



JÖNKÖPING UNIVERSITY
School of Health and Welfare

Licentiate Thesis

Dental- and nursing care collaborations in Sweden – A way to support nursing staff in oral hygiene care for older people

Isabelle Johansson

Licentiate Thesis in Health and Care Sciences

Dental- and nursing care collaborations in Sweden – A way to support
nursing staff in oral hygiene care for older people
Dissertation Series No. 099

© 2019 Isabelle Johansson

Published by
School of Health and Welfare, Jönköping University
P.O. Box 1026
SE-551 11 Jönköping
Tel. +46 36 10 10 00
www.ju.se

Printed by BrandFactory AB 2019

ISSN 1654-3602
ISBN 978-91-85835-98-0

Acknowledgements

Writing this thesis has been a privilege, a journey and hard work. A thesis addressing collaboration is not possible without collaboration. I would most sincerely like to thank everyone who has contributed in different ways, in particular:

I'm profoundly grateful to my financiers who believed in this project: The National Society for Research on Ageing, Helge Ax:son Johnsons Foundation and School of Health and Welfare.

This journey would have been impossible without my main supervisor Ulrika Lindmark who has been supervising me from the first bachelor thesis, through first grade master thesis, second grade master thesis, and now this licentiate thesis. Thank you for believing in me all the way! I would not be here today if it wasn't for you!

Thank you my co-supervisor Joy Torgé for an open door, time, engagement and your ability to always see things from another (non-dental) perspective. You have given me, my English and this thesis so much!

I would also like to thank Henrik Jansson, main supervisor at the start, for valuable input.

My research would have been impossible without Senior Alert who entrusted me with access to data material and the Public Dental Service in Region Jönköping County, staff and participants. Thank you Eva Herremo for so kindly answering every question!

My sincere thanks to Research School of Health and Welfare: the directors Bengt Fridlund and Jan Mårtensson for advice, help and support in different issues. Thank you Kajsa Linnarsson and Karolina Boberg, Research Coordinators, for help in all kind of matters, making this journey so much smoother.

Elisabeth Nylander and Stefan Carlstein at Jönköping University Library helped me with literature search, Endnote and how to write references. What an asset you are!

Thank you, my dear colleagues at the Research School of Health and Welfare, for broadening my view with your interesting research areas, transdisciplinary lunch breaks, laughter, stress-related support, and all those feministic gender-related discussions! Hanna Aahonen and Lisbeth Johansson for being sounding boards and providing support in different PhD student- and thesis-related matters.

All my amazing colleagues at Centrum för Äldretandvård and Hälsoodontologiska enheten, you have given me input, inspiration and happy cheers along the way. It's a true privilege to have the opportunity to continue to work with you for oral health in older people! Thank you, Eva-Karin Bergström, for believing and supporting me with whatever was needed; time for writing, drafting manuscripts, "fika" and crying houseplants.

Heartfelt thanks to my parents in law/neighbours/friends Inger & Roland for an unknown number of hours of reading, baking, driving the tractor and feeding your grandchildren and me. Having you as parents in law is an exercise in receiving grace.

Mum and dad for support and encouragement in life's ups and downs. My siblings for engaging discussions about everything except research, where I necessarily not have to think before I talk.

My wonderful and in every way supporting husband Andreas, taking care of every little thing so that I could do just one thing. Sixten, Arthur, Ellen and Tage for having me to iron all those picture beads and taking my mind back to what really matters in life. I love you! Thank you God, for love and grace during all seasons and all aspects of the journey of life.

Abstract

Background: Oral health is an integral part of the general health and quality of life. Yet oral health among older people requiring nursing care is often poor. Despite this group's frequent contact with health care services, they tend to lose contact with dental care. In nursing care, nursing staff are tasked to assist with oral hygiene care, but this has become more demanding as many older people retain more teeth or have advanced prosthetic constructions. Previous research in the field emphasised the need of collaboration between dental- and nursing care to support the nursing staff in this task. However, there is a lack of evidence regarding the effects of these collaborations.

Aim: The overall aim of the thesis is to examine two oral health programmes used within nursing care with different design regarding support from and collaboration with dental care.

Methods: Quantitative research methods was used. The data in Study I comes from an oral health assessments guide (ROAG-J) performed by nursing staff in a national health register. Oral health, assessed at two occasions from older people with nursing care, were used. Study II was a controlled intervention study performed at a nursing home. The intervention involved individual coaching of nursing staff in oral hygiene care by dental hygienist for four hours per week at the ward for a period of three months. Oral assessments of older people were performed by dental hygienists and questionnaires to nursing home staff were used.

Result: In Study I, 667 individuals aged 65 years or older, receiving nursing care services and assessed using ROAG-J between November 2011 and March 2014 were included. No statistically significant difference in any of the oral health variables was found between the first and subsequent assessments. At the first assessments, less than one third of participants had oral health problems. At the first assessment, status of the tongue differed in men and women ($p < .01$); at the subsequent assessment, gender differences were found in voice ($p < .05$), mucous membranes ($p < .003$), tongue ($p < .01$), and saliva ($p < .006$).

In Study II, 33 nursing staff and 48 residents participated at the baseline measurement and 22 and 32 respectively at the 9-month follow-up. The nursing staff changed in knowledge and attitudes related to gum disease, approximal cleaning, usage of fluoride and the likelihood that older persons would express the need for oral health support. The most frequently reported oral health problems among the residents pertained to teeth and gums. The residents relatively high level of oral health was stable during the study period.

Conclusions: The participants in the oral health programmes were able to maintain an acceptable level of oral health during the study periods although health was likely to decline. The nursing staff maintained a high level of knowledge and attitudes about oral health. However, there seems to be a discrepancy regarding the prevalence of oral health problems among older people. A collaboration between dental- and nursing care providers indicates a positive influence on providing oral hygiene care.

Original papers

Paper 1

Johansson, I., Jansson, H. & Lindmark, U. (2016). Oral Health Status of Older Adults in Sweden Receiving Elder Care. Findings from Nursing Assessments. *Nursing Research* 65(3): 215-223.

The article has been reprinted with the kind permission of the journal.

Paper 2

Johansson, I., Torgé, C. J. & Lindmark, U. (2019). Is an oral health coaching programme a way to sustain oral health for elderly people in nursing homes: A feasibility study. *Submitted*.

Abbreviations

CRFA	Common risk factor approach
Nursing DCBS	Nursing dental coping beliefs scale
MPS	Mucosal-plaque score
NBHW	National Board of Health and Welfare
ROAG-J	Revised Oral Assessment Guide - Jönköping
WHO	World Health Organisation

Contents

Preface.....	1
Introduction	2
Background	3
Oral health.....	3
Oral- and general health	4
Oral diseases in older people.....	5
Oral health status in older people.....	5
Older people in nursing care	6
Complexity in oral health and care needs	8
Theoretical framework – Interprofessional collaboration	10
Collaboration in earlier research and current practice.....	11
Rationale.....	14
Aims	15
Materials and methods.....	16
Research design.....	16
Participants and setting.....	17
Data collection	22
Data analysis Study I and II	26
Ethical considerations.....	27
Result.....	30

Study I30

Study II.....33

Discussion 38

 Strengths and limitations.....47

Conclusion..... 49

Implications for practice..... 50

Implications for future research 51

Svensk sammanfattning..... 52

Reference list..... 54

Preface

It was summer when I visited her. She was almost 90 years old and was lying on her bed. A nice lady, sweet and petite. I was a dental hygienist working with older people in nursing care. She took several medications and her mouth was dry. Four months earlier, a colleague of mine had met her for dental check-up without registering any dental caries. I started examining the woman's mouth with a mirror and probe and found a cavity: dental caries. Eventually, I found another one. I noted these down and continued with the probe. I ended up finding 15 manifest dental cavities, even without access to an X-ray. I found a mix of caries on root surfaces, enamel and secondary caries in very fast progression. The woman was tired, but I told her about the situation.

I went on and talked to one of the nursing staff, who explained that the woman was often too tired to eat. In agreement with the registered nurse, the staff had started giving her juice and nutritional drinks. However, she only drank about 10–20 ml at a time, so the nursing staff offered her the drinks as often as possible, to improve her nutritional status. I continued and found the responsible registered nurse to further discuss the woman's health and oral status. It was not a question of palliative care; the woman was relatively healthy except for being constantly tired. I came back to the unit and found the nursing staff on their break and explained the situation once more to make sure that everyone on duty that day received the same information. I gave recommendations about diet and supplementary fluoride, went back to the dental office and booked a dentist appointment for the woman.

The 15 dental cavities that appeared in four months continued to bother me. Could they have been prevented? Can dental care work with preventive measures in nursing care for patients like this woman?

Introduction

Oral health is and should be seen as a natural and integral part of general health. It is an essential factor for quality of life and is important for physical and mental well-being [1]. Yet, many older people can have unmet needs for oral health, despite frequent contact with healthcare services [2]. Older people receiving home care services and those that live in nursing homes are no exception [3]. For this group, their needs for oral health care may increase due to diet, medication and ailing health. Some may even have extensive help needs for oral hygiene [4] and are entitled to receive oral hygiene care.

The World Health Organization's (WHO) third sustainable development goal for 2030 is to "ensure healthy lives and promote well-being for all at all ages" [5]. The WHO has also underlined the need to focus on oral health care for among older people, through the adoption of national strategies, policies and measurable goals for oral health [6]. Without a holistic perspective on health that includes oral health and without systematic collaboration between health care workers and dental services, there is a risk that older people's oral health can be neglected in the shadow of other somatic diseases.

This thesis is about two oral health programmes in nursing care that both aim to improve the oral health of older people but use different approaches and designs regarding the type of collaboration and support from dental care.

Background

Oral health

The WHO has long espoused a holistic perspective of health that includes oral health. In line with the WHO's perspective, the World Dental Federation (FDI) has created a definition of oral health. With consultation from e.g., dental care, politics, patients, research and medical care, the definition can be widely used.

The understanding of oral health in this thesis is based on this definition that includes both physical and psychological aspects as well as objective and subjective experiences of oral health:

Oral health is multi-faceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow and convey a range of emotions through facial expressions with confidence and without pain, discomfort and disease of the craniofacial complex.

Further attributes related to the definition state that oral health:

- *is a fundamental component of health and physical and mental well-being. It exists along a continuum influenced by the values and attitudes of individuals and communities;*
- *reflects the physiological, social and psychological attributes that are essential to the quality of life;*
- *is influenced by the individual's changing experiences, perceptions, expectations and ability to adapt to circumstances.* [1]^(p3)

Studies that have used interviews with older people confirm that the oral health affects many aspects of their life. Problems in the oral cavity not only affects the body but also social life and well-being [7-9]. For example, keeping one's own teeth was valued as something important, not simply to be free from pain and discomfort [8, 9] or to be able to chew properly to get nutrition [7-9]. It was also deemed important for the enjoyment of food and the feeling taste and consistency [9]. Oral health is also an important factor in social life, as it affects appearance [7-9], speaking and communication [7, 8]. With good oral health and hygiene – such as having a fresh breath – one can feel secure

and confident in social contexts [7]. A healthy mouth can strengthen self-confidence [10].

There are many factors influencing the oral health of older people. A model by Newton & Bower [11] illustrates how government policy, parental socioeconomic position, environment, employment, education, oral health behaviours, psychosocial stress, income and culture all directly or indirectly affect oral health regardless of age. Access to dental care, informal care (care and support by friends and family) and one's financial situation [12] has also been identified as specific factors affecting the oral health of older people.

In this thesis, the understanding of oral health is considered as multi-dimensional and multifactorial, although the studies included mainly address the physical aspects of oral health.

Oral- and general health

Many general health conditions are related to oral health and poor oral health is strongly connected to poor oral hygiene [4]. Poor oral hygiene has a negative impact on overall health and is associated with health conditions including cardiovascular diseases [13], diabetes [14] and respiratory diseases [15], malnutrition [16] and involuntary weight loss [17]. Poor oral health can also cause infection, pain and discomfort in the mouth, that can in turn impair well-being, self-esteem and social relationships [18].

A variety of oral health conditions also affect each other. One example of this is the decrease in salivary flow (hyposalivation), which is more common with increasing age, especially among women [19]. Hyposalivation is a common side effect of many drugs such as anticholinergics, diuretics, psychopharmaceuticals, antihistamines and some inhalation drugs. Polypharmacy, or the use of six or more drugs, increases the risk even more [20]. It is not only uncomfortable, but also affects speaking, chewing, swallowing and wearing of dental prostheses [21]. Because saliva plays an important role in eating meals [7], hyposalivation also affects nutrition [16]. Saliva is a protector for caries, implying that one oral health condition can lead to other conditions if left untreated [22].

Oral diseases in older people

Physical changes caused by ageing make it more difficult to maintain oral health [23], which can lead to an increased risk for oral diseases such as dental caries (tooth decay/cavities), gingivitis (inflammation of the gums), periodontitis (tooth loss) and oral candidiasis. The prevalence of dental caries and periodontitis is higher among older people [24] and root caries is common especially among older people [25].

Hyposalivation is a common reason for dental caries, aggravated by exposed dentin, changes in eating habits and decreased oral motor function which prolongs oral clearance [19]. The prevalence of periodontitis increases with age and in western Europe the incidence peaks at the age of 65 [26]. Among people who used dental care services in Sweden in 2017, about 27% of the population aged 50-70 years and 34% aged over 80 years had some degree of periodontitis [27]. The risk for oral candidiasis increases with reduced immune resistance that can be caused by other diseases or by local oral factors including a lack of oral hygiene, hyposalivation and suboptimal prosthesis [21]. To maintain or improve oral health, achieving good oral hygiene is important. However, the ability to do so can also be reduced with age as well as functional impairments [23]. One's attitude to oral health may also change. For instance, there is a tendency to decrease one's expectations on oral health as one gets older [28] and increasingly base the perception of oral health on the absence of pain [9].

Oral health status in older people

Historically, the oral health status of older people has improved steadily in the population and many older people have advanced prosthetic constructions – both tooth and implant supported – in Sweden [24] and many other countries [6]. Edentulousness is decreasing constantly which is shown in the Jönköping studies where the number of edentulous individuals aged 40–70 years old decreased from 16% in 1973 to 0.3% in 2013. Also, complete dentitions were found in almost all 60-year olds. Among the dentate individuals, 70-year olds had on average 22.5 teeth, and 80-year olds had 21.1 teeth [24]. These results are in line with other Swedish studies [29, 30]. One of the reasons for the improved oral health in older people in Sweden, is the regular contact with dental care, at least before the need for extensive nursing care. In the age

groups 60–69 and 70–79, 79% and 82% respectively, visited a dental clinic on a regular basis between 2014 and 2016 [31].

