Implementation of oral hygiene practices in nursing homes – the view of supervisor nurses

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ABSTRACT

Objectives: The aim of our study was to analyze the implementation of oral health related practices in private enhanced service housing units and nursing homes in Finland reported by supervisor nurses.

Methods: We sent an anonymous, voluntary Webropol-questionnaire to the supervisor nurses of private enhanced service housing units and nursing homes (N=245). The questionnaire included items about the implementation of oral health care related practices in the care units and items based on the Nursing Dental Coping Beliefs index (DCBS index). Five dimensions of the implementation of oral health care related practices, *Oral hygiene practices* and *Favorable diet for oral health*, *Oral hygiene equipment*, *Professional dental services* and *Knowledge and opinions* were used as outcome. The factors in nursing DCBS index and background variables were used as explanatory variables.

Results: Our main results showed that in care units, *Oral hygiene practices*, *Favorable diet for oral health*, *Oral hygiene equipment* and *Professional dental services* were partly implemented. Furthermore, according to *Knowledge and opinions* supervisor nurses had challenges in oral health related knowledge and difficulties in managing oral care. In the DCBS index, better self-efficacy in "Managing bleeding gums" was associated with better implementation of oral health practices. Furthermore, supervisor nurses' better own oral health habits were associated with better implementation of oral health related practices.

Conclusions: It can be concluded that on the base of the responses of the supervisor nurses, oral health related practices were partly implemented in private enhanced service housing units and nursing homes in Finland.

Introduction

The number of dentate older people increases constantly in developed countries [1]. In Finland, 21 % of the population older than 65 years of age is edentulous [2]. At the same time, cognitive disorders, multimorbidity and consequent deterioration of daily functioning reduce older people's ability to take care of daily oral hygiene practices and arrange the appointments of dental care. Thus, older people with impaired daily functioning are prone to oral diseases [3]. Furthermore, oral problems increase the risk of malnutrition [4] and poor quality of life [5] as well as risk for general diseases such as cardiovascular disease, diabetes, cancers and lung infections [6].

In Finland oral health care belongs to public primary health care. According to the Finnish legislation municipalities are responsible for organizing oral care for all citizens [7]. In addition, it is possible to use the oral health care services of the private sector. The nurses in care units are responsible for organizing dental visits to public primary care or the private sector and day-to-day oral hygiene practices among older people with poor functional ability. However, implementation of oral hygiene practices among older people in various care institutions has been found to be weak in Finland [8] and in other developed countries [9]. In a previous study, it was reported that only 16 percent of nursing home residents received oral care [10]. Furthermore, oral health and oral hygiene level has been found to be poor among institutionalized older people [11].

In order to manage day-to-day oral hygiene practices, nurses working in nursing homes should have knowledge of and time enough for oral health care. However, it has previously been found that nurses report clients resisting oral care, nurses have limited oral health related knowledge, skills, and confidence, and lack of time to oral care of clients [9,12-15]. According to a recent study, Finnish nurses reported only minimal or no oral health care education included in their nursing curricula [13].

The role of a supervisor nurse is very important in improving oral health of clients in nursing homes. A supervisor nurse organizes day-to-day services and is in response of the resources, budgeting, training of the nurses and their professional development, for example [16]. The supervisor nurse may inform nurses to perform day-to-day oral care among old clients and may also help to organize adequate daily oral hygiene equipment to the unit as well as dental visits for clients. Furthermore, it is also desirable that the supervisor nurse organizes both practical and theoretical oral health education for nurses.

To our knowledge the role of supervisor nurse in oral care in nursing homes has not been reported previously. The aim of our study was to analyze the implementation of oral health related practices in private enhanced service housing units and nursing homes in Finland reported by supervisor nurses.

Materials and methods

Our study population comprised 245 supervisor nurses in Finnish private nursing homes and enhanced service housing units. In Finland *nursing home* refers to a care institution where nurses take care of the most dependent older people 24/7, whereas in *an enhanced service housing unit* older people have some functional ability to daily activities. The care units participating in our study were located five Regional State Administration Agencies: Lapland, Eastern, Southern,

Southwestern, and Western and Inland Finland. The data for this study was gathered by using the Webropol survey application which was sent to supervisor nurses.

