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Quality Improvement Project Proposal to Reduce Inflamed Gums of Elderly in Home Care Facilities

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<p>Inflamed gums is caused by infection on the gingival area as a result of poor oral hygiene that most of the elderly of the nursing home is suffering. The purpose of this quality improvement proposal is to reduce the inflamed gums of the elderly in nursing home facilities. The project's intervention is designed to guarantee that elderly will receive the brushing regimen properly twice daily, as advised by the Finnish Dental Association.</p> <p>The model for improvement using PDSA cycle will be used in this project and will be utilized a self-develop measurement tool in collecting data for the brushing regimen and will also be used the periodontal index tool to determine the incidence of the inflamed gums among elderly nursing home care facility. The data collected is analyzed using excel sheet, run chart and control chart.</p> <p>In this quality improvement project we learned that oral health of the elderly in the nursing home facility is poor and given less priority when in terms of care. The importance of proper oral health care among elderly in nursing homes and by providing brushing regimen properly twice a day will help reduce the inflamed gums significantly. The role of the caregiver in this project has a huge impact on how this project succeed.</p>	
Key Words	inflamed gums, elderly, homecare, caregiver

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1 Introduction

1.1 Problem statement

The problem identified in a home care facility is that most of the elderly is suffering from pain and discomfort in chewing due to inflamed gums caused by infection on the gingival area as a result of poor oral hygiene. Since the elderly are unable to take care of themselves fully, they are dependent on their caregivers to maintain proper oral health. Caregivers frequently overlook the oral care without even trying to persuade the elderly, in their haste to get the job done.

The main causes of poor oral health, particularly with long-term care (LTC) or elderly people living in home care facilities, are caregiver's lack of time, resident's inability to cooperate, insufficient resources to maintain oral hygiene and low residents' motivation. However, adequate practice and a positive attitude from caregivers can help the residents maintain good oral hygiene, oral health, and residents' general health. (Stančić et al., 2016: 668-673.)

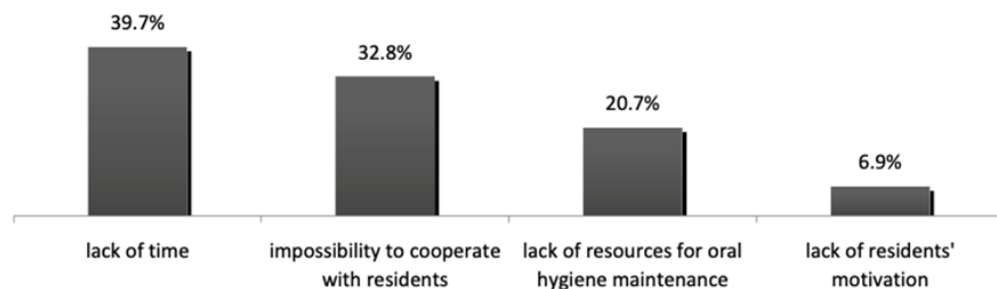


Figure 1. Main barriers to maintaining oral hygiene of the residents (Stančić et al., 2016: 668-673).

Nursing home residents are a particularly vulnerable group because of their poor oral health status compared to the majority of the population. Due to varying degrees of physical and cognitive deterioration and associated behavioral concerns, residents may rely primarily on caregivers for all aspects of their oral care, giving up control and personal autonomy. Because oral health is frequently neglected in nursing homes, screening, identification, and treatment of residents' dental problems may be delayed. (Porter et al., 2015: 102.)

The authors of this project were inspired to conduct a quality improvement study of the oral health of the elderly people after witnessing firsthand experiences. The authors became aware of the critical need for more oral care among the elderly while working part-time in three various homecare settings in and around Helsinki, Finland. Oral care is a basic human need, but there are no set of oral health guidelines for the elderly as minimal care requirements in Europe (Chavez et al., 2022: 27-38). As a result, the quality of oral care among the elderly varies greatly from one location to the next. The authors of this study were motivated to find significant studies that will assist caregivers in enhancing their knowledge about the proper oral health care for the elderly as an important role.

Table 1 shows the Root Cause Analysis that is used to identify 5 WHY's of the problem presented.

Table 1. Root Cause Analysis
5 why's Root Cause Analysis
Why do elderly have inflamed gums?
Why don't the elderly get proper oral care from caregiver?
Why the caregiver lack knowledge on proper oral care?
Why there is no training or education for caregiver on proper oral care?
Why there is no strict guidelines on proper oral care for elderly?

1.2 Background of the study

Elderly refers to those people at the age of 65 and above (Janto et al., 2022: 372) living in the nursing homes or residential care that are care dependent. In Nordic nations life expectancy has been rising steadily in Finland, the percentage of the population 65 and older is at 18% and expected to rise to 26% by 2030. As the elderly population grows, so does the number of dentate elderly people, creating an increased demand for oral health services. (Pihlajamaki et al., 2016: 289-294.)

Ability of the mouth and all its components to perform basic tasks like eating, drinking , speaking and breathing defines oral health (WHO, 2022). Also, it encompasses psychosocial elements like wellbeing, self-assurance, and the ability to interact with others with fear of experiencing shame discomfort. The mouth and teeth are vital components for the growth and support throughout life. (Stark et al., 2022: 269.) Oral condition that causes pain and will inhibit the person's ability to eat, speak, swallow,

communicate and smile are inflamed gums, movable teeth, denture issues and tooth decay (WHO,2015).