Older people in nursing care

Older people and care needs

The demographic development shows an increasing number of older people in the world [32] and in Sweden [33]. Although older people are often defined as those 65 years or older – a definition also adopted in this thesis – it is worth noting that this refers merely to chronological age, without considering the wide variation on health and biological ageing of individuals in this group. Older people are not a homogenous group but are unique in terms of personality, social context and life history. One can be alone, or have a broad circle of family, relatives and friends. They also have different levels of care needs, with some experiencing complete health, while others suffer from functional or cognitive impairments or multiple diseases.

In trying to assess the level of help and care needs for older people, dental care and nursing care can use different definitions. In the area of dental care, Ettinger & Beck [34] proposed a classification where older people can be considered as independent, frail or dependent. Using this typology, an older person is “independent” when he or she can manage daily life without need for support. A “frail” person has an age-related reduced reserve capacity and can gradually become more dependent on others to manage daily life. The term “dependent” refers to the situation where an older person requires the help of others for activities of daily living. In the nursing care area, the Swedish National Board of Health and Welfare (NBWH) provides the definition of a frail older person as one who is aged 65 years or older and has either 25 or more hours with home care service or is living in a nursing home. This includes Ettinger & Beck’s definition of both frail and dependent. According to the NBWH definition, Sweden had about 300 000 frail older persons in 2014 [35]. In 2015, they also estimated that 13% of those older than 80 years lived in nursing homes and had extensive needs [36] that made them dependent on help.

Nursing care

The older person can receive different types of care depending on their care needs. Nursing care in this thesis refers to tax-subsidised old age care performed by formal carers, either by public or private operators, including both nursing homes (also called retirement homes in Study 1) and home care service. A majority of nursing care in Sweden is operated by local municipalities, but even nursing care by private operators are publicly financed [36].

In Sweden, the municipalities are responsible for the nursing care and needs assessments determines eligibility. A specially trained social worker – the needs assessor – assesses the older person’s needs of care and requirements of safety and security [37]. When one’s needs can no longer be met in the ordinary residence with home care services, a transition to a nursing home may be necessary. Nursing homes are group homes where the residents rent an apartment or room via tenancy agreements, but there is 24-hour access to nursing staff. Registered nurses are on site each day and physicians are on site usually once a week for consultation. Other professionals such as physiotherapists, occupational therapists and dieticians may also be present [37]. Yet, in this setting, dental staff are often not involved in the care of the older person [38].

The number of nursing homes apartments has decreased by approximately 25% between 2001 and 2012 [39], despite the increasing number of older people [33]. The idea behind this is of “aging in place”, meaning that the person should be supported in living at home and receive help through home care services as long as possible [37]. As nursing home residents are to a larger extent in the terminal phase of life when moving to nursing home, the time older people live in nursing home is decreasing, with a higher proportion of older people dying shortly after the nursing home transition [40].

Nursing staff

Nursing staff are groups of employees with or without formal education, such as nurse assistants or care assistants, who are involved in the daily care of older people. In 2013, approximately 379 000 persons were working within nursing care in Sweden. The level of education among the staff varies. In the 2013, about 40% of them had education in health and social care as the highest achieved level of education. Among the rest of the staff, 36% had other upper secondary school education, 16% had higher education at university level but

no degree and the remaining 8% had education from elementary school. Approximately 90% of the employed were women [41].

As a part of current practice, oral hygiene care is included in nursing care and the staff are responsible for oral hygiene care. Oral hygiene care can refer to e.g., tooth brushing, cleaning of interdental surfaces and moisturising lips and mucosa [42]. Oral hygiene care is a task that has changed in response to the improvement of oral health. What previously consisted as a task of mainly brushing dentures, now deals with the care of more teeth in the mouth as well as advanced constructions such as dental implants [24].

The nursing staff can find it difficult to perform oral hygiene care for different reasons [43-46]. The nature of the oral hygiene care work itself, as well as personal oral health behaviours of the staff, can affect how the oral hygiene care is prioritised in nursing homes [47]. The attitudes of nursing staff [48]; education and knowledge [46]; experiences of performing oral hygiene care [46]; previous experiences of dental care; dental fear [47, 49]; coping with patients' resistance and lack of time [46] are identified as factors affecting performing oral hygiene care. Also, several factors concerning the older people themselves affect oral hygiene care, such as restraining behaviour [46, 50], care dependence [12, 50] and medication [50]. The oral status and individual recommendation from dental care of the resident can affect how oral hygiene care is performed. For instance, prosthesis that can be taken out of the mouth is easier to clean than advanced osseointegrated prosthetic constructions [49]. Practically orientated training of nursing staff in oral hygiene care is recommended in earlier research [4]. Overall, knowledge about nursing staff and their contribution to oral health is important [4, 6, 35, 44, 45].

Complexity in oral health and care needs

The oral health situation for older people is complex. On the one hand, the oral health status in older people has changed with increased number of teeth and advanced prosthetic construction [24]. However, ageing with its physical changes can make it difficult to maintain oral health, and the risk for oral diseases increases [23].

The situation for oral health in older people can differ depending on the level of care needs. Frail older people tend to lose contact with dental care services some time before moving to nursing homes. There is a connection between

increasing age and increasing tendency to lose contact with dental care, compared to previous regular visits to dental care services. Having no contact with dental care services is closely linked with poor oral health. Reasons for losing contact can be reduced ability due to changes in physical and mental health (due to age or diseases), as well as access to the dental clinic [51]. The oral health status during admission to nursing care may have a significant impact on continued state of oral health [12, 52].

Studies establish that a large proportion of dependent older people in nursing homes in Sweden do not have adequate oral health and hygiene [3, 53]. Adults (aged 18-64) and older people living in their own housing [24] have better oral health and oral hygiene than those in nursing homes. Regarding dental caries, Andersson et al. found that 67.7% of the dentate residents in nursing homes had clinically verifiable manifest caries in an average 5.0 teeth [3], while Norderyd et al. [24] found that an older adult population of 70–80 years old had 1.3–2.9 caries lesions. Norderyd et al. included both clinically and radiographically verifiable initial and manifest caries, while Andersson et al. included only clinically verifiable manifest caries, indicating that the gap between the groups probably is even bigger. Further, persons with cognitive impairment have poor oral health and are more likely to get oral health problems compared to those without cognitive impairments [50].

There is a paradox that frail older people tend to lose contact with dental care [51], while increasing their contact with health care services [2]. Dependent older people in nursing homes have constant contact with health care services and yet they have the poorest oral health.

Older people in nursing care can have a complex situation and the goal of the dental treatment needs to be adapted to the general condition. For a healthy person, dental care often aims to improve and restore health, while for a frail person it may be to maintain health and oral function. For a dependent person, the aim may be to delay oral health problems, or to relieve pain in the final stage of life. To the dental treatment outcome of the older person, collaboration between dental care and other actors involved in the daily care of the older person is essential [54].

Theoretical framework – Interprofessional collaboration

Interprofessional collaborations are recommended by the WHO as a strategy to meet the needs in future health care, impacted by e.g. the shortage of health care workers. In this thesis, the term interprofessional collaboration is defined as a process where professions work together – in this care dental care and nursing care – to deliver care of the highest quality [55]. Interprofessional collaboration can be made through working together and sharing knowledge and experiences and involves a negotiated agreement [56]. The goal of interprofessional collaboration is synergy, where a group of people achieves more when working together than on their own, as they combine their resources, knowledge and skills [57]. Interprofessional collaborations can have positive outcomes for the patients and health care workers, such as decreased mortality rates, decreased hospital admissions and reduced staff turnover. It also helps to achieve a broader view of what determines health [55].

Strategies and programmes to target oral health seem to be more efficient when health workers of different professions works together towards a common health risk factor. This approach is called the Common Risk Factor Approach (CRFA). According to this approach, oral diseases and general diseases has common risk factors. For example, diet may not only affect dental caries but also diabetes, cardiovascular diseases and cancer. Therefore, an interprofessional collaboration between dental care and health care to address diet has a higher probability to have an impact and minimize the risk for contradictory messages [58]. WHO recommends collaboration in the health care sector based on CRFA [6].

Interprofessional collaboration demands knowledge and a common view on the values, task, objective and understanding of the context. Mutual understanding and respect of the other professions, competence and responsibilities and a common base of values is also of importance [59]. Dental- and nursing care share common values regarding the ethical principle about autonomy, non-maleficence, beneficence and justice and are both regulated by laws. Further, they have a common definition of health from the WHO and a definition of oral health from FDI that both parties can agree on. In Sweden, there are no hindrances for collaboration around patients regarding sharing information, but there are practical and technological issues [60].

Interprofessional collaboration is to be further implemented within health care in Sweden and is identified as one of the six core competencies for healthcare professionals: person-centred care, team collaboration, evidence-based care, improvement knowledge for quality development, safety of care and informatics. These core competences are made an agreement between The Swedish Society of Nursing, the Swedish Society of Medicine, Sweden's Association of Occupational Therapy, Swedish Association of Physiotherapists, the Swedish Association of Clinical Dietitians, and the Swedish Dental Association, all aiming to create a high level of patient safety and quality of care [61]. The Swedish Dental Association and the Public Dental Service acknowledge the need for increased collaboration between the actors around older people for oral health in a policy [54, 62]. Interprofessional collaboration with actors from health care is also a part of the dental hygienists' competence description [63].

The National Board of Health and Welfare in Sweden is mapping and analysing barriers to collaboration between dental care and health care to give proposals for goals and measures to improve collaboration. The mapping showed that there is mainly consensus in dental- and health care regarding barriers and solutions for collaboration. Dental care sees a significantly greater need for collaboration than health care [60].

Collaboration in earlier research and current practice

Several studies have been performed evaluating different oral health interventions or programmes in nursing care, often initiated by dental care services. The National Board of Health and Welfare in Sweden performed a systematic review aiming at evaluating the effect of oral hygiene interventions performed by nursing staff in nursing care. The reliability was poor, mainly because of the low number of participants in the study [35]. There is a lack of evidence concerning the effectiveness of oral health education for improving the oral health of older people [64], which may be due to high staff turnover [65, 66].

However, few articles are published with the label of interprofessional/interdisciplinary collaborations between dental care and nursing care. The studies are small in sample size – often pilot studies – and deal with collaboration in various settings and extent and do not evaluate the outcome of the collaboration. The research does not provide a clear overall picture of the subject. A

literature review performed by the NBHW (2019) regarding the collaboration between dental care and health care enhances that picture and concluded that more research is needed [60]. There is a lack of evidence regarding the effect of collaborations between dental and nursing care. However, many articles about oral health in nursing care state in their conclusions that collaboration between dental care and nursing care is needed. The discussions about the oral health care for older people in nursing care and the need for collaboration have further been stressed in scholarly debates. These date back to early the 2000s, indicating that the question has been raised during the last two decades [59, 67-70]. Overall, researchers nationally and internationally seem to agree that collaboration is needed for the oral health of older people in nursing care, even if the research evidence is currently insufficient.

The strategic work with the oral health of older people is carried out in different ways. The older person can receive financial support for dental care, depending on their health and care needs. The financial support varies from regular allowance for preventive care to dental care to the same subsidised price tariff as healthcare [71]. The Swedish Public Dental Service has special centres to undertake research and spread knowledge about the oral health of older people to health professionals and organisations working with older people and to support dental care [72]. In this thesis, dental care refers to both the Public Dental Service and private dental clinics.

There are projects and local initiatives including different actions to improve oral health among older people and support nursing care in Sweden. The Public Dental Service in Region Västra Götaland are trying to strengthen the collaboration between dental care and nursing care through employing dental hygienists in four municipalities to serve as expert advisers regarding oral health in older people. They also support and educate old age care in oral health matters and to put the oral health of older people on the agenda [73].

On a national level there are two main strategies in progress, where collaborations are made to a different extent:

Dental outreach activities under the Dental Regulation

A reform on 1 January 1999 made it possible for people with certain disabilities and extensive long-term care needs to be offered dental care at a lower cost. As a part of this reform, these groups are offered a free oral assessment

at home by dentist or dental hygienist, including recommendations regarding oral hygiene, dental care and level of help needed with oral hygiene care. Nursing staff are offered a free lesson in oral health care education on a yearly basis [71]. Dental care traditionally works separately from nursing care except for these activities [38].

Senior Alert

Senior Alert is a Swedish national web-based quality register aiming to develop, improve and secure quality of care for people aged over 65 years through risk assessments in falls, pressure sores, malnourishment, bladder dysfunction and oral health. The instrument and the preventive actions used in the risk assessments are evidence-based. The instrument Revised Oral Assessment Guide – Jönköping (ROAG-J), are used for measuring oral health [74]. The national implementation of Senior Alert was a part of a government effort ‘Coordinated health and social care for the most severely ill elderly people’. One of the goals for the effort was to stimulate collaboration and that care should be individualised and coordinated across specialty and organisational boundaries [75].

Although the Dental Regulation has been in action since 1999 and Senior Alert on a national level since 2010, there are still great oral health needs in nursing care [3]. Nursing care services may not be able to handle oral health care alone but needs assistance from dental care services on a regular basis [43, 45, 76]. Establishing interprofessional collaboration can be a way to further support nursing staff in the oral health care service [69].

Rationale

The oral health status of older people has improved [24], representing a positive development that also entails risks for an ageing population. The contact with dental care providers decreases as the contact with health care providers increases with growing age. The Swedish law for dental care (1985:125) [77] claims that dentistry should provide good oral health and dental care on equal conditions for the entire population. There is a gap in oral health between older people [3] and the rest of the average adult population [24], which merits focusing on this group. Older people in nursing care are vulnerable and the Swedish National Board of Health and Welfare has identified the lack of interaction between dental care and health care providers as a challenge that affects older people [60]. The risk of pain, malnutrition, suffering and time-consuming treatments is reduced if good oral hygiene is achieved. The nursing staff plays a key role in the improving the oral health of the residents since they are the ones performing daily care. Research has suggested that the responsibility for the daily oral hygiene care cannot rest on nursing staff alone but needs support from dental care which may not be given [43, 45, 62, 76]. Collaboration between dental care and nursing care providers has been suggested throughout the years, but studies examining the effect of collaboration are few in number and in small settings. Despite the lack of evidence, there seems to be agreement about the importance of collaboration. Further knowledge about dental- and nursing care collaborations can lead to an increased quality of oral hygiene care and better oral hygiene and dental care for older people, nursing staff and nursing care providers. The two oral health programmes represented in this thesis can provide valuable knowledge about how dental care, in different ways, can support nursing care and is a contribution to the limited research about collaboration between dental and nursing care.

Aims

The overall aim of the thesis was to examine two oral health programmes in nursing care in Sweden, with different designs regarding support from and collaboration with dental care.

The specific aims were as follows.