Ethical consideration

From the ethical point of view, according to the Finnish legislation, permission from the chief officer of the Regional State Administrative Agency for Northern Finland was sufficient for this voluntary and anonymous survey.

Pilot study

We first carried out a pilot study in April-May 2018 in two provinces (North Ostrobothnia and Kainuu) in Finland. In the pilot study, we had thirteen items about implementation of oral health care related practices in the care units. Answer options were yes/no.

There were also fourteen items based on Nursing Dental Coping Beliefs index. In 1991, Wolfe developed the Dental Coping Beliefs Scale [17] which Wårdh and Sörensen modified to a measure called the Nursing Dental Coping Beliefs (nursing DCBS) index. This index comprises four theoretical frameworks: Internal locus of control, External locus of control, Self-efficacy and Oral health care beliefs [18]. Our nursing DCBS questionnaire included three items on oral health care beliefs, four items on internal locus of control, four items on external locus of control and three items on self-efficacy. There was also space for free comments in the questionnaire. The results were promising, and we expanded the study to include all areas in Finland.

Questionnaire

In the final questionnaire, the same thirteen items about implementation of oral health related practices were included. Of the nursing DCBS index, eleven items were included. The excluded items included one item about oral health care beliefs "Visiting the dentist is only necessary when experiencing pain in teeth", one about external locus of control "One method of brushing is just effective as any other", and one about self-efficacy "If I knew more about dental diseases, I would be able to practice better oral care to older people". These three items were excluded with low loading from the factor analysis in order to improve internal consistency (Cronbach's alpha). In the final questionnaire, background factors were also inquired. In June-August 2018, supervisor nurses answered to this final questionnaire. Response rate for this survey was 41.9%.

a. Implementation of oral health related practices

We classified items on the basis of the content of the items and following three main themes with five dimensions were formulated for implementation of oral health care related practices. The first main theme is "Client's daily practices" which includes dimensions 1. *Oral hygiene practices* and 2. *Favorable diet for oral health*. The second main theme is "Organizational practices" which include 3. *Oral hygiene equipment* and 4. *Professional dental services*. The third main theme is "Orientation for oral health" which includes 5. *Knowledge and opinions*.

b. Nursing DCBS index

In the nursing DCBS index, the participants had the opportunity to answer the queries on a five-point Likert scale from 1 (strongly agree) to 5 (strongly disagree). We excluded one item with low loading (external locus of control) from the factor analysis in order to improve Cronbach's alpha. The excluded item was "The older people tell themselves, if they need help in oral health care". The names of the factors are *Prevention of oral diseases, Managing bleeding gums, Confidence to manage oral diseases* and *Use of removable dentures*. Sum scores for each factor were calculated and mean sum scores were used as explanatory variables in relation to five dimensions of implementation of oral health care related practices.

c. Background variables

Sociodemographic, occupational and oral health-related data were asked in the questionnaire. The age of the participants was classified as <30/30-39/40-49/50+ years, working experience as a nurse as <5/5-10/>10 years and working experience as a supervisor nurse as <5/5-10/>10 years. The gender was classified as female/male. The frequency of tooth brushing and flossing were classified as twice a day/once a day/less than once a day. Dental visiting manner was classified as regularly/unregularly/if necessary.

Statistical methods

Mean sum scores for five dimensions of the implementation of oral health care related practices were calculated and they were used as outcome variables. The sum scores for factors nursing DCBS index and background variables were used as explanatory variables.

The factor structure of the nursing DCBS index was studied by using exploratory factor analysis, in which the items were analysed with orthogonal rotation (Varimax). Kaiser-Meyer-Olkin's measure of sampling adequacy and Bartlett's test for sphericity were used to serving possibility of

performing factor analysis. Cronbach's alpha served as a measure of the reliability of the factors. Sum scores were calculated for each factor.