Inflamed gums of care dependent elderly is a result if the mouth is not cleansed thoroughly (Tuliainen et al., 2019: 938-947) and will lead to infection that will likely get worse with time (Erin, 2014: 15). Residents should receive daily oral care from staff members, including twice-day brushing of natural teeth with fluoride toothpaste, daily maintenance of dentures, and usage of oral care products as advised by dental professionals (Erin, 2014:15).

Oral health may have a substantial effect on a person's quality of life and ability to perform out activities of daily living (Porter et al., 2015: 102). A person's oral health is an important indicator of their overall comfort and satisfaction (Stark et al., 2022: 269). WHO describe quality of life (QoL) is an individual's impressions of his current circumstances which relate to his objectives, aspirations, standards, and worries, as well as the conditions of culture in which he lived. Quality of life in relation to oral health is a description of how one perceives about their own health, happiness, wellbeing and contentment and ability to function. (Koistinen et al., 2019: 712-722.)

As the world's population ages so does the need for significant improvement of Health services for the elderly people to enhance their health and well-being (De Oliveira et al.,2013: 389-397). Due to its strong relationship to overall health and well-being, oral health is receiving more attention globally (WHO, 2019). Keeping excellent dental hygiene is necessary in maintaining a good oral health for elderly individuals who depend on assistance (Koistinen et al., 2019: 712-722).

It was found out that majority of care dependent people have poorer oral health condition and thus the need for more preventive intervention must be implemented. (Bellander et al. 2020: 1262-1274). It is difficult for elderly individuals who lives in residential homes with cognitive impairment and limited functional capacity to maintain good oral hygiene, and these individuals frequently require assistance from caregivers (Tuliainen et al., 2019: 938-947). The delivery of oral care to residents can be difficult for nursing home personnel for a number of reasons, such as patients' resistance to

care, inadequate training, limited time, or coping techniques given more priority over other health care needs (Johansson et al., 2019: 107-115).

European College of Gerontology (ECG), European Geriatric Medicine Society (EUGMS), Task and Finish (T&F) group have developed a plan to implement, taking into consideration several factors like poor oral health of elderly people, factors that affect good oral hygiene and prevention of oral problems, most especially people who are weak and has disability (Table 2). There are three major areas of focus:

(1) Educational Action Plans – Theoretical and practical instruction should be a regular part of the oral health education program in institutional set up. Training should aim to improve not only knowledge but also staff's attitude towards the oral health program.

(2) Health Policy Action Plans – development and implementation of proper health strategies to enhance elderly people's oral health and (3) Citizen Empowerment and Involvement – Individual's willingness to obtain dental care, developing strategies thru cooperation with healthcare team in assessing oral health and encouraging lawmakers to pass laws that will promote oral health most especially for elderly people dependent for care. (Kossioni et al., 2018: 609-013.)

Table 2. ECG/EUGMS Task and Finish Group on Gerodontology Propose Guidelines (Kossioni et al., 2018: 609-013.)

3 Major Areas to Focus:	
1. Educational Action Plans	
<p>1. Learning Objectives for Training of Non-Dental Healthcare Professionals in Oral Health Assessment and Promotion of Older Adults.</p> <p>Non-dental healthcare providers involved in the care of older adults should be competent to:</p>	<ul style="list-style-type: none"> - Recognize oral health as part of multimorbidity and consider its impact on the general health and quality of life of older adults. - Reflect current medication regimens towards their impact on oral health. - Perform an initial assessment of oral health status and discriminate normal from abnormal findings in the oral cavity - Identify and process common oral conditions in older adults - Demonstrate oral hygiene measures to older adults their caregivers and assist or provide daily oral hygiene when necessary. - Develop strategies to overcome barriers to oral health maintenance and access to dental care - Actively communicate findings and interventions to other healthcare professionals as part of an integrated comprehensive care plan and collaborative practice.
2. Health Policy Action Plans	

<p>2. Health Policy Action Plans for Improving Oral Health in Older Adults</p>	<ul style="list-style-type: none"> - Incorporate preventive oral health care in routine medical care, - Integrate oral health assessment into general health assessments and comprehensive geriatric assessments, - Integrate oral care to public health care coverage, - Promote interprofessional collaboration and practice of dental and other care providers of older persons, - Promote oral health prevention campaigns for the public, - Integrate oral health into general health-promotion activities, - Offer free dental examinations for older adults in community settings and residential care, - Ensure access to dental care and support domiciliary care, - Promote and fund research on effective oral healthcare professionals in oral health assessment and promotion, - Encourage companies to develop appropriate oral care products for older adults and promotion, - Encourage companies to develop appropriate oral health care products for older adults and promote campaigns, - Ensure legislative and policy developments and protocols on oral health promotion targeting residents in institutional care settings (e.g. nursing homes, residential care, assisted living long-term care hospitals) (see table 3)
<p>3. Citizen Empowerment and Involvement</p>	
<p>3. Legislative and Policy Developments and Protocols for Oral Health Prevention and Promotion in Institutional Settings for Older Adults (e.g., Nursing Homes, Rehabilitation Centers, Residential Care, Assisted Living, Long-Term Care Hospitals)</p>	<ul style="list-style-type: none"> - Ensure that oral health assessment is incorporated into the medical entry assessment, - Provide daily oral and denture hygiene, - Train caregivers in providing daily hygiene to residents, - Ensure accessibility of oral healthcare products, - Provide and promote a healthy diet that protects oral health (e.g. limit sugar and refined and processed foods: avoid beverages and foods rich in sugar between meals; provide more vegetables, cheses, and milk) - Ensure access to emergency and routine examinations and comprehensive dental services, - Provide regular oral screenings for resident using appropriate validated tools.