- To describe oral health status of older people according to mouth assessments performed by nursing staff in daily nursing care. (Study I)
- To examine the feasibility of an oral health coaching programme to influence their oral health beliefs and the oral health of nursing home residents. (Study II)

Materials and methods

Research design

Quantitative longitudinal and prospective designs were used in this thesis, one study based on data from a quality register and one an intervention study. Table 1 shows an overview of each design.

A longitudinal study is characterised by making comparisons over time, with data collection occurring at more than one point of time and studying a time related process. A prospective design study a presumed cause, here dental support to nursing care, and follows up on an outcome ahead in time, here oral health status [78]. Study I used data from the quality registrar Senior Alert at two occasions. Study II evaluated the feasibility of a coaching programme (Table 1).

Table 1. Overview of study I-II.

Study	Design	Sample	Data Collection	Data analyses
I	Quantitative Longitudinal Prospective	667 older persons in varied housing ^{a)}	Register data from Senior Alert. ROAG- J ^{b)} assessments by Nurses	Non-parametric tests: Wilcoxon signed rank test, Chi-square test, Kruskal Wallis test and Spearman correlation.
II	Quantitative Longitudinal Prospective	33 nursing staff and 46 older per- sons in nursing home	ROAG-J and MPS ^{c)} assessments by dental hygienists, DCBS ^{d)} to staff	Descriptive statistics, Regression analysis.

^{a)} short-term accommodation; own homes with care by home care teams; nursing homes and accommodation provided according to the Swedish Act concerning Support and Service for Persons with Certain Functional Impairments

^{b)} Reversed Oral Assessment Guide -Jönköping

^{c)} Mucosal Plaque Score

^{d)} Dental Coping Beliefs Scale

Participants and setting

Study I

The sample in Study I were enrolled in the nursing care and had chosen to participate in the register Senior Alert in a selected municipality (approximately 100 000 inhabitants) in Sweden. Data from both private and public operators were included. Different types of settings were included: short-term accommodation; ordinary housing with care by home care teams; nursing homes (which also included facilities for people with dementia); and accommodation provided according to the Swedish Act concerning Support and Service for Persons with Certain Functional Impairments (LSS housing, which is a type of group home) [79]. The nursing care service in the included municipality has systematically performed ROAG-J assessments since 2011 and had a sufficiently large amount of data over time for analysis, making this municipality the most appropriate to be evaluated compared to other municipalities in Sweden.

Participant Characteristics

Assessments from a total of 667 individuals (where of women 66.8%) formed the data for this study. The age varied between 65 and 104 years (mean age 86.2, $SD = 7.7$). The number of ROAG-J assessments on individual level varied between 2 and 9 per participant ($Mdn = 2$). The time between the first and subsequent assessment varied between 0.5–27 months and the mean length of time was 5 months.

The number of participants in LSS housing was 10 (1.5%) at both assessments. At baseline 3.3% ($n=22$) of the population had home care service and 12.6% ($n=84$) stayed in short term accommodation, which decreased to 2.5% ($n=17$) and 2.5% ($n=17$) respectively. Most of the participants lived in retirement accommodation, 82.6% ($n=551$) at baseline and 93.4% ($n=623$) at the subsequent assessment.

Study II

Study II was performed at a medium-sized nursing home, consisting of four wards and one service housing, with room for 125 residents. The employees

included 85 staff involved in daily care and four registered nurses with medical responsibility. Three wards including residents with different somatic and cognitive impairments were randomly selected with no particular priority. Data was collected from the residents at baseline and after three, six and nine months, and from nursing staff at baseline and after nine months. Participants and flowchart are shown in Figure 1.

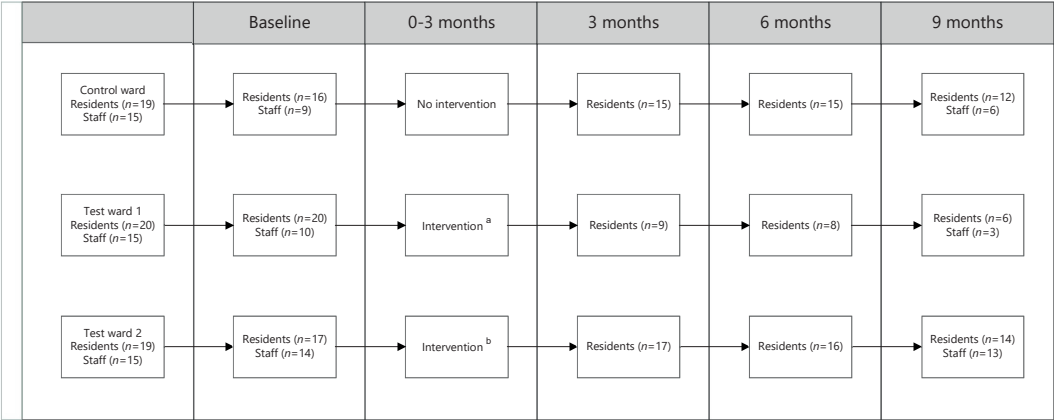


Figure 1. Participants and flowchart in Study II. ^a) Coaching (3 months), ^b) Coaching (3 months) & Fluoride rinse (9 months).

Nursing staff

All regular nursing staff ($n=45$), and registered nurses ($n=3$) for the selected wards, were invited to participate in the study. The inclusion criteria were that they were working full- or part time at the selected wards, regardless of length of employment. Nursing staff with temporary employments were excluded. Of the total invited staff, 33 individuals chose to participate at baseline and 22 at follow-up, nine months later. At follow-up, 5 of the staff had changed wards within the nursing home but were still invited to complete the follow-up questionnaire. Three had ended their employment during the study period.

The response rate on the nursing Dental Coping Belief Scale (DCBS) was 69% ($n=33$) at baseline and 49% at follow-up ($n=22$). Women were overrepresented (93.8 %) and most of the staff were trained nurse assistants (71.9 %). The age varied between 24–63, and the mean age was 44.3 years at baseline. The staff had 2–33 years of experience from working in the nursing care (mean 13.8 at baseline and 16.3 at follow-up). A majority of the participants had received oral care education; 81.3% at baseline and 100% at follow-up, mostly in the workplace or as a part of their formal education.

Residents

All residents ($n=58$) at the three selected wards were invited to participate. Regarding residents unable to express informed consent because of cognitive impairments, close relatives were asked for informed consent. Nine residents died during the study: two at the control ward, four at test ward 1, and 3 at test ward 2.

In total, 48 residents participated in the study (Table 2). Depending on the time of assessment, the number of participating women varied between 28–39 (84.4% to 87.5%) and men between 4-7 (12.5% to 15,2%). The mean age for the residents varied between 88.3 years and 89.8 years at the different times for the assessments.

Table 2. Background variables of the participants at baseline, and after 3, 6 and 9 months for each ward.

		Participants <i>n</i> (%)	Women <i>n</i> (%)	Men <i>n</i> (%)	Age mean	Age min-max
Nursing staff	Baseline, total	33 (100)	30 (93.8)	2 (6.3)	44.3	24–63
	Control ward	9 (27.3)	8 (24.2)	0 (0)	46.0	26–62
	Test ward 1	10 (30.3)	9 (27.3)	1 (3.0)	42.1	24–62
	Test ward 2	14 (42.4)	13 (39.4)	1 (3.0)	44.9	27–63
	9 months, total	22 (100)	20 (90.9)	1 (4.5)	47.2	28–64
	Control ward	6 (27.3)	4 (18.2)	0 (0)	51.2	40–63
	Test ward 1	3 (13.6)	2 (9.1)	0 (0)	46.0	32–54
	Test ward 2	13 (59.1)	12 (54.5)	1 (4.5)	45.6	28–64
	Baseline, total	46 (100)	39 (84.8)	7 (15.2)	88.7	73–98
	Control ward	16 (34.8)	15 (32.6)	1 (2.2)	88.9	77–97
Residents	Test ward 1	13 (28.3)	11 (23.9)	2 (4.3)	90.5	84–96
	Test ward 2	17 (37.0)	14 (30.4)	3 (6.5)	87.2	73–98
	3months, total	41 (100)	36 (87.8)	5 (12.2)	89.8	74–103
	Control ward	14 (34.1)	13 (31.7)	1 (2.4)	91.4	78–103
	Test ward 1	9 (22.0)	8 (19.5)	1 (2.4)	90.8	85–96
	Test ward 2	18 (43.9)	15 (36.5)	3 (7.3)	88.1	74–99
	6months, total	39 (100)	34 (87.2)	5 (12.8)	89.1	74–103
	Control ward	14 (35.9)	13 (33.3)	1 (2.6)	90.0	78–103
	Test ward 1	8 (20.5)	7 (17.9)	1 (2.6)	90.0	85–95
	Test ward 2	17 (43.6)	14 (35.9)	3 (7.7)	87.8	74–99
	9months, total	32 (100)	28 (87.5)	4 (12.5)	88.3	74–99
	Control ward	11 (34.4)	10 (31.3)	1 (3.1)	89.5	78–99
	Test ward 1	6 (18.8)	6 (18.8)	0 (0)	89.2	85–95
	Test ward 2	15 (46.9)	11 (34.4)	4 (12.5)	87.0	74–99

According to the ROAG-J assessments performed by the dental hygienists, most of the participants had their own teeth, but 12 had prostheses (complete or partial prostheses) and 5 had implants (from single tooth to full mouth) at baseline.

Intervention

The wards were randomly selected to be the control ward, test ward 1 and test ward 2. At the control ward, no interventions were made i.e. business as usual, while at test ward 1 & 2, an oral health coaching programme were performed. Two dental hygienists employed at the Swedish Public Dental Service carried out the intervention. They had education and experience from dental outreach activities under the Dental Regulation and local initiatives concerning oral

health in older people, carried out the intervention. The dental hygienists were at the wards four hours per week for three months to support the nursing staff through observing, giving advice, supporting, encouraging, answering oral care questions, giving training and acting as a coach in the daily oral care of residents. The main idea of the intervention is based on the knowledge that the presence of dental professionals in nursing care, as well as oral hygiene training and education for nursing staff, are identified as facilitators for providing oral hygiene [46].

Behavioural determinants are defined as generic sets of beliefs. By changing the determinants of a certain behaviour, a behaviour can be changed [96]. In this thesis, behaviour change methods target what earlier research has identified as barriers for performing oral hygiene care, such as low priority of oral hygiene care [45]; negative attitudes [44]; experienced difficulty in performing tasks; lack of education and difficulties in handling patients' resistance [43]. Coaching aimed to strengthen the self-efficacy, develop trust and establish relationships with the nursing staff. The programme aimed to influence the nursing staff's behaviour through facilitation, knowledge, modelling, feedback and consciousness raising according to a taxonomy of behaviour change methods [80]. At test ward 2, the residents were offered daily fluoride rinse (10 ml NaF 0,2%), as a preventative measure [81] and as a trigger to raise oral health awareness among the nursing staff on a daily basis.

The dental hygienists performing the intervention were asked to keep logbooks and write their experiences after each visit in the nursing home. The notes could also include suggestions of improvements for the oral health coaching programme. The logbooks were kept in digital form in the dental hygienists' personal computers at the work place, which could only be reached with a personal code. After the study period the logbooks were sent to the authors. The logbooks were coded, and individual staff could not be identified. The dental hygienists were from the beginning informed of the purpose of the logbooks.

Data collection

Study I

Study I was based on data from the register Senior Alert. The analysis is made on data of assessments of individuals aged 65 years or older who were enrolled in nursing care in the selected municipality and who had taken part in two or more ROAG-J registered between November 2011 and March 2014.

Revised Oral Assessment Guide – Jönköping (ROAG-J)

ROAG is a standardized measurement instrument developed for health professionals (nursing staff, registered nurses, physicians) for the detection, examination and documentation of problems in the mouth. It is to be carried out on a regular basis: a recommendation is twice a year or when there is a change in the general health [74]. ROAG evaluates oral health by assessing the condition of the voice, lips, mucous membrane, tongue, gums, teeth, saliva, swallowing and any prostheses/implants (Table 3). Each item is scored, where score 1 indicates health, score 2 indicates moderate ill-health and score 3 indicates major signs of ill health [82]. The inter-rater reliability of ROAG has been evaluated in previous studies, showing K value = 0.38-1.00 [83] and K value = 0.45-0.84 [82]. Altogether, the items showed moderate to very good inter-rater reliability, with highest agreement in the items voice and swallow, [84], but lower inter-rater reliability in the items tongue, teeth, dentures. Above this, ROAG-J is an adapted version of ROAG where recommendations about care, i.e., planned measures, have been added such as improving oral hygiene or other actions that can be taken by the health professional, or dental or medical care.

TABLE 3. Revised Oral Assessment Guide- Jönköping: Scoring Guide

Item	Grade 0	Grade 1	Grade 2	Grade 3
Lips		Smooth; bright red; moist	Dry, cracked, sore corners of the mouth	Ulcerated, bleeding
Voice		Normal voice	Dry, hoarse, smacking	Difficult to speak
Mucous membrane		Bright red; moist	Red; dry or areas of discoloration, coating	Wounds, with or without bleeding, blisters
Tongue		Pink, moist with papillae	No papillae, red, dry coating	Ulcers with or without bleeding, blistering
Gums	No gums, only oral mucosa	Light red and solid	Swollen, reddened	Spontaneous bleeding
Teeth	No natural teeth	Clean; no visible coating, leftovers	Coating or leftovers locally	Coating, leftovers generally or broken teeth
Dentures	No prosthetic	Clean; works	Coating or leftovers	Not used or malfunctioning
Saliva		Runs freely	Runs sluggishly	Does not run at all
Swallow	Not relevant to assess	Normal swallow	Some pain or difficulty on swallowing	Unable to swallow

Note. Grade 0–1 does not require any actions. Deviations of grade 2 are to be treated by the nursing staff at the unit with recommended planned measures. The recommendation for deviations of grade 3 is to contact a dentist or physician for treatment [87].

Study II

Nursing staff

All nursing staff were invited to an information meeting about the study with representatives of the Swedish Public Dental Service Jönköping, a researcher from Jönköping University and one of the dental hygienists who was going to carry out the oral health programme. The nursing staff were given oral and written information about the study. The questionnaires were distributed together with written information about the study. Since a substantial proportion of the nursing staff were not present at the information meeting, written information and the questionnaire were distributed to them later. A completed questionnaire was considered as consent. The questionnaire was completed by the nursing staff at baseline and again after 9 months. The follow-up questionnaire after 9 months was placed in the nursing staff's room at their work place, with an allowance of three weeks for answering. The nursing staff were instructed to put the questionnaires in an envelope. At both times, the nursing staff put the questionnaires anonymously in an envelope at the ward, which was collected by the manager of the nursing home who gave or sent them to

the author. The questionnaires were not coded, which is why a drop-out analysis could not be performed.