The Mann-Whitney test was used to compare the explanatory variables in relation to the outcome variables.

The statistical analyses were performed using SPSS version 25 (IBM SPSS Statistics for Windows, Armonk, NY: IBM Corp.)

Results

Characteristics of the study population

Characteristics of the study population are shown in Table 1. Almost all supervisor nurses were female (97%). The majority of the supervisor nurses were aged over 40 years (78%) and their working experience as a nurse was more than 10 years (85%) and as a supervisor less than 10 years (55%). Eighty percent of the respondents had also some other education. Most of the supervisor nurses brushed their teeth twice a day (90%), about half of the nurses cleaned their interdental spaces at least once a day (42%) and about two thirds visit the dentist regularly (71%).

Responses to items about implementation of oral health care related practices in care units

Actual percentages of supervisor nurses' reported answers are shown in Table 2. Mean sum scores for five dimensions of the implementation of oral health care related practices were as follows: 1. *Oral hygiene practices* (two items; min score 2, max score 4, mean score 2.9), 2. *Favorable diet for oral health* (two items; min score 2, max score 3, mean score 2.2), 3. *Oral hygiene equipment* (three items; min score 3, max score 6, mean score 4.4), 4. *Professional dental services* (two items; min score 2, max score 4, mean score 2.9) and 5. *Knowledge and opinions* (two items: min score 4, max score 7, mean score 4.8).

In the main theme, "Client's daily practices", including *oral hygiene practices* and *favorable diet for oral health*, 98% of the supervisor nurses answered that removable dentures are cleaned once a day whereas less than 10% answered that they brush the older people's teeth twice a day and clean interdental spaces. Furthermore, mealtimes were regular in every care unit, but sugary snacks were given in over 80% of care units.

In the second main theme, "Organizational practices"*,* including *oral hygiene equipment* and *professional dental services,* almost 90% of the nurses answered that they check the condition of the oral hygiene equipment regularly, but the oral hygiene equipment was included in the service in

only 40% of the care units. About 60% of the nurses answered that the older people get help during the same day if they have a toothache and about 50% of the nurses answered that dentist or dental hygienist visits regularly to do clinical dental examinations.

In the third main theme, "Orientation for oral health", including *knowledge and opinions,* about 60% of the nurses stated that they had received information about oral health in their education and almost 95% would like to have more information about older people's oral health care. About 70% of supervisor nurses felt that oral health care is difficult.

Variables of Nursing DCBS index

Proportions of the answers in the Nursing DCBS index are shown in Table 3. In factor analysis the Cronbach's alpha of the factors varied between 0.281 and 0.919 (Table 4). The factor "Prevention of oral diseases" in Internal locus of control showed the highest reliability (Cronbach's α 0.830). When the association between the sum scores of factors in psychological characteristics in the nursing DCBS index and mean sum score of the five dimensions of implementation of oral health care related practices were analyzed, it was found that higher sum scores for self-efficacy in "Managing bleeding gums" was associated with higher sum scores *Professional dental services* (p<0.001) and *Knowledge and opinions* (p=0.004) and, as a trend, *Oral hygiene equipment* (p=0.065). Other psychological characteristics were not associated with dimensions of implementation of oral health care related practices.

Supervisor nurses' own oral health care and other background variables

Better brushing habit (twice a day, p=0.008) and flossing habit (at least once a day, p=0.04) and, as a trend, habit of regular dental visits (p=0.099), were associated with higher sum scores for *Professional dental services.* In addition, better brushing habit (twice a day, p=0.009) was associated with higher sum scores for *Oral hygiene equipment*. There was also a trend of an association between previous dental education during nursing studies and higher sum score for the dimensions *Knowledge and opinions* (p=0.094) and for *Favorable diet for oral health* (p=0.094). Longer working experience was associated with lower sum score for *Favorable diet for oral health* (p=0.032).

Free comments in the questionnaire

In free comments, the nurses wrote that the main reason for not taking care of clients' oral health is lack of time. Furthermore, nurses commented that most of the clients have some memory and

behavioral disorder, such as dementia, which make the oral health care practices more difficult. There were two comments where the nurses noted that they are not interested in oral health.