2 Review of Literature

The aim of our literature review is to describe (1) the main barriers in maintaining proper oral health care of the elderly in nursing homes and (2) the interventions needed to reduce inflamed gums of elderly in home care facilities. A database search from

CINAHL and PubMed was conducted after identifying the main concepts using FACET/PEO analysis. Search terms used were Elderly in nursing home”, “oral health” and “inflamed gums” as the main keyword (Table 3).

Table 3. PEO/FACET Analysis

Population:	AND	Exposure:	AND	Outcome:
Elderly in Nursing home		Oral Health		Inflamed Gums
Elderly		Oral health		Gingival disease
OR		OR		OR
nursing home		Oral		Gingivitis
OR		OR		
Older persons		Mouth		
OR		OR		
Aged		Dental care		
OR		OR		
Home for the aged		Hygiene		

The databases used to collect data for the project included: PubMed and CINAHL. The main keywords used for this search were “Elderly in nursing home”, “oral health” and “inflamed gums”. Furthermore, keywords with medical subject headings (MeSh) were used as follows: ((elderly OR “nursing home” OR “older persons” OR aged OR “home for the aged”) AND (“oral health” OR oral OR mouth OR “dental care” OR hygiene)) AND (“gingival Disease” OR gingivitis) (Table 4).

Table 4. Database search

Database / Date/ Limits	Search Phase	Total number of citations	Papers included based on title	Papers included based on abstract	Papers included based on full text
CINAHL Accessed: 11 November , 2022 Limit: 2012 - 2022	((elderly OR "nursing home" OR "older persons" OR aged OR "home for the aged") AND ("oral health" OR oral OR mouth OR "dental care" OR hygiene)) AND ("gingival Disease" OR gingivitis)	239	15	8	4

PubMed/ 24th October 2022 Limit: 2012 - 2022	((elderly OR "nursing home" OR "older persons" OR aged OR "home for the aged") AND ("oral health" OR oral OR mouth OR "dental care" OR hygiene)) AND ("gingival Disease" OR gingivitis) "gingival bleeding" OR gingivitis)	4,292	11	5	3
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To identify relevant and up-to-date articles, inclusion and exclusion criteria was implemented to reduce the number of articles to be reviewed. Articles excluded from the study were those which did not meet the criteria (Table 5).

Table 5. Inclusion and Exclusion Criteria

Inclusion	Exclusion	Rationale
Criteria 1: Studies that focus on oral health and reducing inflamed gums of elderly in nursing homes.	Criteria 1: Studies that focuses on oral health and reducing inflamed gums on children to adult.	Rationale 1: This project focus on oral health and reducing inflamed gums of elderly in nursing homes only.
Criteria 2: Article published from 2012 to 2022	Criteria 2: Article published before 2012	Rationale:3 To gather relevant and latest articles.
Criteria 3: Articles with intervention aimed to reduce inflamed gums of elderly in nursing homes.	Criteria 3: Articles with intervention related to other diagnosis	Rationale 3: To find intervention to reduce inflamed gums of elderly.

A total of five articles were selected, reviewed and summarized (Table 6) composed of mixed studies, randomized control trial, randomized & single-blinded study, controlled clinical trial and controlled, longitudinal interventional study. Studies were conducted mostly in European countries with four studies from Germany and one study from Sweden. Results from these articles addressed questions and queries regarding barriers in maintaining proper oral health and the interventions needed to reduce inflamed gums of elderly people living in home care facilities (Table 6).

Table 6. Description of the included articles

Author, Year, Country	Purpose	Sample	Design/method/(scale/tool), analysis	Main findings
Barbe et al. 2019, Germany	To determine the efficacy of regular tooth brushing by a nurse on oral health of nursing home residents.	50 participants, aged 83+ living in nursing home	<p>RCT- randomized controlled trial (n=25 test group-to brushing by dental nurse every 2 weeks for 3months) and (n=25 control group- oral hygiene procedures performed/ controlled by nursing home staff.</p> <p>Group differences(unpaired t test or fisher's exact test)</p> <p>Wilcoxon signed rank test and Friedmann's test with alpha adjustment</p> <p>oral hygiene parameter as baseline plaque index (PI), gingivitis index (GI), papilla bleeding index (PBI), oral hygiene index (OHI), and Volpe-Manhold Index (VMI)</p>	After professional brushing for 3 months, there were improvements in PI, GI and PBI, with significant increases compared with the control group in OHI and VMI (P=0.017 and P< 0.001, respectively).
Zenthöfer et al. 2013, Germany	To compare 3 types of intervention for Improving oral hygiene with a control	106 living in long-term care homes	<p>Randomized and single-blinded study, (n=27- re instructed and re motivated) by a dentist, (n=26 – re motivated) by, staff educated and dental hygiene (n=26 – not re motivated after professional cleaning of teeth and dentures), (n=23 controlled group-there was no intervention).</p> <p>Main target clinical data: mean plaque (plaque-control record, O'Leary), gingival bleeding (Ainamo/ Bay), and denture hygiene indices.</p> <p>Mixed-model analysis performed for each main target variable</p>	Compared with controls, denture hygiene, plaque, and gingival bleeding indices were significantly lower in the intervention groups over a twelve-week period (mixed model for repeated measurement; p< 0.023)