Questionnaire – nursing staff

The questionnaire involved five questions about the respondents' background. Facts were added to the questionnaire, i.e., sex, age, number of years working in nursing care, position (registered nurse, nurse assistant with a 1.5-year formal education, or nurse assistant without formal education), and oral health care training. The question about oral health care training refers to whether the training was received in formal education or at the yearly one-hour training recommended by the Swedish Ministry of Health and Social Affairs [85]. In the follow-up questionnaire, two questions were added about whether they completed the questionnaire at baseline or not and if they worked at the nursing home at the time for the intervention. Staff took approximately 10-15 minutes to fill in the questionnaire.

The effect of the oral health coaching programme was evaluated in the nursing Dental Coping Beliefs Scale (DCBS) [86]. The nursing DCBS is an instrument measuring knowledge and attitudes towards oral health related conditions and problems and was developed to measure oral health care priority among nursing staff working in hospital wards and nursing homes over time and between groups. Three models that emphasised the role of cognition, Self-efficacy, Locus of Control and Self-Instructional Techniques was used in the instrument. The instrument is validated in a similar population. The nursing DCBS includes 28 items on a 5-point Lickert scale, where the total score can vary from 7 to 35 per subscale. A lower score indicates good oral health care knowledge and high priority for oral care. A higher total score indicates poor oral health care knowledge and low priority for oral care. The items are divided into four subscales with seven items for each scale: Oral Health Care Beliefs (OHCB), Self-Efficacy (SE), Internal Locus of control (IL) and External Locus of control (EL) [86].

Oral Health Care Beliefs (OHCB) measures beliefs, knowledge and misconceptions about oral health and care. In this instrument the questions measuring OHCB concern for example oral diseases and when to visit the dentist. Self-Efficacy (SE) is a social cognitive theory and describes a person's beliefs or confidence in being able to cope with an act in a specific situation. It determines the behaviours of people; what they choose to engage in and also the

perseverance when they face challenges [87]. In this instrument the questions measuring SE concern (for example) the ability to floss, brush, reduce oral diseases and the ability if further education was given. The theory of **Health Locus of Control** concerns the likelihood to engage is influenced by expectancy and reinforcement value, where the theory about internal, and external locus of control is one of the most influential expectancy concepts. The theory is about the degree of personal control in daily life. A person with a large extent of **internal locus (IL) of control** believes that life outcomes are dependent on their own behaviour and are under personal control. A person with a large extent of **external locus (EL) of control** believes that life outcomes depend on luck, chance or powerful others, outside their direct control [88]. In the nursing DCBS the questions regarding IL concerns (for example) if oral hygiene care can prevent oral diseases and the impact of ageing. The questions regarding EL concern for example to what extent heredity, diseases, medication and ageing affects oral health.

Residents

All residents were invited to an information meeting about the studies, together with representatives of the Swedish Public Dental Service, Jönköping and one of the dental hygienists who was going to carry out the programme. The residents were given oral and written information about the study and were asked to give a written consent. Participants identified by the registered nurse as unable to give an informed consent due to cognitive impairments were invited and their close relatives were asked for informed consent.

Clinical examination - residents

The residents' oral health was measured using ROAG-J [82] and Mucosal-Plaque Score (MPS) [89]. The assessments were performed at baseline and after three, six and nine months in the nursing home on the participating residents by two experienced registered dental hygienists trained and calibrated to assess ROAG-J and MPS, and one assisting dental hygienist. The training and calibration were made through performing ROAG-J and MPS assessments on patients, supported by reference pictures and discussing the scoring together. This was made one month before the study started. The ROAG-J and MPS assessments were always performed with one dental hygienist making the assessments and the other dental hygienist assisting.

MPS is an index measuring the condition of mucosa and gums for evaluating oral health and oral hygiene in persons in hospitals, nursing homes and other institutions. The mucosa is measured in Mucosal Score (MS) and dental plaque in Plaque Score (PS), both ranged 1–4. MS and PS together form MPS, with a score range of 2–8. Score of 2–4 means good/acceptable oral health, score 5–6 unacceptable, and 7–8 means poor oral health (Table 4). MPS has shown good inter-rater reliability by K value = 0.47-0.80 [89].

Table 4. Simplified table of Mucosal-Plaque Score.

Scale/score	1	2	3	4
Mucosal score MS (1-4)	Normal appearance of gingiva and oral mucosa	Mild inflam- mation	Moderate inflam- mation	Severe inflamma- tion
Plaque score PS (1-4)	No easily visible plaque	Small amounts of hardly visi- ble plaque	Moderate amounts of plaque	Abundant amounts of con- fluent plaque
MPS (2-8)	Good/Acceptable (2-4)		Unacceptable (5-6)	Poor (7-8)

To minimise the risk of drop-outs caused by patients showing resistance at the time for the clinical registrations, the dental hygienists tried again later the same day or another day within the time frame for the registrations.

Data analysis Study I and II

The material was processed using the Statistical Package for the Social Sciences, version 21.0 (PASW statistics, IBM Corporation, Armonk, NY, USA). In study I frequency distributions for each item in the ROAG-J were reported. To see the distribution of number of oral health problems, the ROAG-J variable was assessed and given a score. Each item with a score of 0 or 1 received no points i.e. healthy, scores of 2 received two points and, finally, scores of 3 received three points. Score 2 and 3 is considered to have oral health problems. The points from each variable were added together into a total ROAG-J score for each assessment. The minimum and maximum scores ranged from 0-27. Higher score indicates poor oral health. To compare change in the total score between the first and the final assessments, the Wilcoxon signed rank test was performed. Chi-square tests for independence were performed to test for associations with gender. The Kruskal-Wallis test was used to determine differences in grades between the first and subsequent assessment. Spearman correlations were computed to evaluate associations between items within the time periods. Nominal *p*-values of .05 were used. Study II aimed to examine

the feasibility on a small sample and therefore mainly presents descriptive statistics, according to the literature [90]. To ease interpretation of the result, Mann-Whitney's test were used to discover differences at baseline, and regression analysis were used to discover changes in the test wards.

Ethical considerations

Integrity is an inviolable human value essential in ethics. A humanistic view sees the individual as inviolable independent of her age, health status, social status and function, and everyone has the right to equal care [54]. To be able to improve the oral health among older people, research on older people and nursing staff is necessary, yet older people in nursing care also belong to a vulnerable group. Accordingly, the researcher needs to reflect upon what the research means for the participants in terms of risks and benefits and also of the actual meaning of the research [91, 92]. The work of this thesis has been carried out in line with the ethical codex of dental hygienists [93] and registered nurses [94]. The four ethical principles from the Declaration of Helsinki [95] – the principle of autonomy, the principle of non-maleficence, the principle of beneficence and the principle of justice – have also been taken into account throughout the thesis work.

The **principle of autonomy** was applied in asking for the informed consent. Research participants capable of giving an informed consent should do so before being enrolled in research. Participation must be voluntary and adequate information must be provided about the study, including benefits and risks, what participation entails, the right to refuse and withdraw a consent [95]. In this study, all participation has been voluntary for both older people and nursing staff, although performing ROAG-J assessments and receiving the coaching was a part of the work tasks for the nursing staff. Regarding Study I, participation in Senior Alert is voluntary and participation does not affect the delivery of care, according to Senior Alerts guidelines [74]. For inclusion in quality registers, a consent form is not mandatory. However, information about the register, its purpose, legal rights relating to the registered data and that the material was going to be available for research could be obtained by the participants. Participation in Study II was voluntary for the residents and did not affect the everyday delivery of care. Nursing staff's participation in terms of answering the questionnaire was voluntary, while receiving the

coaching and participating in the workshop was seen as a part of their job. All participants received written information about the study, confidentiality, legal rights and ethical codes of practice and were asked to give a written consent. Registered nurses identified participants who, due to cognitive impairments, were unable to express informed consent. In these cases, close relatives were asked for informed consent [92].

To acknowledge the **principle of justice**, all residents at the selected population was invited to both studies. Senior Alert including ROAG-J assessments are based on the principle justice. It aims to secure safe and equal care for all older people, regardless of where they live. In Study II, all residents were invited regardless of cognitive impairments.

The **principle of non-maleficence and the principle of beneficence** was acknowledged throughout the data registrar Senior Alert used in Study I. The ROAG-J assessments aims to do good and detect problems in the mouth and perform the recommended preventive care action. A failure to assess oral health can harm the older people in nursing care. In Study II the participants were not exposed to any risks regarding health: instead, the intervention contributed to a health improvement measure. The participating residents got regular fluoride rinse and mouth assessments from the dental hygienist who reported and took action if any serious deviations were found. If questions about the general health of the residents appeared, medical deviations or a risk of medical deviations, the registered nurse who had the main responsibility of the resident was contacted. None of the wards were exposed to any impairments of the daily care. Members of the control group were free to use fluoride rinse on their own initiative. The nursing staff benefited from the opportunity to improve their working skills and to ease the performance of oral hygiene care through support from the dental hygienist. Ultimately, the goal for this research is to contribute positively to the staff. Nevertheless, there was a risk that nursing staff could feel uncomfortable with someone asking questions about their attitudes and knowledge and oral health.

All data was handled with confidentiality. The results have been presented to ensure that they are as fair, value free, and accurate as possible, and no addition or omission of important information has been made. The manager of the nursing home in Study II had knowledge or influence of which wards were included, but no knowledge of which nursing staff or residents who participated. The manager was given a report of the outcome of the study. Study I

was approved by the organisation of the quality register Senior Alert and the study was originally performed as a quality improvement work within the organisation where no ethical vetting was needed. A request of approval for participation was sent to the manager of the nursing home. Ethical approval for Study II has been retrieved from the ethical review board in Linköping (2015/307-31).

Result

In this section, the results from Study I and Study II are presented.

Study I

The nursing staff identified oral health problems according to ROAG-J as shown in table 5. Scores of 2–3 are considered to be oral health problems. The most common problems identified at both assessments were found in teeth (coating, leftovers generally, or broken teeth) and swallowing (minor or/and pronounced problems).

At both assessments, less than one third of the 667 participants ($n=190$ (28.5%) and $n=192$ (28.8%) respectively) were considered to have oral health problems i.e., scored grade 2–3 in one or more of the oral health parameters. The one third of the participants with oral health problems were uneven distributed with most of them having problems in a 1-3 items, i.e. total score of 1-6. Few participants had problems in more than 3 items (Figure 2).

First (n)	Total score	Sub-sequent(n)
0	25–27	0
0	22–24	0
0	19–21	0
1	16–18	4
3	13–15	0
6	10–12	7
14	7–9	13
54	4–6	61
109	1–3	104
480	0	478

Figure 2. Revised Oral Assessment Guide-Jönköping (ROAG-J) total score distributions at first ($n=667$) and subsequent ($n=667$) assessments.

The range of the total ROAG-J score was the same at both times, from 2 to 18 out of 27, although the mean was higher at the follow-up: 3.87 (SD=2.82) and 4.16 (SD=3.11) respectively. No statistically significant differences were found in total score or on item level. Some differences were found regarding

gender. At the first assessment, women experienced more oral health problems regarding the tongue ($p=0.01$) compared to men. In the subsequent assessment, women had more problems than men regarding voice ($p=0.05$), mucous membrane ($p=0.003$), tongue ($p=0.01$), and saliva ($p=0.006$) (Table 5).

Table 5. The distribution of number and percentage of identified oral health problems.

Item/grade		Total (<i>N</i> = 667)	Baseline Women (<i>n</i> = 444)	Men (<i>n</i> = 223)	<i>p</i>	Total (<i>N</i> = 667)	Follow-up Women (<i>n</i> = 444)	Men (<i>n</i> = 223)	<i>p</i>
		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	
Lips	1	633 (94.9)	419 (94.7)	214 (96.0)	ns	642 (96.3)	427 (96.8)	215 (96.4)	ns
	2	31 (4.6)	23 (5.2)	8 (3.6)		22 (3.3)	14 (3.2)	8 (3.6)	
	3	0 (0)	0 (0)	0 (0)		1 (0.1)	1 (0.2)	0 (0)	
Voice	1	616 (92.4)	407 (91.7)	209 (93.7)	ns	619 (92.8)	408 (91.9)	211 (94.6)	.05
	2	35 (5.2)	24 (5.4)	11 (4.9)		27 (4.0)	18 (4.1)	9 (4.9)	
	3	13 (1.9)	11 (2.5)	2 (0.9)		14 (2.1)	14 (3.2)	0 (0)	
Mucous Membrane	1	633 (94.9)	417 (93.9)	216 (96.9)	ns	624 (93.6)	406 (91.4)	218 (97.7)	.003
	2	29 (4.3)	23 (5.2)	6 (2.7)		37 (5.5)	32 (7.2)	5 (2.2)	
	3	2 (0.3)	2 (0.5)	0 (0)		4 (0.6)	4 (0.9)	0 (0)	
Tongue	1	642 (96.3)	422 (95.5)	220 (98.6)	.01	634 (95.1)	415 (93.4)	219 (98.2)	.01
	2	19 (2.8)	17 (3.8)	2 (0.9)		29 (4.3)	25 (5.6)	4 (1.8)	
	3	3 (0.4)	3 (0.7)	0 (0)		2 (0.3)	2 (0.5)	0 (0)	
Gums	0	33 (4.9)	23 (5.2)	10 (4.5)	ns	50 (7.5)	38 (8.6)	12 (5.4)	ns
	1	605 (90.7)	405 (91.2)	200 (89.7)		589 (88.3)	388 (87.4)	201 (90.1)	
	2	24 (3.6)	14 (3.2)	10 (4.5)		20 (3.0)	13 (2.9)	7 (3.1)	
Teeth	3	2 (0.3)	0 (0)	2 (0.9)	ns	6 (0.9)	3 (0.7)	3 (1.3)	ns
	0	146 (21.9)	96 (21.6)	50 (22.4)		154 (23.1)	106 (23.9)	48 (21.5)	
	1	457 (68.5)	309 (69.6)	148 (66.4)		443 (66.4)	295 (66.4)	148 (66.4)	
Dentures	2	51 (7.6)	33 (7.4)	18 (8.1)	ns	52 (7.8)	30 (6.7)	22 (9.9)	ns
	3	10 (1.5)	4 (0.9)	6 (2.7)		16 (2.4)	11 (2.5)	5 (2.2)	
	0	417 (62.5)	267 (60.1)	150 (67.3)		407 (61.0)	261 (58.8)	146 (65.5)	
Saliva	1	222 (33.3)	165 (37.2)	57 (25.6)	ns	233 (35.0)	167 (37.6)	66 (29.6)	.006
	2	11 (1.6)	3 (0.7)	8 (3.6)		9 (1.3)	6 (1.4)	3 (1.3)	
	3	14 (2.1)	7 (1.6)	7 (3.1)		16 (2.4)	8 (1.8)	8 (3.6)	
Swallow	1	630 (94.5)	416 (93.7)	214 (96.0)	ns	631 (94.6)	412 (92.8)	219 (98.2)	ns
	2	34 (5.1)	26 (5.9)	8 (3.6)		32 (4.8)	29 (6.5)	3 (1.3)	
	3	0 (0)	0 (0)	0 (0)		2 (0.3)	1 (0.2)	1 (0.4)	
	0	0 (0)	0 (0)	0 (0)	ns	4 (0.6)	4 (0.9)	0 (0)	ns
	1	610 (91.5)	403 (90.8)	207 (92.8)		591 (88.6)	387 (87.2)	204 (91.5)	
	2	39 (5.8)	26 (5.9)	13 (5.8)		54 (8.1)	41 (9.2)	13 (5.8)	
	3	15 (2.2)	13 (2.9)	2 (2.7)		16 (2.4)	10 (2.3)	6 (2.7)	

Comparisons of the relationships between the items were evaluated in correlations. Statistically significant correlations were found between several variables (Table 6). In both the first and the last assessment, statistically significant correlations were found, but in general they were slightly stronger in the last assessment.