Discussion

To the best of our knowledge, this is the first investigation about the role of supervisor nurse in the implementation of oral health related practices in private enhanced service housing units and nursing homes in Finland. Response rate for this survey was 41.9%. The low response rate may have been influenced by the supervisor nurses' rush at work or their lack of interest, and the timing of the survey (summer). Our main results showed that in the care units, *Oral hygiene practices*, *Favorable diet for oral health*, *Oral hygiene equipment* and *Professional dental services* were partly implemented. Furthermore, according to *Knowledge and opinions* supervisor nurses had challenges in oral health related knowledge and difficulties in managing oral care. In DCBS index, better self-efficacy in "Managing bleeding gums" was associated with better implementation of oral health practices. Furthermore, supervisor nurses` better own oral health habits were associated with better "Organizational practices".

The main theme, "Client's daily practices" comprised basic daily factors affecting oral health among clients. Our results showed that according to *Oral hygiene practice* the daily cleaning of client's own teeth is insufficient. Our results are in line with previous results where residents' own teeth were brushed for too short a time [10]. Furthermore, in our study, *Favorable diet for oral health* was not attained, as sugary snacks were given in 80% of care units. Impaired oral hygiene resulting in accumulation of dental plaque, sugary snacks and hyposalivation increase the risk for dental caries among older people [19-20]. Dental plaque is also a risk factor for periodontal disease, which has been shown to relate to many systemic inflammatory or infectious conditions, such as cardiovascular diseases and diabetes [21]. Improving oral hygiene and diet would improve both dental health and general health among clients.

In a previous study among domiciliary care nursing staff, the awareness of cleaning and storage of removable dentures was reported to be weak. Also, in the same study, oral hygiene equipment was not regularly changed [22]. In our study, oral hygiene equipment was checked well as in the main theme "Organizational practices", almost 90% of the supervisor nurses answered that they regularly checked the condition of the oral hygiene equipment. Oral health habits among nurses seems to be important in that respect because in our study, better brushing habit was associated with higher sum scores for *Oral hygiene equipment*.

In our study, better self-efficacy in *"Managing bleeding gums"* was associated with better organization of *Professional dental services* and better *Knowledge and opinions*. Self-efficacy is formed thorough personal accomplishment, modelling and verbal persuasion [23]. Improvement of dental self-efficacy among supervisor nurses would include information about oral diseases, hands on training of oral hygiene practices to ensure personal accomplishment and verbal persuasion by encouraging nurses to organize day-to-day oral hygiene practices and dental visits in their care units. It has previously been found that improving self-efficacy among nurses improves oral health among older people [9].

Our results are parallel with previous studies which have reported that 90% of nurses brush their teeth twice a day and at least 40% of them floss once a day [24] and that 30% of nurses attended the dentist only when they have a toothache or some other dental problems [25]. It has to be noted, however, that supervisor nurses may have reported too high tooth brushing frequency when compared to females with the same age groups in a national health survey [26]. In our study, supervisor nurses' own oral health habits were associated with better "Organizational practices". It has been found that improving dental knowledge among nurses is successful in improving oral health among older people [9]. Most of the nurses in our study reported that they want to get more oral health education which is in line with previous studies which have reported that nurses are willing to receive more education about oral health care [13,27]. Oral health education for supervisor nurses would improve their own oral health habits as well as the implementation of oral health related practices in their care units.

Of *Oral hygiene practices*, the implementation of denture hygiene was well organized. Our results are parallel with a previous study where 73% of the nurses thought that dentures should be cleaned at least once a day [24]. Almost all supervisor nurses claimed that removable dentures are cleaned on daily basis. This may rise a question of too positive answers and/or thoroughness of the cleaning of the removable dentures as it has been previously reported high prevalence of denture stomatitis in long term hospitalized older people in Finland [28]. In Finland, a remarkable proportion of the old people have removable dentures, and good denture hygiene improves their oral health related quality of life and prevents candida stomatitis. Denture hygiene is also important for the systemic health because respiratory pathogens may colonize denture plaque and lead to pneumonia [29]. Thus, supervisor nurses should encourage nurses to continue to clean the dentures, preferably twice a day, and in addition, to rinse the dentures after meals.