Schwindling et al. 2017, Germany	To investigate the long-term effectiveness of oral health education of caregivers in nursing homes with care-dependent and cognitively impaired residents	269 residents from 14 nursing homes	Controlled clinical trial Oral health was assessed at baseline and after 6-12 months by use of the Plaque Control Record(PCR), Gingival Bleeding Index(GBI), Community Periodontal Index of Treatment Needs(CPITN), and Denture Hygiene Index(DHI).	After 6-12 months, PCR and DHI were significantly improved in the intervention group. For PCR, the intergroup difference of improvements was -14.4(95% CI: -21.8; -6.9) after 6 months. After 12 months, the difference was -16.2(95% CI: -27.7; -4.7). For DHI, was -15(95% CI: -23.6; -6.5) after 6 months and -13.3(95% CI: -24.9; -1.8) after 12 months. There was neither a statistically significant effect on GBI nor on CPITN. Care dependency showed a substantial trend to smaller improvements in PCR(P=0.74) while an inverse effect was apparent for DHI(P<.001)
Croonquist et al, 2020, Sweden	To describe the effects for nursing home residents of monthly professional cleaning and individual oral hygiene instruction provided by registered dental hygienists (RDHs), in comparison with daily oral care as usual and to study the knowledge and attitudes among nursing staff regarding oral health care and needs.	146 residents from 9 nursing homes	RCT- randomised controlled trial(intervention group (I; n=72) or control group (C; n=74) Oral health-related data was registered with the mucosal-plaque score index (MPS), the modified sulcus bleeding index (MSB), and root caries. The nursing staff's attitudes and knowledge were analysed at baseline and at six-month follow-up. Statistical analysis was performed by Fisher's exact test and two-way variance analysis (ANOVA).	Improvements were seen in both Group I and Group C concerning MPS, MSB and active root caries. The nursing staff working with participants in Group I showed significant improvements regarding the Nursing Dental Coping Beliefs Scale (DCBS) in two of four dimensions, oral health care beliefs (p=0.0331) and external locus of control (p=0.0017) compared with those working with Group C. The knowledge-based questionnaire showed improvement (p=0.05) in Group I compared with Group C.
Barbe et al. 2020, Germany	To investigate the efficacy of professional brushing using a specialised brush every three weeks and its impact on geriatric outcomes.	40 nursing home residents	Controlled, Longitudinal Interventional study Their general clinical, geriatric and oral health (number of teeth, periodontitis, Gingivitis Index, Plaque Index, Root Caries Index, Volpe-Manhold Index [VMI]) were investigated, and Geriatric Oral Health Assessment Index (GOHAI) was obtained before and after three months.	Seventy-six percent of participants suffered from periodontitis, while 48% had partial and 20% total dentures. After three months, VMI had decreased vs baseline (P < .001). An improvement in nutritional status (P = .012) was found in residents with dementia after the intervention, as well as an improvement in the GOHAI (P = .031) in all participants.

Summary of the Results of the five (5) selected articles

Barriers in maintaining proper oral health care of the elderly in nursing homes

Two main barriers in maintaining oral health of the elderly are identified were (1) Lack of knowledge of caregiver- insufficient knowledge of the staff in oral hygiene (Barbe et al., 2019: 327-335; Croonquist et al., 2020: 1305-1315) and (2) Inability of self-care - patient's lack of energy, immobility and multimorbidity (e.g. dementia) (Barbe et al., 2019: 327-335; Barbe et al., 2020: 1305-1315; Croonquist et al., 2020: 1305-1315).

Theme1: Lack of knowledge of caregiver

Caregivers are essential to both providing high quality care and maintaining a good oral hygiene of the elderly in the nursing homes. However, depending on their educational background, the amount of work they are assigned and how satisfied they are with their jobs overall, knowledge and attitudes may vary. According to a poll on the knowledge and attitudes of nursing staffs towards oral health care, most of them thought that patient will ask help only when they needed it. The poor quality of oral care provided in elderly nursing homes worsen by the nursing staff's lack of proper dental hygiene protocols. (Barbe et al., 2019: 327-335.)

Theme 2: Inability of self-care

Loss of independence is mostly brought on by a decreased functional health state. Self-care is thought to be an important tool for preserving healthy function. Thus, nursing home residents frequently have dementia and immobility, which may make it difficult for the staff to undertake proper dental hygiene routines on them. (Barbe et al., 2020: 238-250.) A study shows, that there were 6 patients who were unable to remove their dentures by themselves and depend on caregiver to remove it. Overall, 65% (n = 26) brushed their teeth by themselves, but 97.5% (n = 39) of all participants wished to receive further assistance for their tooth brushing routine. (Barbe et al., 2019: 327-335.) Each individual's requirements for self-care are unique and depend on each individual's level of movement and health status. Identifying the capability and types of care an individual needed followed by a discussion with the patient. Interventions to

improve the oral health care and reduce the inflamed gums of the elderly in nursing homes.

The two intervention identified in improving oral health care and reducing inflamed gums of the elderly are (1) professional toothbrushing - to improve oral hygiene (Barbe et al., 2019: 327-335; Zenthöfer et al., 2013: 261-268; Croonquist et al., 2020: 1305-1315) and (2) caregivers training and education - healthcare staff dental training in performing basic dental hygiene(Schwindling et al., 2017: 109-117; Barbe et al., 2019: 327-335; Barbe et al., 2020: 238-250; Croonquist et al., 2020: 1305-1315).