Strong relationships were found between mucous membrane and tongue (first assessment: $r=0.48$ and subsequent assessment: $r=0.57$, respectively) and mucous membrane and saliva ($r=0.43$ and $r=0.54$, respectively), meaning that the condition of the two of those parameters often were alike. The occurrence of problems of the mucous membrane, for example, indicated a higher risk of impairment in the variables of tongue and saliva. A medium-strength relationship was found between tongue and saliva ($r=0.38$ and $r=0.47$, respectively); gums and teeth ($r=0.26$ and $r=0.32$, respectively); teeth and prostheses ($r=-0.31$ and $r=-0.41$, respectively); and voice and saliva ($r=0.33$ and $r=0.30$, respectively).

TABLE 6. Correlations Among Revised Oral Assessment Guide-Jönköping Items on Admission and Subsequent Assessment

Item	1	2	3	4	5	6	7	8	9
1. Voice	--	.25	.21**	.17**	-.03	.06	-.04	.33**	.25**
2. Lips	.22**	--	.12**	.20**	.03	.03	.04	.25**	.23**
3. Mucous membrane	.24**	.26**	--	.48**	.13**	.16**	.01	.43**	.17**
4. Tongue	.21**	.27**	.57**	--	.04	.07	.02	.38**	.07
5. Gums	.07	.02	.15**	.13**	--	.26**	-.08*	.01	-.07
6. Teeth	-.07	.01	.17**	.07	.32**	--	-.31**	.05	.01
7. Prosthesis	.05	.01	-.02	.00	-.19**	-.41	--	.04	-.05
8. Saliva	.30**	.26**	.54**	.47**	.04	.03	.01	--	.21**
9. Swallow	.25**	.23**	.22**	.14**	.03	.03	-.04	.20**	--

Note. $n = 664$ (on admission); $n = 665$ (subsequent assessment). ROAG-J = Revised Oral Assessment Guide-Jönköping. Admission correlations are above the diagonal; correlations from subsequent assessments are below the diagonal. * $p < 0.05$. ** $p < 0.01$.

Study II

Nursing staff

The nursing staff showed rather good knowledge and attitudes to oral health both at baseline and after the oral health coaching programme. The mean scores for the nursing DCBS varied from 45.20–52.33, compared to the range of 28–140. Mean scores from the nursing DCBS and its subscales for the wards (Table 7) varied from 10.00–15.67 on a range of 7–35. Low scores indicate good knowledge and attitudes.

Regarding the items, the mean scores for the items ranged from 1.00–4.33, where most mean scores varied from 1.00–2.00. The nursing staff expressed some uncertainty regarding knowledge about how to treat oral mucosal disorders, the prevention of oral candidiasis, the ability to remove plaque, whether teeth should last a person's life and the effect of diseases and medication on oral health.

To compare changes in the mean value for the test wards, regression analysis was made, giving Beta values (B), a standardised coefficient that indicates effect of the intervention on the mean values for the items. The data suggests some statistically significant changes in the test wards. Positive changes in the test wards in OHCB on questions "I believe that the patients themselves report when oral health care is needed" ($B=-1.464$; $p=.017$), and "I believe that fluoride products are most suitable for children" ($B=1.31$; $p=.018$). But also, negative change in OHCB regarding "Once gum disease has started, it is almost impossible to stop it" ($B=2.001$; $p=.011$), and in IL regarding "I believe flossing teeth can help prevent gum disease" ($B=0.988$; $p=.042$). Apart from these items, the control and test wards scored in a similar way.

Table 7. Pre-(n=33) and post-intervention(n=22) mean values of the nursing Dental Coping Belief Scale for nursing staff.

	Baseline			9 months		
	Control ward n=9 mean (SD)	Test ward 1 n=10 mean (SD)	Test ward 2 n=14 mean (SD)	Control ward n=6 mean (SD)	Test ward 1 n=3 mean (SD)	Test ward 2 n=13 mean (SD)
The nursing DCBS	49.22 (6.08)	52.33 (7.73)	48.58 (11.74)	45.20 (7.19)	48.67 (9.24)	51.23 (6.67)
OHCB subscale	12.00 (2.12)	12.00 (2.40)	12.08 (3.15)	12.83 (5.04)	10.00 (1.73)	12.85 (3.48)
SE sub-scale	13.33 (1.12)	13.22 (2.33)	13.31 (3.66)	12.17 (2.48)	12.00 (0.00)	13.31 (3.84)
IL sub-scale	11.89 (2.76)	11.80 (3.19)	11.50 (4.57)	10.50 (2.07)	11.00 (3.46)	11.62 (4.70)
EL sub-scale	12.00 (3.94)	14.20 (3.23)	13.86 (4.77)	10.00 (1.41)	15.67 (4.04)	13.46 (2.76)

Residents

At the times of the assessments, several residents were considered to be healthy concerning MPS and all ROAG-J items (Table 8). The percentage of healthy individuals varied between 15.4% and 53.3% for ROAG and 30.8% and 100% for MPS.

Table 8. Number of healthy residents according to Revised Oral Assessment Guide - Jönköping and MPS.

		Number of healthy concerning ROAG <i>n</i> (%)	Number of healthy concerning MPS <i>n</i> (%)
Baseline	Control (<i>n</i> =16)	4 (25)	9 (56,3)
	Test ward 1 (<i>n</i> =13)	2 (15,4)	4 (30,8)
	Test ward 2 (<i>n</i> =17)	7 (41,2)	9 (52,9)
3 months	Control (<i>n</i> =14)	8 (57,1)	14 (100)
	Test ward 1 (<i>n</i> =9)	3 (33,3)	6 (66,7)
	Test ward 2 (<i>n</i> =18)	7 (38,9)	11 (61,1)
6 months	Control (<i>n</i> =14)	8 (57,1)	12 (85,7)
	Test ward 1 (<i>n</i> =8)	3 (37,5)	5 (62,5)
	Test ward 2 (<i>n</i> =17)	4 (23,5)	7 (41,2)
9 months	Control (<i>n</i> =11)	3 (27,3)	4 (36,4)
	Test ward 1 (<i>n</i> =6)	1 (16,7)	2 (33,3)
	Test ward 2 (<i>n</i> =15)	8 (53,3)	8 (53,3)

The oral health of the residents is shown in Figure 3, showing mean values of ROAG-J for the wards. The results from baseline ROAG-J assessments shows that issues with teeth (54.6% of the participants) and gums (43.2% of the participants) were the most frequently reported oral health problems. The residents at the control ward had significant higher mean value in voice ($p=.011$) and lips ($p=.049$) compared to the test wards at baseline, apart from this there were no differences in oral health between the wards. No differences were found between test ward 1 and 2.

In the test wards, changes were found in the parameter voice ($B=.019$; $p=0.044$), gums ($B=.542$; $p=.013$) and teeth ($B=.698$; $p=.014$) after 3 months. After 6 months changes remained in gums ($B=.391$; $p=.047$) and teeth ($B=.592$; $p=.024$). After 9 months changes were found in saliva ($B=-.455$; $p=.05$) and swallowing ($B=.232$; $p=.048$).

Revised Oral Assessment Guide - Jönköping

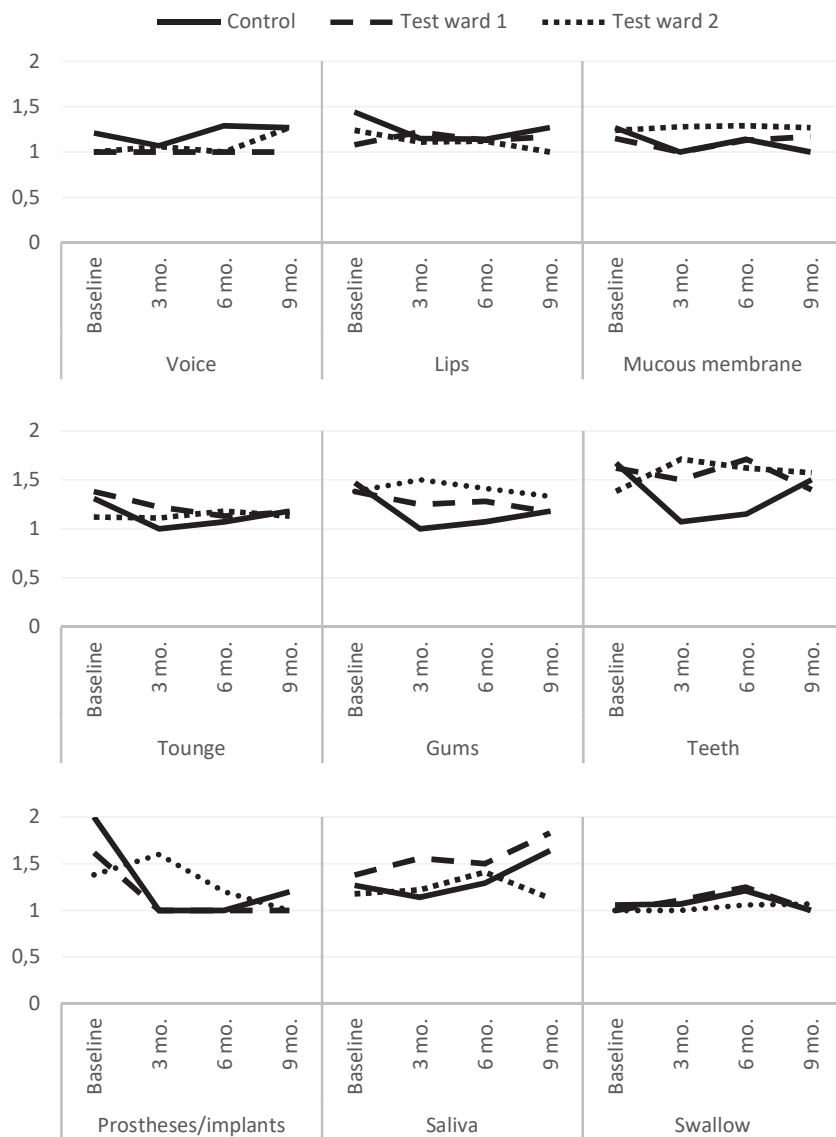


Figure 3. Mean values of residents Revised Oral Assessment Guide-Jönköping (ROAG-J) on control ward and test wards 1 & 2 at baseline and after three, six and nine months.

Figure 4 illustrates the participants' oral hygiene measured in mean values of MPS, showing the differences between the wards. All wards showed improvements in MPS after three months, but the effect declined over time. No differences were found between test ward 1 and 2.

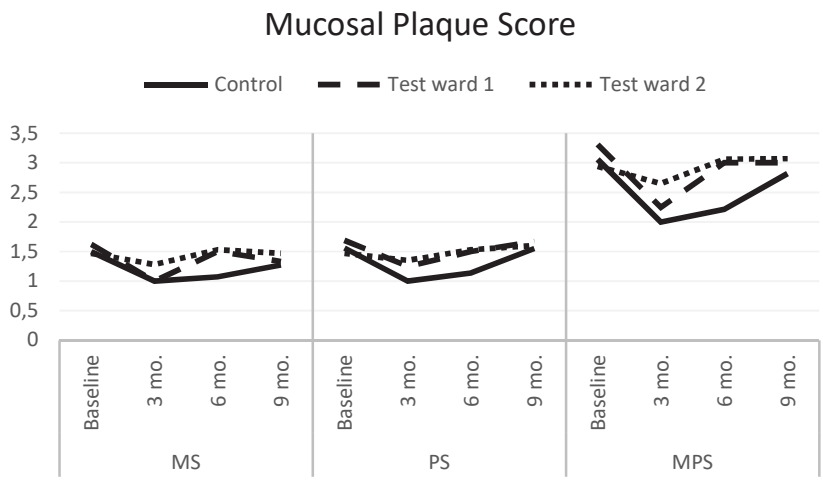


Figure 4. Mean values of residents Mucosal Plaque Score (MPS) in control ward and test wards 1 & 2 at baseline and after three, six and nine months.

Discussion

This thesis examined two oral health programmes within nursing care. In both programmes, the oral health actions were performed by nursing staff supported by dental care, but the programs used different strategies. Study I analysed the oral health status of frail older people by using the instrument ROAG-J, i.e. assessments performed by nursing staff in daily nursing care after training from dental staff. Study II examined the feasibility of a coaching programme that provided individual practical support to nursing staff by dental staff. Both studies involved some level of collaboration between the two actors — dental- and nursing care — with the aim of influencing the oral health of older people in need of care. In both studies, the result showed that older people were able to maintain an acceptable or even good level of oral health and the knowledge and attitudes of the nursing staff likewise remained on a high level. The oral health coaching programme (Study II) was feasible according to our evaluation, although improvements are also suggested.

Research can both give answers and raise questions. The method and result of these studies have raised important viewpoints about oral health programmes that lend to further discussion. Based on the results and the theoretical framework of interprofessional collaboration, common patterns emerged, resulting in three questions concerning programme design, results and future challenges. Thus, the discussion of these aspects is integrated under these questions.

Are oral health programmes also useful for “healthy” older people?

According to the data, a majority of the participants in Study I and II were registered as having acceptable or good oral health even at the time of the baseline, which is the main explanation why neither of the oral health programmes managed to drastically improve the oral health of the participants.

Good oral health at baseline was a rather surprising observation and is in contradiction with other studies [3, 43]. The assessments were made by nursing staff (Study I) and dental hygienists (Study II), which affects the interpretation of the results.

The ROAG-J assessments in Study I could reflect a good oral health status of the population, but there are reasons to believe that the number of registered oral problems was underrepresented. In comparison to other studies, the figures for registered oral problems were notably low, affecting less than one third of the participants. Around 5% had signs of hyposalivation (Study I) compared to 20–72% in an earlier review [19]. Willumsen et al [43] found that more than 40% of older people in nursing homes had unacceptable hygiene, while the ROAG-J data in Study I reflected that only around 4% had gum problems and 9–10% had problems with their teeth (defined as broken teeth and/or occurrence of coatings and food leftovers). When evaluating ROAG, Andersson et al. [82] discovered that registered nurses tended to score the condition of teeth better, i.e. healthier, compared to dental hygienists. The risk of underestimating oral problems and raises the importance of sufficient knowledge when performing the assessments, in order for nursing staff to correctly recognise problems or risks in the mouth [75, 83].

