk of malnutrition in elderly patients who remain hospitalized (24). This lack of discontent may be due to older persons accepting their changed dietary habits such that they become a part of their normal life.

The value of our study results is limited by the small study material and the high drop-out rate. However, one conclusion can be drawn. We cannot expect the majority of dependent elderly and long-term care patients (or their frail relatives) to maintain oral health care involvement. The subjective need of oral health care decreases while the objective need increases. Consequently, health professionals and care providers need to be constantly aware of the necessity for maintaining an optimal oral health status in the elderly and choose an active way of collective engagement to solve oral health care problems.

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