Theme 1. Professional toothbrushing

Professional toothbrushing has a beneficial effect on gingival bleeding and with regular professional dental cleanings help nursing home residents maintain better oral hygiene and may even lower their risk of developing root caries. (Croonquist et al., 2020: 1305-1315). According to three studies oral hygiene can be improved by using professional teeth cleaning.(Barbe et al., 2019: 327-335; Croonquist et al., 2020: 1305-1315; Zenthöfer et al., 2013: 261-268), and according to one intervention study, professional brushing should be done by a dental professional or dental nurse every two weeks for 3 month to improve oral hygiene (Barbe et al., 2019: 327-335). Oral hygiene can be improved by getting professional teeth cleaning and personalized instruction (Zenthöfer et al., 2013: 261-268; Croonquist et al., 2020: 1305-1315). However, performing assisted oral care, such as brushing teeth, cleaning between teeth, and/or cleaning prosthetics, are challenging and the residents' lack of cooperation was cited as the most significant barrier by 80% (Croonquist et al., 2020: 1305-1315).

Theme 2: Caregiver training and education

Education and training for nursing staff and all healthcare provider is needed to be included in caring for the elderly and must be done by dental professional to support proper oral healthcare (Croonquist et al., 2020: 1305-1315). Nursing staffs were given in-house training on oral health guidelines for daily use in elderly facilities. First, the Nursing home residents were given an educational course on the value of routine oral hygiene and the actual oral health status in the elderly care home. Second, a standardized information about oral health and oral hygiene in the elderly. (Barbe et al., 2019: 327-335.) Oral health education must be available to all nursing home

employees (nursing aides, RNs, and other staff that is involve in decision making for the resident like administrators and managers) and must be taught by a RDH (Registered Dental Hygienist) (Croonquist et al., 2020: 1305-1315). Oral hygiene guidelines for everyday use in nursing homes must be covered in an internal training session for all nursing home employees. This is necessary to give residents with standardized knowledge on how to provide and maintain oral hygiene and supervising resident's ability to perform self-care control the outcome of the intervention. (Barbe et al., 2019: 327-335.) As a result, dental health of residents living in nursing home care who depend on their caregiver shows improvement and was preserved for an longer time because of the caregiver's education. (Schwindling et al., 2017: 109-117) and (Croonquist et al., 2020: 1305-1315). It also provide information on the importance of further research studies about nurse's capacity to provide oral health care in residents living in nursing home care facilities (Croonquist et al., 2020: 1305-1315).

3 Aim and Objectives

The aim of this quality improvement project proposal is to reduce the inflamed gums of elderly by 50% in home care facilities by the end of December 2023. A brushing regimen will be implemented as per recommendation of the Finnish Dental Association.

4. Measurement, Design and Strategy

4.1 Measurement

To measure the number of inflamed gums the dental hygienist will be performed an oral examination to the elderly in the nursing home as a baseline data before the project will start. Then the second collection of data of inflamed gums will be performed by the trained registered nurse every two weeks for the first month of implementation of intervention. The data will be summed into percentage mean values and presented using a run chart to monitor if the intervention is effective on the first month or not. The data collection will continue every two weeks if the intervention is effective and will be tabulated monthly for nine months.

The Periodontal Index (Table 7), Gingivitis Index (GI), which employs a scale of 0 (healthy tissue) to 3 (severe inflammation), is one of the indicators used to assess the condition of the tissue. Gingival Bleeding Index (GBI) range 0-100% will be used to measure and evaluate the percentage of gingivitis. (Barbe et al., 2019: 327-335).

Table 7. Periodontal Index (Barbe et al., 2019: 327-335)

TOOL	RANGE		
Gingivitis index(GI)	0 (healthy gums tissue)	1-2 (mild to moderate)	3 (severe inflammation)
Gingival Bleeding Index (GBI)	0 (no bleeding)	-----	100% (severe bleeding)

In collecting the data, a self-developed instrument will be made in which a weekly tally of brushing regimen will be monitored. The data will be accessed by the nurse manager and the registered nurse to ensure the validity of the entire project.

4.2 Design

This quality improvement project proposal will utilize the model for improvement framework and one part of it is PDSA cycles. Model for improvement framework is a simple and understandable approach that can be used by both big healthcare organizations and small office practices (Courtlandt et al., 2009: 757-778). Plan-Do-Study-Act (PDSA) cycle will be used to implement, to test the ideas and the effect of changes. (NHS QI handbook).

The project team consists of a dental hygienist, nurse manager, two registered nurses and two practical nurses in elderly home care facility. Dental hygienist is responsible for performing the oral examination in collecting baseline data, conducting oral hygiene training and evaluating oral hygiene procedure through return demonstration and also for training the registered nurses on how to perform oral examination and how to use periodontal index.

This quality improvement project will start on the first of April 2023 as the first day of implementation wherein the baseline data of inflamed gums is collected. The result will be tabulated on the last day of the month of April using excel sheet to monitor if the intervention is effective. If yes, the same intervention that is used from the month of April will continue to May, June up to December 2023 (Figure 3).