Yet another way to scrutinise the data from the ROAG-J assessments is to explore correlations, where parameters are assumed to correlate. Looking at this, the correlations between teeth and dentures should match the correlations between gums and mucosa, yet they do not. At the subsequent assessment of gums, there was an increase in the frequency of scores of grade 0 (no gums, only mucous membrane) which was not seen in the score frequency for teeth, grade 0 (no natural teeth). This may indicate a methodological bias, perhaps due to insufficient knowledge regarding the tissues around implants and prostheses, thus affecting the validity in terms of sensitivity and specificity.

External factors may have also influenced the assessments. During the data collection of Study I, the Swedish government introduced performance-based remuneration, with incentives for each person registered in Senior Alert. The final report of “Coordinated health and social care for the most severely ill elderly people” that included Senior Alert and ROAG-J [75], described that the register was not used according to its intention of continuously monitor the health and care units’ results in order to increase the quality of care. Accordingly, they would not have led to improvements in working methods. The report concluded that if nursing staff did not understand the function and aim of the register, they are only likely to see the assessments as an extra workload. In the report, two thirds of the study population did not believe that using Senior Alert had improved their working condition and they did not feel that

they had sufficient time or knowledge to administer the assessment properly. Although most respondents considered the instruments useful for detecting risks and to plan for preventive care [75], the reported lack of time, knowledge and benefit may have affected the registrations, in common with the result in Study I. However, Senior Alert – which ROAG-J is a part of – is an example of when health professionals from different professions work together towards a common goal, as recommended by the CRFA [58].

In Study II, oral health was assessed by experienced and trained dental hygienists. In their logbooks and evaluating conversations, the dental hygienists described the population as old but relatively healthy. As there is no information on the participating residents' length of stay, it is possible that the residents could have been recently moved to the nursing home and still maintained relatively health or have had diseases that did not yet affect their oral health. In the county where the study took place, the mean age of nursing home residents is two years higher than the national average. Further, in the studied wards, 84.4% were women, compared to 71% in the selected county and 67% on a national level [36]. Obviously, a small sample affects representativeness. Another bias could be the region and nursing care where the nursing home is situated. The region has a higher mean length of time that older people live in nursing homes compared to Sweden as a whole, indicating that the older people are "healthier" when they move to a nursing home. The nursing home is known to be attractive and the manager was keen to participate in the study. These aspects also affect the reliability.

On the one hand, the good oral health of residents in Study II could give nuance or challenge the rather negative picture of oral health in nursing care [3]. On the other hand, it cannot be generalised to other populations.

In Study II, a positive baseline result was also seen among nursing staff. According to the questionnaire, the nursing staff had good attitudes and a high level of knowledge about oral health, in line with other studies using the nursing DCBS [86, 96], but not in line with interview studies [45]. There is a risk that individuals who declined to participate skewed the results in a somewhat more positive direction; or conversely, only staff interested in oral health issues chose to participate. These factors also affect representativeness.

According to previous studies on oral health in nursing care [3, 43], the scenario involving populations with good oral health, seen in this thesis, seemed

unlikely to appear. Because older people receiving nursing care — regardless of oral- and general health — was the thesis’ target population, there is still however a value in the unexpected high baseline results. Preventive care to maintain good oral health is important [54] and can still show the importance of interprofessional collaboration in oral health programmes, as this thesis indicates. Neither older people nor nursing care are homogenic groups, which speaks for several parallel strategies and methods for improving the oral health where both Senior Alerts ROAG-J assessments and individual coaching can be included.

Did the programmes actually support nursing staff in their oral health strategies?

In planning oral health programmes, the strategies must be adapted and implemented to suit the context. The setting and target group needs to be examined and barriers must be identified [97]. This thesis examined two different strategies of oral health programmes within nursing care. The choice of strategies plays an important role, as they reflect different ways in which dental care supports or collaborates with nursing care.

Figure 5 illustrates the type of collaboration seen in Study I. Although there is interaction between dental care and nursing care, this interaction is mainly one-directional, with dental care giving assessment tools (ROAG-J), to nursing care through Senior Alert, who in turn perform the programme on older people.

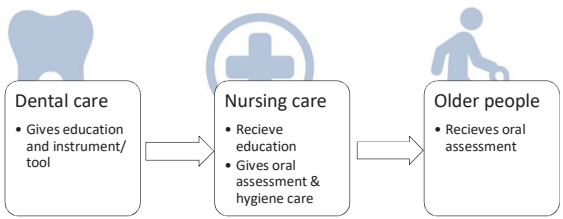


Figure 5. Model of collaboration including dental care and nursing care as a one direction interaction, and older people as the receiver of care (Study I).

Study II included an expanded type of collaboration, as dental hygienists were physically present in the wards on a weekly basis to support and coach the

nursing staff in their work, which has been identified as a facilitator when providing oral health care [46, 98]. This type of collaboration between dental- and nursing care is illustrated in Figure 6. There is a two-way interaction between the dental hygienists and nursing staff, with mutual exchange of knowledge and experiences, for the benefit of older people.

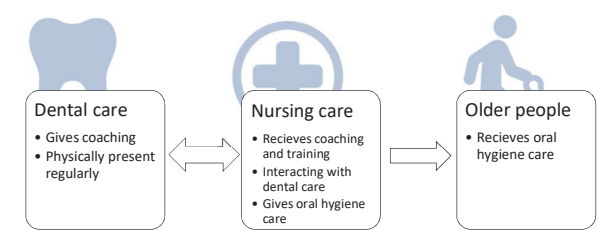


Figure 6. Model of collaboration including dental care and nursing care as a two-way interaction, and older people as the receiver of the collaborative care (Study II).

The two programmes are similar in a sense of that both have the same source: they are initiated by dental care and have same intention to support nursing staff in improving the oral health status of older people. The programmes differ from each other in how the support is being delivered. Senior Alert supports nursing staff by providing an instrument to detect risks and tools to solve many of these problems independent of dental care. A disadvantage is that the nursing staff can see this as an extra burden, causing stress in an already pressed schedule [75]. As there is no two-way communication to dental care, any emerging questions will also likely stay in the workplace. In the coaching programme, dental care provides supports through coaching and instruction on how to perform oral hygiene care on site. Here, the regular interaction between the two professions is the characteristic aspect of the intervention.

On the one hand, the coaching programme puts high demands regarding knowledge, time and financial resources on the professionals within dental care. On the other hand, Senior Alert which includes ROAG-J, has high demands on the nursing staffs' knowledge, time, independence and responsibility, with limited involvement from dental care.

Barriers for nursing staff to perform oral hygiene care recognised in earlier research are the staff's low prioritisation of oral hygiene care, low education [45], negative attitudes, the perception of a difficult task [99], lack of time,

and difficulty coping with patients' resistance [46]. All these barriers can be overcome, for example through strengthened collaboration with dental care. Senior Alert and the ROAG-J assessment address barriers regarding low prioritisation of oral hygiene care and lack of education. By performing ROAG-J assessments as recommended (Study I), Senior Alert effectively puts oral health on the agenda, by making nursing staff work with oral health on a regular basis. Nursing staff receive an education in ROAG-J on one occasion, that also includes information about oral health care. Further support is available on Senior Alert's webpage, as documents and instruction films. The coaching programme (Study II) also tried to overcome barriers regarding prioritisation, education, attitudes and coping with resistance through the dental hygienists' presence, coaching and discussion.

Both programmes presented in this thesis included nursing staff training, but to different extents. Registration of ROAG-J assessments requires training in using the instrument. Study II describes a more interactive training, that included both a workshop and coaching. Educating nursing staff in oral health have shown to have a limited effect on the oral health of older people in nursing care [100]. However, education and training can have other positive effects. Extensive competence improvements among nursing staff in Sweden 2011–2014 resulted in nursing staff improving on several qualities: increased self-confidence, an increased desire to study, being encouraged to learn, an increased sense of curiosity, personal growth, strengthened professional identity and pride, broadened perspective, greater analytical ability and increased acceptability to changes at the workplace [65]. The National Board of Health and Welfare describes nursing care as a knowledge-intensive area of profession and stipulates the need for regular training for nursing staff [101].

Neither Senior Alert with ROAG-J nor the oral health coaching programme alone is the answer to the oral health situation of older people receiving nursing care. Nevertheless, interprofessional collaboration between dental care and nursing care, that involves different activities and characterised by continuity, is needed if barriers for working with oral hygiene care are to be overcome.

Why is a collaboration between dental care and nursing care a challenge?

The results of the two studies indicate that collaboration between dental care and nursing care can be challenging in different ways. Interprofessional collaboration should be characterised by a common goal and values, knowledge and understanding of each other's context [59], which can be a challenge.

Common goal

Older people receiving nursing care is the main target for the programmes described in this thesis. Central in this understanding is that the collaboration between dental- and nursing care is not only about oral health, but the older person's general health and well-being, of which oral health is a part. The heterogeneity of the group also needs to be considered. In this target population, the golden standard for oral health is not the goal, but rather the maintenance of an acceptable standard of oral health and to prevent or delay problems [54].

An interprofessional collaboration with common goal is also promoted by CRFA [58]. A collaboration between dental- and nursing care needs to take place at all levels in the organisations. It is important to have a clear strategy that all actors can agree on. The evaluation of Senior Alert showed that the top-down implementation was an important factor in engaging staff, scheduling time, and providing follow-up training and feedback [75]. The municipality in Study I implemented Senior Alert and ROAG-J early, which can indicate an interest from leaders to prioritise oral health. Implementing a new way of working demands continuity and takes time, reportedly up to two years [102]. In Study I, the time between baseline and subsequent assessment varied from 0.5–27 months, indicating the programme had been in progress for more than two years. The programme in Study II only lasted for three months and long-term effects still remain to be seen.

Knowledge and attitudes

Earlier research has recognised the need of improvements regarding knowledge and attitudes to oral health in nursing care [43, 103]. Even dental practitioners need to have knowledge of the biomedical and psychosocial dimensions of care for older people, i.e., gerodontology [6], but they often lack

this knowledge and may even have negative attitudes towards treating older people [52, 104]. In this thesis, questions about dental practitioners' attitudes were not included, but the nursing staff showed a high level of knowledge and the proactive attitudes regarding oral health according to the nursing DCBS (Study II), which contrasts with other studies [45, 103]. The lack of a national formal syllabus regarding oral health care in the formal education for nursing staff presumed there are differences in oral health knowledge and education. Therefore, the oral health coaching programme was tailored to be adapted after the current level of knowledge on the wards. A national standardised oral hygiene care education for nursing staff is desired to ensure basic knowledge about oral health matters in nursing care. To achieve successful interprofessional collaborations, both dental and nursing care need to have basic knowledge about collaboration [59].

Mutual understanding of each other's context

It is important to gain understanding about the nursing care context [61], even though dental care has by tradition not given much support to the nursing staff [45]. Several factors outside the influence of dental care and not directly related to oral health, can affect how nursing staff take on oral hygiene care tasks. Staffs characteristics [105], employment issues such as salary, level of education and development opportunities can affect the drive for collaboration and the provision of oral hygiene care [52, 106]. The Common Risk Factor Approach describes how oral health not only depends on oral health-related behaviour, but also depends on socioeconomic position and social conditions [58, 107]. It is possible that the socioeconomic position, status of the profession, local workplace culture and the staff member's own oral health status, attitude and experiences of oral health in private life and dental fear, also affects the attitude and priority given to oral health care at work [52, 58, 106-108]. Further, nursing care in Sweden already faces challenges [65] and is anticipated to be understaffed for future demands [109]. In Study II, the dental hygienists gained an understanding of the nursing care context and could adapt the programme to some extent. However, if the intervention had been conducted over a longer time period it may have promoted a better understanding of the context.

The goal of interprofessional collaboration is synergy, where a group of people achieve more together than individually, through working together and

combining their resources, knowledge and skills [57]. Figure 7 shows a hypothetical model for collaboration between dental care and nursing care, that involves the older people receiving nursing care, and where all actors are interacting. The circles represent the actors and the arrows the desirable interactions between the actors. The circles around the older person illustrate examples of passive or active actors engaged in the older person. The figure does not represent any particular programme but can illustrate several strategies in progress that together form a mutual exchange.

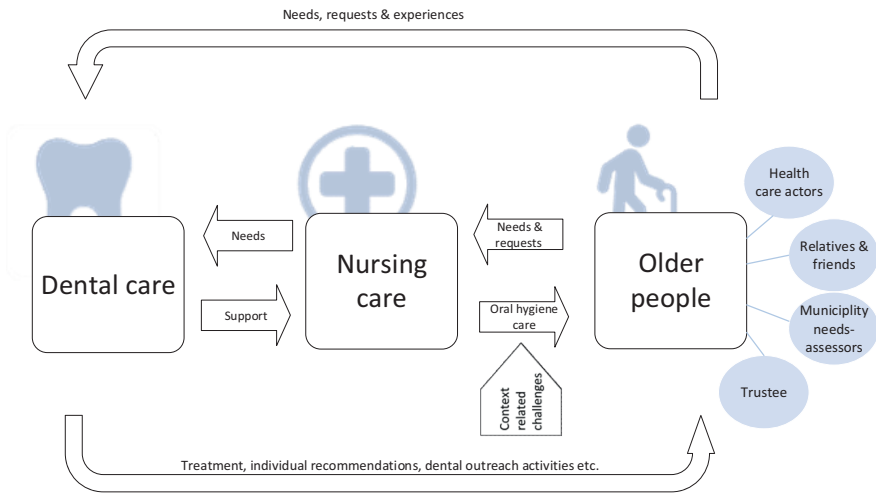


Figure 7. Hypothetical model of collaboration including dental care and nursing care with a mutual exchange, and older people as receivers of the collaborative care with possibilities to make requests and provide feedback from oneself and surrounding actors.

The type of collaboration showed in Figure 7 with mutual exchange is not seen in Sweden today on a national level, although attempts are being made. As a collaboration between a municipality and Swedish Public Dental Service Region Västra Götaland, a dental hygienist was hired by the Public Dental Service and worked in the municipality for a three-year project, to support and educate the nursing care in oral health matters and to integrate the oral health of older people in nursing care [73]. The project has continued and now includes four municipalities in Region Västra Götaland.