In this study, the supervisor nurses wrote in the verbal comments that oral health care was complicated by client's memory and behavioral disorders. These comments are in line with a

pervious review where resisting clients were the most important barrier to oral care [14]. Furthermore, two supervisor nurses in our study were not interested in oral health care. In fact, it has been reported that nurses have psychological barriers to work in resident's mouth [30]; to overcome these challenges, education among nurses with possibility to free, open discussion about the challenges and barriers to oral care would be beneficial.

Strengths and limitations

Our outcome variables were the five dimensions about the implementation of oral hygiene practices. One strength of our study is that these dimensions describe main points that are important in preventive dental care in care institutions.

Another strength of this study is the new perspective of investigating supervisor nurses´ perceptions and resources for oral health care in private geriatric nursing homes in Finland. The role of the supervisor nurse in improving oral health related practices in the care unit is essential in supporting nurses in day-to-day oral hygiene practices and in organizing oral hygiene equipment and visits of dentists and dental hygienists in the unit.

A further strength of this study is its representative sample of supervisor nurses in Finland form five Regional State Administration Agencies. This means that the opinions and views of the supervisor nurses may differ between different areas of the country. For example, in urban areas where people have higher education level, the appreciation of oral health even among older people is higher than in rural areas. Consequently, this may have induced diversity in answers describing the five implementation dimensions of oral health related practices as well as in the DCBF index. However, in order to maintain the anonymity of the results, the role of the region of the supervisor nurses on the results was not analyzed.

One limitation of this study is the high non-participation rate, 58%, which may mean that non-responders include supervisor nurses who do not pay attention to clients' oral health. On the other hand, there may also be social desirability bias in the participants' answers, especially in reporting the frequency of tooth brushing and cleaning the removable dentures. Thus, both high non-participation rate and social desirability bias may have inclined results in an overly positive direction.

Practical implications

The results show that oral health care education is needed both in nursing curriculum and on the job. Education improving supervisor nurses' knowledge about oral health and elf-efficacy in daily

oral hygiene practices among clients would be beneficial. In fact, supervisor nurses expressed a wish for more dental education. Improved dental knowledge and self-efficacy may improve supervisor nurses' Orientation to oral health and help supervisor nurses to better implement both Client-related practices and Organizational practices in care units as well as provide support to nurses in day-to day oral care.

Conclusion

It can be concluded that on the base of the responses of the supervisor nurses, oral health related practices were partly implemented in private enhanced service housing units and nursing homes in Finland.

Disclosure statement

The authors declare no conflict of interest.

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Table 1. Descripitive statistics of the supervisor nurses (n=245)

	n	%
Age (year)		
<30	10	4.1
30-39	45	18.4
40-49	98	40.0
50+	92	37.5
Working experience (year)		
<5	12	4.9
5-10	24	9.8
>10	209	85.3
Working experience as a supervisor nurse (year)		
<5	74	30.2
5-10	61	24.9
>10	92	37.6
Missing data	18	7.3
Gender		
Female	237	96.7
Male	8	3.3
Other education		
Yes	195	79.6
No	50	20.4
Have you had education on cleaning the mouth of the patient during nursing education?		
Yes	196	80.0
No	49	20.0
How often do you brush your teeth?		
Twice a day	221	90.2
Once a day	23	9.4
More rarely than once a day	1	0.4
How often do you clean your interdental spaces?		
Twice a day	25	10.3

Once a day	104	42.4
More rarely than once a day	116	47.3
How often do you visit the dentist?		
Regularly	175	71.4
Irregularly	53	21.6
When I have a toothache	17	7.0

Table 2. Actual percentages of answers to the questions about implementation of oral health related practices, questions in three main themes with five dimensions. (n=245)