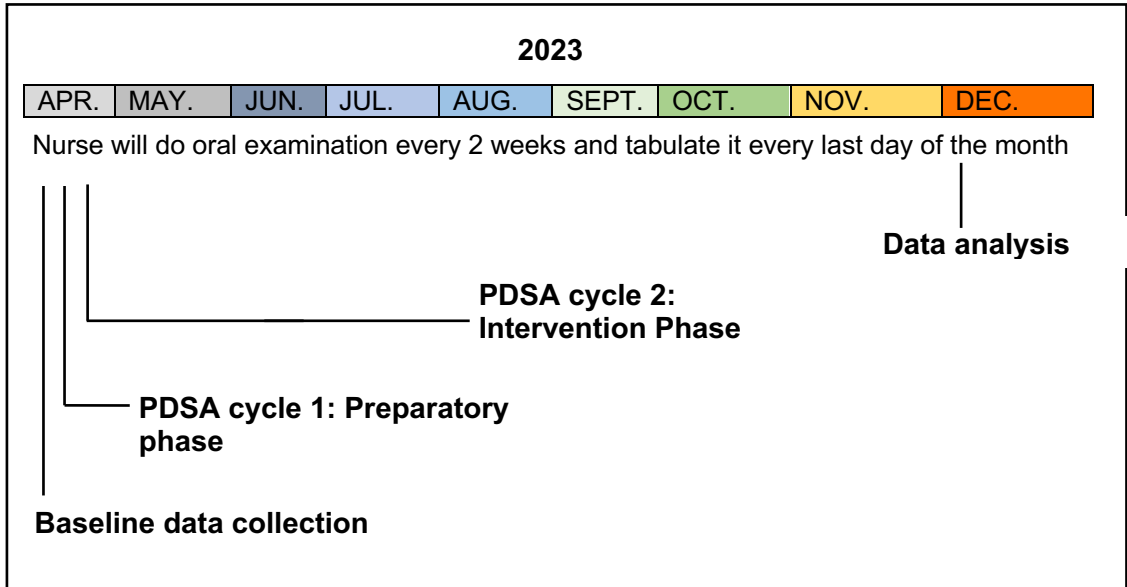


Figure 3. Project timeline illustrating Plan, Do, Study, Act, and phases.

4.3 Strategy

The main intervention of this quality improvement project is the implementation of brushing regimen that will be rendered by the caregivers to reduce the number of inflamed gums of the elderlies in nursing home care facility. This will be supported by caregivers training and lectures on proper brushing regimen.

Plan, Do, Study, and Act (PDSA) cycles will be used to test the elements of the proposed intervention to obtain the 50% rate of reduce number of inflamed gums of the elderlies in nursing home care facility. The project will have two PDSA cycles and have a corresponding goal to assess the improvement process.

4.3.1 Preparatory phase

The goal of this phase is to prepare the caregivers for the implementation of the intervention.

PDSA Cycle 1

The goal of PDSA cycle 1 is to increase caregivers' knowledge and awareness regarding the importance of proper oral health care among the elderlies and applying into practice.

Plan

To plan for two hours training for all the caregivers at different timing according to their availability to ensure that all of the caregivers will be able to attend, the nurse manager will collaborate with the dental hygienist to conduct a lecture-training in the nursing home facility. To develop in-house training material that includes lecture handouts and PowerPoint presentation that includes the anatomy and physiology of the teeth, common oral health problems in elderly and proper brushing regimen. And identify good quality video on proper oral hygiene in elderly form free available resources from internet. As well as to formulate a brushing regimen checklist to use to evaluate the caregivers knowledge on the procedure.

Do

The lecture handouts will be distributed to every caregiver one day before the training. The in-house lecture training will be conducted by the dental hygienists who is responsible for the power point presentation and will discuss the anatomy and physiology of the teeth, common oral health problems in elderly and brushing regimen procedure one day before the implementation of intervention. Brushing regimen will introduce to the caregivers as an intervention to reduce the number of inflamed gums of the elderlies in home care facility.

Study

To evaluate that the caregivers understand the training program, the dental hygienist will ask the caregivers to have a return demonstration regarding the procedure of proper oral hygiene using a dummy. A brushing regimen checklist will be formulated as a tool for evaluation during return demonstration (Table 8).

Table 8. Sample Brushing Regimen Checklist

Brushing Regimen Checklist

Name (optional): _____ Date: _____

Check YES if able to perform properly and NO if not able to perform the procedure properly.

Procedure	Yes	No
1) Prepare all necessary equipment.		
2) Inform the residents about the procedure.		
3) Remove denture (if applicable).		
4) Rinse mouth with water to remove food debris.		
5) Brush teeth facial, buccal and lingual area using circular motion.		
6) Rinse mouth with water to remove toothpaste.		
7) Use floss properly.		
8) Place back denture (if applicable).		
TOTAL		

Act

To act and re-demonstrate brushing regimen based on the result of the checklist. The training will be extended to another hour if needed to ensure that the caregivers understand completely and be able to perform the brushing regimen properly.

4.3.2 Intervention Phase

The goal of this phase is to implement the brushing regimen to the elderlies everyday twice a day properly and document it using self-developed checklist.

Cycle 2

The goal of the PDSA cycle 2 is to ensure that brushing regimen will be implemented properly among elderlies in nursing home care facility.

Plan

A plan to develop a brushing regimen checklist (Figure 2) that will serve as a documentation tool during the implementation of intervention of brushing regimen. The brushing regimen checklist will be presented to the caregivers during the training to inform on how to use it. A plan to develop a restricted folder in the home care computer wherein only the dental hygienist, nurse manager and trained registered nurse has the access.