Strengths and limitations

Some methodological aspects have previously been discussed in relation to the oral health programmes. However, some further strengths and limitations must be addressed. The programmes in Study I and II are carried out in daily nursing care, developed in accordance to evidence. No adjustments were made in the nursing care context regarding time or staffing, meaning both studies examine effectiveness: how the programmes work in “real world conditions”, rather than efficacy, in “ideal conditions”. An effectiveness study has advantages; it doesn’t overestimate the results, but there is a risk of missing out of observing the effect of the programme since external factors can interfere with the programme and moderate the effect.

Study I used data from a register, which has both advantages and disadvantages. It reflects the reality, demonstrating how the instrument ROAG-J works in practice. The instrument has good reliability in most of the parameters [82, 83], but might measure both the actual health of the older people and indicate the level of knowledge of the nursing staff, which is a question of validity. Further, the result of Study I raised the question of what was done with the identified oral health problems, which could have been answered with broader research questions. The participants were able to maintain their level of oral health, but the actual effect of ROAG-J and Senior Alert is difficult to assess without a control group. Nevertheless, comparisons can be made between the baseline and subsequent assessments. Additionally, assessment of oral health in a control group, but without doing anything about the potential identified oral health problems could raise ethical issues.

The oral health coaching programme (Study II), was based on theory and research about behaviour changing methods [80] and is tested here in a smaller setting as a feasibility study. This was made in daily nursing care to determine strengths and weaknesses in the programme and method, assess the preliminary outcome and enable to make changes before potentially carrying it out in a larger setting. The programme included both continuity and mutual feedback between the dental hygienists and the nursing staff. The programme could also have included a component to further put oral health on the agenda, such as involving the nursing home manager. Since the study was performed in three wards at one nursing home, contamination and a spill-over effect between the wards cannot be excluded. This was also one of the reasons for the feasibility

study design, but it could also have explained the good results in the control group.

For evaluating the oral health in Study II, ROAG-J was used. The instrument is developed for health care workers [82] and not mainly for dental staff but provides a wide picture of the oral health. Also, since ROAG-J was used in daily practice through Senior Alert, the dental hygienist and nursing staff had a common language. As a complement, MPS was used, which was developed for dental staff to be used in nursing care [89]. It is a relatively simple instrument but has the advantage that it neither causes the patient pain nor is time consuming. Study I and II evaluated clinical aspects of oral health related to general health but did not assess oral health from the participants' perspective. Measuring oral health-related quality of life could have been a good complement for achieving a more holistic view of the outcome of the programmes [97].

Study II was made following an initiative from dental care staff. The coaching and workshop were based on the requests of the nursing staff but was still designed by dental care staff. This may have been a limitation: early participation in planning of the study from the nursing care could have been advantageous in a nursing care context [48].

Conclusion

This thesis addresses the complex situation regarding oral health in nursing care today. In the oral health programmes with different designs regarding strategies for collaboration, the participants were able to maintain an acceptable level of oral health during the study periods and the nursing staff maintained a high level of knowledge and attitudes about oral health.

- An oral health programme in nursing care can have a positive influence on oral health over time for the target population, although overall health is likely to decline.
- There seems to be a discrepancy regarding the prevalence of oral health problems among older people depending on the target population and barriers.
- Nursing staff had good knowledge and attitudes towards oral health, although in contradictory to other studies.
- Collaboration including extended support from dental care in nursing care indicate a positive influence on providing oral hygiene care.

Implications for practice

The use of ROAG-J in nursing care can reveal oral health problems and risks but can also create a platform for collaboration between dental and nursing care.

Nursing staff need further knowledge and support in correctly using ROAG-J to assess oral health.

An understanding of the nursing care context can serve as a further explanation to the complex oral health situation of older people in nursing care.

The dental hygienist profession can be an actor in the collaboration process between dental- and nursing care.

Interprofessional collaboration can be included in the formal education for dental and nursing staff.

Implications for future research

Many authors have recommended collaborations between dental- and nursing care. It is time to explore and evaluate how the collaboration can be formed in the nursing care context in a longitudinal perspective.

A collaboration between dental- and nursing care needs to ensure a regular mutual interaction. The implementation process needs to be carefully considered.

The voices of older people in nursing care needs to be heard. Their opinions about oral health, receiving oral hygiene care from nursing staff and oral needs must be explored.

Svensk sammanfattning

Bakgrund: Oral hälsa är en integrerad del av både allmänhälsa och livskvalitet. Äldre personer med insatser inom äldreomsorg har ofta bristande oral hälsa. Trots att denna grupp har frekvent eller till och med konstant kontakt med äldreomsorg och sjukvård, så tenderar de att förlora kontakten med tandvården. Omsorgspersonal inom äldreomsorg har till uppgift att bistå med hjälp vid munhygien, vilket är en arbetsuppgift som har blivit allt mer krävande då allt fler äldre har fler tänder kvar, ofta med avancerade protetiska konstruktioner. Forskning har betonat behovet av samarbete mellan tandvård och äldreomsorg för att bistå omsorgspersonal med denna uppgift. Det finns emellertid brist på evidens gällande effekten av dessa samarbeten.

Syfte: Det övergripande syftet med avhandlingen är att undersöka två munhälsoprogram inom äldreomsorgen med olika design gällande stöd från och samarbete med tandvård.

Metod: Kvantitativa forskningsmetoder användes. Data i Studie I baseras på Senior Alert, ett nationellt kvalitetsregister för vård och omsorg, och består av munbedömningar enligt ROAG-J (röst, läppar, munslemhinnor, tunga, tandkött, tänder, protes, saliv och sväljning) utförda av vårdpersonal. Äldre personer med insatser från kommunal vård och omsorg med två eller fler ROAG-J bedömningar inkluderades. Studie II är en kontrollerad interventionsstudie utförd på särskilt boende. Interventionen innebar individuell coaching i munvård av tandhygienister fyra timmar per vecka under tre månaders tid. Munbedömningar enligt ROAG-J och MPS utfördes av tandhygienister och omsorgspersonalen besvarade enkäter om kunskap och attityder till oral hälsa.

Resultat: I Studie I inkluderades 667 personer i åldern 65 år eller äldre inom äldreomsorg, och som fått bedömningar utförda mellan november 2011 och mars 2014. Inga statistiskt signifikanta skillnader mellan bedömningarna förelåg. Vid båda bedömningarna hade mindre än en tredjedel av deltagarna identifierade avvikelser. Vid första bedömningen skilde sig män och kvinnor avseende avvikelser på tungan ($p < .01$); Vid den efterföljande bedömningen hittades skillnader mellan kvinnor och män angående avvikelser på röst ($p < .05$), slemhinnor ($p < .003$), tunga ($p < .01$) och saliv ($p < .006$).

I studie II deltog 33 omsorgspersonal och 48 äldre personer vid studiens början, för att sedan sjunka till 22 respektive 32 deltagare efter 9 månader. Förändringar uppmättes i omsorgspersonalens kunskap och attityder gällande tandköttssjukdomar, approximal rengöring, användning av fluor och äldres benägenhet att uttrycka om de behöver hjälp med munhygien. Det mest frekvent rapporterade avvikelserna bland deltagarna gällde tänder och tandkött. Deltagarnas relativt goda munhälsa var stabil under studieperioden.

Slutsatser: Deltagarna i munhälsoprogrammen upprätthöll en acceptabel oral hälsa under studieperioderna, trots att allmänhälsan sannolikt försämrades. Omsorgspersonalen behöll en god nivå av kunskap om och attityder till oral hälsa. En diskrepans tycks finnas gällande förekomsten av avvikelser i munhälsa bland äldre personer. Ett samarbete mellan tandvård och äldreomsorg kan ha positiv inverkan på munhygien hos äldre personer med insatser från äldreomsorg.

Reference list

1. Glick, M., et al., *A new definition for oral health developed by the FDI World Dental Federation opens the door to a universal definition of oral health*. J Public Health Dent, 2017. **77**(1): p. 3-5.
2. Wastesson, J.W., et al., *Inequalities in health care use among older adults in Sweden 1992-2011: a repeated cross-sectional study of Swedes aged 77 years and older*. Scand J Public Health, 2014. **42**(8): p. 795-803.
3. Andersson, P., et al., *Dental status in nursing home residents with domiciliary dental care in Sweden*. Community Dent Health, 2017. **34**(4): p. 203-207.
4. Pearson, A. and J. Chalmers, *Oral hygiene care for adults with dementia in residential aged care facilities*. JBI Libr Syst Rev, 2004. **2**(3): p. 1-89.
5. United Nations. *Sustainable Development Goals*. n.d. [cited 2019 20190326]; Available from: <https://sustainabledevelopment.un.org/?menu=1300>.
6. Petersen, P.E. and T. Yamamoto, *Improving the oral health of older people: the approach of the WHO Global Oral Health Programme*. Community Dent Oral Epidemiol, 2005. **33**(2): p. 81-92.
7. Andersson, K. and G. Nordenram, *Attitudes to and perceptions of oral health and oral care among community-dwelling elderly residents of Stockholm, Sweden: an interview study*. Int J Dent Hyg, 2004. **2**(1): p. 8-18.
8. Slack-Smith, L., et al., *Oral health and access to dental care: a qualitative investigation among older people in the community*. Gerodontology, 2010. **27**(2): p. 104-13.
9. MacEntee, M.I., R. Hole, and E. Stolar, *The significance of the mouth in old age*. Soc Sci Med, 1997. **45**(9): p. 1449-58.
10. McKenzie-Green, B., et al., *Older peoples' perceptions of oral health: 'it's just not that simple'*. Int J Dent Hyg, 2009. **7**(1): p. 31-8.
11. Newton, J.T. and E.J. Bower, *The social determinants of oral health: new approaches to conceptualizing and researching complex causal networks*. Community Dent Oral Epidemiol, 2005. **33**(1): p. 25-34.
12. Caines, B., *Evidence summary: why is access to dental care for frail elderly people worse than for other groups?* Br Dent J, 2010. **208**(3): p. 119-22.
13. Kelly, J.T., et al., *The association between periodontitis and coronary heart disease: a quality assessment of systematic reviews*. J Am Dent Assoc, 2013. **144**(4): p. 371-9.

14. Kudiyirickal, M.G. and J.M. Pappachan, *Diabetes mellitus and oral health*. Endocrine, 2015. **49**(1): p. 27-34.
15. Azarpazhooh, A. and J.L. Leake, *Systematic review of the association between respiratory diseases and oral health*. J Periodontol, 2006. **77**(9): p. 1465-82.
16. Van Lancker, A., et al., *The association between malnutrition and oral health status in elderly in long-term care facilities: a systematic review*. Int J Nurs Stud, 2012. **49**(12): p. 1568-81.
17. Andersson, P., et al., *Oral health and nutritional status in a group of geriatric rehabilitation patients*. Scand J Caring Sci, 2002. **16**(3): p. 311-8.
18. Kandelman, D., P.E. Petersen, and H. Ueda, *Oral health, general health, and quality of life in older people*. Spec Care Dentist, 2008. **28**(6): p. 224-36.
19. Liu, B., et al., *Xerostomia and salivary hypofunction in vulnerable elders: prevalence and etiology*. Oral Surg Oral Med Oral Pathol Oral Radiol, 2012. **114**(1): p. 52-60.
20. Tan, E.C.K., et al., *Medications That Cause Dry Mouth As an Adverse Effect in Older People: A Systematic Review and Metaanalysis*. J Am Geriatr Soc, 2018. **66**(1): p. 76-84.
21. Rautemaa, R. and G. Ramage, *Oral candidosis--clinical challenges of a biofilm disease*. Crit Rev Microbiol, 2011. **37**(4): p. 328-36.
22. Chamani, G., et al., *"Assessment of relationship between xerostomia and oral health-related quality of life in patients with rheumatoid arthritis"*. Oral Dis, 2017. **23**(8): p. 1162-1167.
23. Gronbeck Linden, I., et al., *Factors Affecting Older Persons' Ability to Manage Oral Hygiene: A Qualitative Study*. JDR Clin Trans Res, 2017. **2**(3): p. 223-232.
24. Norderyd, O., et al., *Oral health of individuals aged 3-80 years in Jonkoping, Sweden during 40 years (1973-2013). II. Review of clinical and radiographic findings*. Swed Dent J, 2015. **39**(2): p. 69-86.
25. Hayes, M., F. Burke, and P.F. Allen, *Incidence, Prevalence and Global Distribution of Root Caries*. Monogr Oral Sci, 2017. **26**: p. 1-8.
26. Kassebaum, N.J., et al., *Global Burden of Severe Tooth Loss: A Systematic Review and Meta-analysis*. J Dent Res, 2014. **93**(7 Suppl): p. 20s-28s.
27. SKaPa Svenskt kvalitetsregister för karies och parodontit, *Årsrapport 2017 [Annual report 2017]*. 2018, Karlstad: SKaPa Svenskt kvalitetsregister för karies och parodontit.

28. Borreani, E., et al., *Informing the debate on oral health care for older people: a qualitative study of older people's views on oral health and oral health care*. Gerodontology, 2010. **27**(1): p. 11-8.
29. Unell, L., et al., *Dental status and self-assessed chewing ability in 70- and 80-year-old subjects in Sweden*. J Oral Rehabil, 2015. **42**(9): p. 693-700.
30. Nordenström, B. and K. Edman, *EpiWux 2008. Vuxnas mun- och tandhälsa samt attityder till tandvård [EpiWux 2008. Oral- and dental health and attitudes to dental care among adults]*. 2009, Falun: Folk tandvården Landstinget i Dalarna.
31. The National Board of Health and Welfare, *Vård och omsorg om äldre - Lägesrapport 2018 [Health and social care of older people - Progress report 2018]*. 2018, Stockholm: The National Board of Health and Welfare.
32. United Nations Population Fund, *State of World Population 2018: The power of choice. Reproductive rights and the demographic transition*. 2018, New York: United Nations Population Fund.
33. Statistics Sweden. *Sveriges befolkningspyramid [Population pyramid of Sweden]*. n.d. [cited 2019 Apr 10]; Available from: <https://www.scb.se/hitta-statistik/sverige-i-siffror/manniskorna-i-sverige/sveriges-befolkningspyramid/>.
34. Ettinger, R.L. and J.D. Beck, *Geriatric dental curriculum and the needs of the elderly*. Spec Care Dentist, 1984. **4**(5): p. 207-13.
35. The National Board of Health and Welfare, *Interventioner för äldres munhygien utförd av äldreomsorgspersonal – En systematisk översikt av interventioners effekter och vetenskapliga stöd [Interventions for older people's oral hygiene performed by nursing staff - A systematic review of the effects and evidence for interventions]*. 2014, Stockholm: The National Board of Health and Welfare.
36. The National Board of Health and Welfare, *Statistik om särskilt boende [Statistics about nursing homes]*. 2016, Stockholm: The National Board of Health and Welfare.
37. Ministry of Health and Social Affairs, *Socialtjänstlagen [Social Services Act] (SoL 2001:453)*. 2001, Stockholm: Ministry of Health and Social Affairs.
38. The National Board of Health and Welfare, *Vägledning för landstingens särskilda tandvårdsstöd enligt tandvårdslag och tandvårdsförordning samt samverkan mellan kommuner, primärvård och tandvård. [A guide regarding county councils' special financial support for dental care according to National Dental Service Act and Dental care regulation and the collaboration between municipalities, primary care and dental care]*. 2004, The National Board of Health and Welfare: Stockholm.