Questions	Yes n (%)	No n (%)
Client's daily practices		
1. Oral hygiene practices		
Does oral care take place daily for all older people, including brushing twice a day and interdental cleaning?[a]	20 (8.2)	223 (91.8)
Do you clean removable dentures once a day?[b]	239 (98.4)	4 (1.6)
2. Favorable diet for oral health		
Are mealtimes regular in your unit?	245 (100.0)	0 (0.0)
Do you give sugary snacks to the older people?[c]	198 (81.8)	44 (18.2)
Organizational practices		
3. Oral hygiene equipment		
Do you use an electric toothbrush?	68 (27.8)	177 (72.2)
Do you regularly check the condition of the oral hygiene equipment?	216 (88.2)	29 (11.8)
Is oral hygiene equipment included in your service?[d]	101 (41.4)	143 (58.6)

4. Professional dental services

Does the dentist or dental hygienist visit your unit regularly to perform a clinical tooth examination?[e]	118 (48.6)	125 (51.4)
If an older person has a toothache, do you get help the same day?[f]	149 (61.8)	92 (38.2)

Orientation for oral health

5. Knowledge for oral health care

Does your education include information on the dental care of the older people?[g]	157 (64.3)	87 (35.7)
Would you like to have more information about oral health care of older people?[h]	230 (95.0)	12 (5.0)
Do you feel that oral health care is difficult?	173 (70.6)	72 (29.4)
Did you know that good oral health care can prevent pneumonia?[i]	225 (93.0)	17 (7.0)

[a]missing value 2, [b]missing value 2, [c]missing value 3, [d]missing value 1, [e]missing value 2, [f]missing value 4, [g]missing value 1, [h]missing value 3, [i]missing value 3

Table 3. Actual percentage (%) of responses for all items (*n*=245)

Questions	Completely agree (%)	Agree (%)	No idea (%)	Disagree (%)	Completely disagree (%)
Unless an elderly person so desires no removable dentures need to be removed for the night	18.8	26.9	8.2	30.6	15.5
Removable dentures are easier to take	28.3	32.8	12.3	19.3	7.3

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care of than own teeth[a]					
Tooth brushing can prevent tooth cavitation	91.0	4.5	0.4	0	4.1
Gum diseases can be prevented[b]	81.2	13.1	0.4	0.4	4.9
I know how to prevent oral yeast inflammation[c]	41.8	41.0	7.4	5.3	4.5
I have knowledge and training about oral health of elderly	12.2	37.1	15.6	31.4	3.7
Regular tooth brushing and flossing prevent oral diseases	90.2	4.9	0	0.4	4.5
If the gums bleed while tooth brushing you should stop brushing[d]	3.7	7.8	2.0	22.6	63.9
I know how to use dental floss correctly	54.7	31.4	4.9	5.3	3.7
If the gums bleed while using dental floss you should stop flossing	4.9	5.7	14.7	29.0	45.7

[a]missing value 1, [b]missing value 1, [c]missing value 1, [d]missing value 1

Table 4. Factor loadings on factors item and Cronbach's α

Indicators	Factors and items (Cronbach's α)	Factor loadings			
		I	II	III	IV
Internal locus of control	**Prevention of oral diseases (0.830)**				
	Tooth brushing can prevent tooth cavitation	0.919			
	Regular tooth brushing and flossing prevent oral diseases	0.800			
	Gum diseases can be prevented	0.797			
	I know how to use dental floss correctly	0.510			
Oral health care beliefs	**Managing bleeding gums (0.767)**				
	If the gums bleed while tooth brushing, you should stop brushing		0.879		
	If the gums bleed while using dental floss, you should stop flossing		0.670		

Self-efficacy	**Confidence to manage oral diseases (0.534)**		
	I have knowledge and training about oral health of elderly	0.576	
	I know how to prevent oral yeast inflammation	0.587	
External locus of control	**Use of removable dentures (0.280)**		
	Removable dentures are easier to take care of than own teeth		0.281
	Unless an elderly person so desires, no dentures need to be removed for the night		0.508