Self-Developed Instrument Checklist

Name (Optional): _____
 Room No: _____
 Week No: _____

Check box	SHIFT and DATE							TOTAL
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	
Yes								
No								

Figure 2. Self- Developed Instrument Checklist

Do

The self- developed instrument checklist will be place in the patient bathroom and it will be utilized by checking the box YES if the procedure is done and NO if the procedure is not done during the shift by the caregiver assigned to the patient on that particular shift. The trained registered nurse will perform oral examination every two weeks to know whether the incidence of the inflamed gums in the elderly decreased or increased.

Study

The trained registered nurse will tally the YES or NO checklist gathered from the self-developed instrument (Figure 2) every week and will total the results by the end of the month and will be analyzed using run chart (Figure 3). This will show if the brushing regimen is rendered to the elderly. The oral examination every two weeks using the periodontal index tool (Table 7) will also be tabulated by the end of the month. The data will be analyzed using control chart (Figure 4) the result will indicate if the inflamed gums have reduced according to aim. All collected data will be kept and recorded in the restricted folder and will be handed over to dental hygienists for evaluation if necessary.

Act

The results will be studied by the trained registered nurse and will assess the progress of the intervention. If the intervention is effective the same intervention will be carried out for the next month, but in the event that the number of inflamed gums after one month of the implementation of intervention does not change then a follow up check-up to the dental hygienist may be considered.

Sustainability Phase

This project intervention can be sustained by ensuring that the brushing regimen will be a part of daily hygiene routine of the elderly in nursing home facilities. This will be achieved by committing caregivers and monitoring the use of the brushing regimen by the nurse manager.

4.4 Data Analysis

This quality improvement project proposal will use an excel sheet and compute the mean values and will be analyzed using run chart, to display the result of brushing regimen self-developed instrument checklist tally every week monthly and control chart

to display and analyzed the oral examination using periodontal index before the intervention and every two weeks monthly after the intervention for 9 months, aiming to reduce the inflamed gums to <50% by December 2023.

Run Chart (NHS QI Handbook p57) will be utilized to present the data gathered every week from the self- developed instrument checklist for brushing regimen where in the vertical axis will represent number of the brushing regimen compliance and the horizontal axis will be the date of weekly tally after implementation of intervention as shown in figure 3.

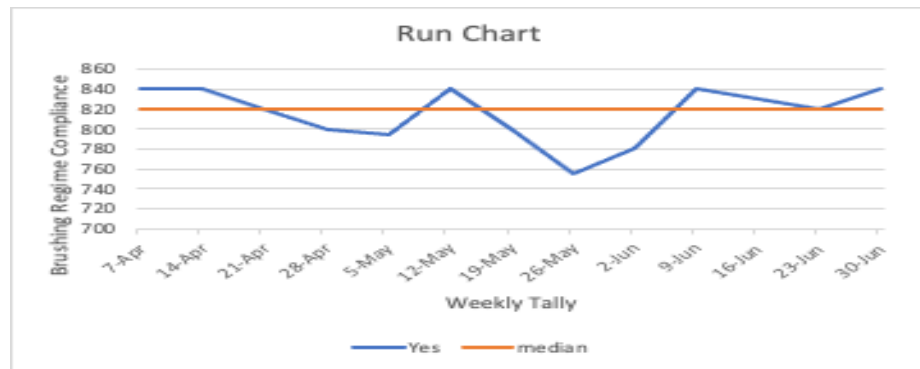


Figure 3. Sample Run Chart for Brushing Regime Checklist (NHS QI Handbook p57).

Statistical Process Control Chart (NHS QI Handbook p161) will be used to present the gathered data wherein the vertical axis will represent the number of participants who have inflamed gums and the horizontal axis will represent the date of oral examination as shown in figure 4.

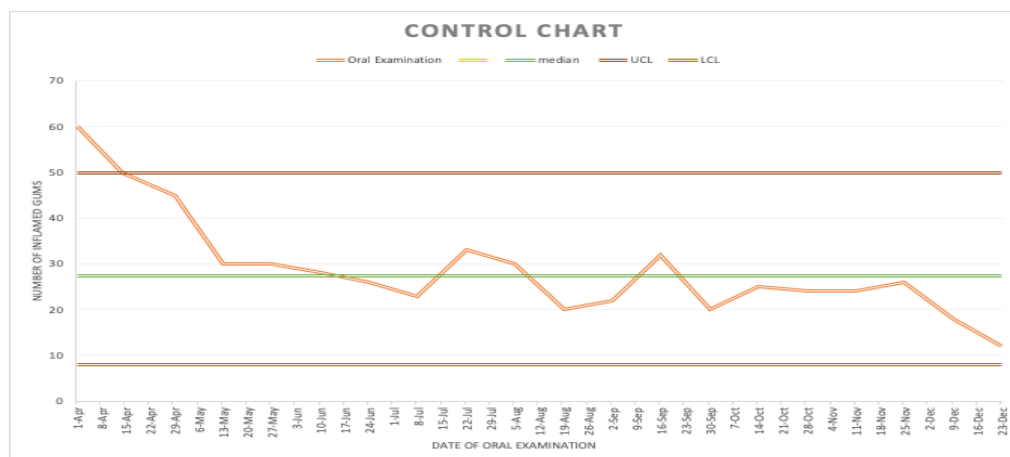


Figure 4. Sample Statistical Process Control Chart for Oral examination (NHS QI Handbook p161)

4.5 Ethical consideration

Before conducting research in the specific place under the city of Helsinki, project team must consider the research and data collection must be feasible without unreasonable efforts from the staff. Project team must contact the unit or office in advance to determine whether the study proposal is feasible and who would be the contact person (supervisor) at the Social Services and health Care Division, to join in planning and implementation of the data collection. (City of Helsinki, 2022.)