39. The National Board of Health and Welfare, *Tillståndet och utvecklingen inom hälso- och sjukvård och socialtjänst. Lägesrapport 2014 [The state and development of health care and social services. Progress report 2014]*. 2014, Stockholm: The National Board of Health and Welfare.
40. Schon, P., M. Lagergren, and I. Kareholt, *Rapid decrease in length of stay in institutional care for older people in Sweden between 2006 and 2012: results from a population-based study*. Health Soc Care Community, 2016. **24**(5): p. 631-8.
41. Statistics Sweden, *Vård- och omsorgsutbildade – idag och i framtiden [Educated in health and social care - today and in the future]*. 2015, Stockholm: Statistics Sweden.
42. The Swedish Association of Local Authorities and Regions, *Munhälsa: åtgärder för att förebygga ohälsa i munnen [Oral health: preventive measures to oral problems]*. 2014, Stockholm: The Swedish Association of Local Authorities and Regions.
43. Willumsen, T., et al., *Are the barriers to good oral hygiene in nursing homes within the nurses or the patients?* Gerodontology, 2012. **29**(2): p. 748-55.
44. Wardh, I., L. Andersson, and S. Sorensen, *Staff attitudes to oral health care. A comparative study of registered nurses, nursing assistants and home care aides*. Gerodontology, 1997. **14**(1): p. 28-32.
45. Wardh, I., et al., *Oral health care--a low priority in nursing. In-depth interviews with nursing staff*. Scand J Caring Sci, 2000. **14**(2): p. 137-42.
46. Gostemeyer, G., S.R. Baker, and F. Schwendicke, *Barriers and facilitators for provision of oral health care in dependent older people: a systematic review*. Clin Oral Investig, 2019. **23**(3): p. 979-993.
47. Lin, C.Y., et al., *Oral health assessment by nursing staff of Alzheimer's patients in a long-term-care facility*. Spec Care Dentist, 1999. **19**(2): p. 64-71.
48. Cochrane, L.J., et al., *Gaps between knowing and doing: understanding and assessing the barriers to optimal health care*. J Contin Educ Health Prof, 2007. **27**(2): p. 94-102.
49. Unfer, B., et al., *Challenges and barriers to quality oral care as perceived by caregivers in long-stay institutions in Brazil*. Gerodontology, 2012. **29**(2): p. e324-30.
50. Henriksen, B.M., K. Engedal, and T. Axell, *Cognitive impairment is associated with poor oral health in individuals in long-term care*. Oral Health Prev Dent, 2005. **3**(4): p. 203-7.

51. Gronbeck-Linden, I., et al., *Discontinued dental attendance among elderly people in Sweden*. J Int Soc Prev Community Dent, 2016. **6**(3): p. 224-9.
52. Smith, M.B. and W.M. Thomson, 'Not on the radar': dentists' perspectives on the oral health care of dependent older people. Gerodontology, 2017. **34**(1): p. 90-100.
53. Andersson, P., et al., *Oral health problems in elderly rehabilitation patients*. Int J Dent Hyg, 2004. **2**(2): p. 70-7.
54. Swedish Dental Service, *Ramdokument Äldretandvård [Framework for older peoples dental care]*. 2013, s.l.: Swedish Dental Service.
55. World Health Organization, *Framework for Action on Interprofessional Education & Collaborative Practice*. 2010, Geneva: World Health Organization.
56. Emich, C., *Conceptualizing collaboration in nursing*. Nursing Forum, 2018. **53**(4): p. 567-573.
57. Bowes, D.L., H. McConnell, and M.-L. van der Horst, *Case report: Interprofessional collaboration—A Nursing–Dental hygiene experience*. Can J Dent Hygiene, 2010. **44**(5): p. 217-220.
58. Sheiham, A. and R.G. Watt, *The common risk factor approach: a rational basis for promoting oral health*. Community Dent Oral Epidemiol, 2000. **28**(6): p. 399-406.
59. MacEntee, M.I., *Muted dental voices on interprofessional healthcare teams*. J Dent, 2011. **39 Suppl 2**: p. S34-40.
60. The National Board of Health and Welfare, *Kartläggning av hinder för samverkan mellan tandvård och hälso- och sjukvård. Delrapport 2019 [Mapping barriers to collaboration between dental care and health care]*. 2019, Stockholm: The National Board of Health and Welfare.
61. The Swedish Society of Nursing, *Säker vård - en kärnkompetens för vårdens samtliga professioner [Safe care - a core competence for all healthcare professionals]* 2016, Stockholm: The Swedish Society of Nursing.
62. Swedish Dental Association, *Äldres tandvård och munhälsa. Policydokument [Dental care and oral health of older people. Policy document]*. 2016, Stockholm: Swedish Dental Association.
63. The National Board of Health and Welfare, *Kompetensbeskrivning för legitimerad tandhygienist [Competence Description for Registered Dental Hygienist]*. 2004, Stockholm: The National Board of Health and Welfare.
64. Albrecht, M., et al., *Oral health educational interventions for nursing home staff and residents*. Cochrane Database Syst Rev, 2016. **9**: p. Cd010535.

65. The National Board of Health and Welfare, *Omvårdnadslyftet - Slutredovisning av regeringens kompetenssatsning 2011-2014 [Final report of the Government's competence initiative for nursing care 2011-2014]*. 2015, Stockholm: The National Board of Health and Welfare.
66. Simons, D., et al., *An evaluation of an oral health training programme for carers of the elderly in residential homes*. Br Dent J, 2000. **188**(4): p. 206-10.
67. Mouradian, W.E. and S.B. Corbin, *Addressing health disparities through dental-medical collaborations, part II. Cross-cutting themes in the care of special populations*. Journal Of Dental Education, 2003. **67**(12): p. 1320-1326.
68. Chávez, E.M. and A. Hendre, *Caring for Older Adults With Complex Needs: Drafting an Interdisciplinary Team*. Journal Of The California Dental Association, 2015. **43**(10): p. 597-604.
69. Coleman, P., *Opportunities for nursing-dental collaboration: addressing oral health needs among the elderly*. Nurs Outlook, 2005. **53**(1): p. 33-9.
70. Yellowitz, J.A., *Building the Ideal Interdisciplinary Team to Address Oral Health*. Generations, 2016. **40**(3): p. 60-65.
71. Ministry for health and social affairs, *Tandvårdsförordningen [Dental care regulation] (SFS 1998:1338)*. 1998, Ministry for health and social affairs: Stockholm.
72. Swedish Dental Service. *Kunskapscentra för äldres munhälsa i Sverige [Centres of knowledge for older people's oral health in Sweden]*. 2019 [cited 2019 jan 24]; Available from: <http://www.folk tandvarden.se/aldretandvard/kunskapscentra-for-aldres-munhalsa-i-sverige/>.
73. Nyström, E., et al., *Mariestadsprojektet - Tandhygienist i kommunal verksamhet. Ett projekt i Västra Götaland för att förbättra munhälsan hos äldre [The Mariestad Project - Dental hygienist in municipal activities. A project in Västra Götaland to improve oral health in the elderly]*. 2017, Gothenburg: Department of Preventive and Community Dentistry, Public Dental Health Service, Västra Götaland Region.
74. Senior Alert. *Senior alert—More than just a quality register*. 2014 [cited 2019 feb 15]; Available from: <http://plus.rjl.se/infopage.jsf?nodeId=43617>.
75. The Swedish Agency for Public Management, *Sammanhållen vård och omsorg om de mest sjuka äldre. Utvärdering av överenskommelsen mellan regeringen och SKL. Slutrapport [Coordinated health and social care for the most severely ill elderly]*

- people. Final report]. 2015, Stockholm: The Swedish Agency for Public Management.
76. Rantzow, V., P. Andersson, and U. Lindmark, *Occurrence of oral health problems and planned measures in dependent older people in nursing care*. J Clin Nurs, 2018. **27**(23-24): p. 4381-4389.
 77. Ministry of Health and Social Affairs, *Tandvårdslagen [National Dental Service Act] SFS (1985:125)*. 1985, Stockholm: Ministry of Health and Social Affairs.
 78. Polit, D.F. and C.T. Beck, *Nursing Research. Generating and Assessing Evidence for Nursing Practice (8th ed.)*. 2008, Philadelphia: Lippincott Williams & Wilkins.
 79. Ministry of Health and Social Affairs, *Lagen om stöd och service till vissa funktionshindrade [The act on support and service for persons with certain functional impairments] (Swedish Code of Statutes SFS 1993:387)*. 1993, Stockholm: Swedish Parliament.
 80. Kok, G., et al., *A taxonomy of behaviour change methods: an Intervention Mapping approach*. Health Psychol Rev, 2016. **10**(3): p. 297-312.
 81. Wyatt, C.C. and M.I. MacEntee, *Caries management for institutionalized elders using fluoride and chlorhexidine mouthrinses*. Community Dent Oral Epidemiol, 2004. **32**(5): p. 322-8.
 82. Andersson, P., I.R. Hallberg, and S. Renvert, *Inter-rater reliability of an oral assessment guide for elderly patients residing in a rehabilitation ward*. Spec Care Dentist, 2002. **22**(5): p. 181-6.
 83. Ribeiro, M.T., et al., *Validity and reproducibility of the revised oral assessment guide applied by community health workers*. Gerodontology, 2014. **31**(2): p. 101-10.
 84. McHugh, M.L., *Interrater reliability: the kappa statistic*. Biochem Med (Zagreb), 2012. **22**(3): p. 276-282.
 85. Ministry of health and social affairs, *Tänder hela livet – nytt ersättningssystem för vuxentandvården 1998 [Teeth for life - new remuneration system for adult dental care] (SOU 1998:1338)*. 1998, Stockholm: Ministry of health and social affairs.
 86. Wardh, I. and S. Sorensen, *Development of an index to measure oral health care priority among nursing staff*. Gerodontology, 2005. **22**(2): p. 84-90.
 87. Bandura, A., *Self-efficacy: The exercise of control*. 1997, New York: Freeman
 88. Holt, N., et al., *Psychology the science of mind and behavior*. 2012, Berkshire: McGraw-Hill.
 89. Henriksen, B.M., E. Ambjornsen, and T.E. Axell, *Evaluation of a mucosal-plaque index (MPS) designed to assess oral care in groups of elderly*. Spec Care Dentist, 1999. **19**(4): p. 154-7.

90. Arain, M., et al., *What is a pilot or feasibility study? A review of current practice and editorial policy*. BMC Med Res Methodol, 2010. **10**: p. 67.
91. Liamputtong, P., *Researching the Vulnerable - A guide to Sensitive Research methods*. 2006, London: Sage publications.
92. Council for International Organizations of Medical Sciences (CIOMS), *International Ethical Guidelines for Health-related Research Involving Humans*. 2016, Geneva: Council for International Organizations of Medical Sciences (CIOMS).
93. The Swedish Dental Hygienist Association, *Etiska regler & kommentarer [Ethical rules & comments]*. 2017, Stockholm: The Swedish Dental Hygienist Association.
94. Northern Nurses' Federeation, *Ethical guidelines for nursing research in the Nordic countries*. 2003, Oslo: Northern Nurses' Federation.
95. World Medical Association, *Declaration of Helsinki—Ethical Principles for Medical Research Involving Human Subjects*. JAMA, 2013. **310**(20): p. 2191-2194.
96. Pihlajamaki, T., et al., *Oral health care-related beliefs among Finnish geriatric home care nurses*. Int J Dent Hyg, 2016. **14**(4): p. 289-294.
97. Weening-Verbree, L., et al., *Oral health care in older people in long term care facilities: a systematic review of implementation strategies*. Int J Nurs Stud, 2013. **50**(4): p. 569-82.
98. Gostemeyer, G., S.R. Baker, and F. Schwendicke, *Barriers and facilitators for provision of oral health care in dependent older people: a systematic review*. Clin Oral Investig, 2019.
99. Forsell, M., et al., *Attitudes and perceptions towards oral hygiene tasks among geriatric nursing home staff*. Int J Dent Hyg, 2011. **9**(3): p. 199-203.
100. The National Board of Health and Welfare, *Fortbildning för undersköterskor och vårdbiträden i äldreomsorgen – en systematisk översikt om vetenskapligt stöd och effekter för äldre och personal 2014 [Training for nurse assistants and care staff in elderly care - a systematic review of scientific support and effects for older people and staff 2014]*. 2014, Stockholm: The National Board of Health and Welfare.
101. The National Board of Health and Welfare, *Vägledning om kunskapsområden för specialiserade arbetsuppgifter inom äldreomsorgen [A guide on areas of expertise for specialized tasks in the elderly care]*. 2012, Stockholm: The National Board of Health and Welfare.
102. Wardh, I.M. and M.B. Wikstrom, *Long-term effects of using oral care aides at a nursing home for elderly dependent residents--a pilot study*. Spec Care Dentist, 2014. **34**(2): p. 64-9.

103. Wardh, I., M. Jonsson, and M. Wikstrom, *Attitudes to and knowledge about oral health care among nursing home personnel--an area in need of improvement*. Gerodontology, 2012. **29**(2): p. e787-92.
104. De Vissschere, L., et al., *The impact of undergraduate geriatric dental education on the attitudes of recently graduated dentists towards institutionalised elderly people*. Eur J Dent Educ, 2009. **13**(3): p. 154-61.
105. Castle, N.G. and J. Engberg, *The influence of staffing characteristics on quality of care in nursing homes*. Health Serv Res, 2007. **42**(5): p. 1822-47.
106. The Swedish Association of Local Authorities and Regions, *Framgångsfaktorer inom äldreomsorgen - en analys utifrån kommunernas resultat 2009 [Factors for success in old age care - an analysis based on the municipalities' results in 2009]*. 2010, Stockholm: The Swedish Association of Local Authorities and Regions.
107. Watt, R.G. and A. Sheiham, *Integrating the common risk factor approach into a social determinants framework*. Community Dent Oral Epidemiol, 2012. **40**(4): p. 289-96.
108. Lindqvist, L., et al., *Oral care perspectives of professionals in nursing homes for the elderly*. Int J Dent Hyg, 2013. **11**(4): p. 298-305.
109. The National Board of Health and Welfare, *Nationell ledarskapsutbildning för chefer inom äldreomsorg. Förslag och vägledande underlag [National leadership training for managers in elderly care. Suggestions and guidance]*. 2011, Stockholm: The National Board of Health and Welfare.