Research permit form can be downloaded using the City of Helsinki website with instructions and must be filled completely, stating the place, target group, goals, methods, data gathering and data analysis of the study, along with the consent form that will be given to each individual participating in the study. Application of research permit must be sent to the City of Helsinki Registry Office. Data protection Act 1050/2018 guidelines must be strictly implemented to protect the identity of each person participating in study. In relation to Medical Research Act 488/1999, an ethical statement from National Committee on Medical Research Ethics must be secured. Two to six weeks in time must be allocated by the project team for the processing of the research permit. All materials for data collection will be sent to the City of Helsinki Registry Office. (City of Helsinki, 2022.)

5 Reflections and Conclusions

While working in the elderly home care facilities, most of elderly is suffering from pain and discomfort due to inflamed gums. And in this quality improvement project proposal our aim is to reduce the number of inflamed gums in elderly homecare facilities. The quality improvement methodology of this project utilizes PDSA cycle which is very important framework to use for every quality improvement in healthcare setting wherein this will help the project team to test and learn if the propose change of ideas is effective or not, and also the process of change is less disturbance and bearable to the caregivers.

In this quality improvement project we learned that oral health of the elderly in the nursing home facility is poor and given less priority when in terms of care. The importance of proper oral health care among elderly in nursing homes and by providing brushing regimen properly twice a day will help reduce the inflamed gums significantly. The role of the caregiver in this project has a huge impact on how this project succeed.

This quality improvement project will be beneficial to elderly home care facility and also in healthcare settings in the future as it will help in promoting good oral hygiene and prevent further illness related to poor oral care.

The strength of this project is that caregivers already have knowledge in looking after an elderly, which is why teaching them proper oral routines is much easier. This project has a limitation and weaknesses in which dental hygienists have a minimal visit to the elderly because of restricted sources of funds. Also, the possible barrier of this project if the elderly are uncooperative, will have unplanned hospital visit and in case of death. In addition to weaknesses and limitation in regards to the use of PDSA cycle, run chart and control chart is that the project team is using it for the first time.

References

- Barbe, A. & Kottman, H. & Derman, S. & Noack, M. 2019. Efficacy of regular professional brushing by a dental nurse for 3 months in nursing home residents-A randomized, controlled clinical trial. *International Journal of Dental Hygiene*, 2019, 17, 327-335.
- Barbe, A. & Kupeli, L. & Hamacher, S. & Noack, M. 2020. Impact of regular professional toothbrushing on oral health related quality of life, and nutritional and cognitive status in nursing home residents. *International Journal of Dental Hygiene*, 2020, 18, 238-250.
- Bellander, L. & Andersson, P. & Nordvall, D. & Hägglin, C. 2021. Oral Health among older adults in nursing homes: A survey in a national quality register, the Senior Alert. *Nursing Open*, 2021, 8, 1262-1274.
- Chavez, E. & Kossioni, A. & Fukai, K. 2022. Policies Supporting Oral Health in Ageing Populations Are Needed Worldwide. *International Dental Journal* 2022, 72, 27-38.
- Courtlandt, C. & Noonan, L. & Feld, L. 2009, Model for improvement- Part 1 A framework for health care quality. *Pediatric Clinics of North America*, 2009, 56: 757-778.
- Croonquist, C. & Dalum, J. & Skott, P. & Sjörgen, P. & Wardh, I. & Moren, E. 2020. Professional Oral Care for Care-Dependent Elderly in Nursing Homes- Oral Hygiene, Gingival Bleeding, Root Caries and Nursing Staff's Oral Health Knowledge and Attitudes. *Clinical Interventions in Aging*, 2020, 15, 1305–1315.
- De Oliveira, T-C. & Da Silva, D-A, & De Freitas, Y-N-L. & Da Silva, R-L. & De Castro Pegado, C-P. & De Lima, K-C. Socio-demographic factors and oral health conditions in the elderly: A population based study 2013. *Archives of Gerontology and Geriatrics*, 27, 3, 389-397.
- Erin, D. 2014, Oral health for adults in care homes. *Nursing Standard*, 2014, 31, 15.
- Janto, M. & Iurcov, R. & Diana, C-M. & Neculoiu, D-C. & Venter, A.C. & Badau, D. & Cotonavu, A. & Negrau, M. & Suteu, C-L. & Sabau, M. & Daina, L-G. 2022. Oral health among elderly, impact on life quality, access of elderly patients to oral health services and methods to improve oral health: A narrative review. *Journal of Personalized Medicine*, 2022, 12, 372.
- Johansson, I. & Torge, C. & Lindmark, U. 2019. Is an oral health coaching programme a way to sustain oral health for elderly people in nursing homes? A feasibility study. *International Journal of Dental Hygiene*, 2019, 18, 107-115.
- Koistinen, S. & Olai, L. & Stahlacke, K. & Fält, A. & Ehrenberg, A. 2019. Oral health and oral care in short-term care: prevalence, related factors and coherence between older peoples' and professionals' assessments. *Scandinavian Journal of Caring Sciences*, 2019, 33, 712-722.
- Kossioni, A. & Haito-Bryk, J. & Maggi, S. & McKenna, G. & Petrovic, M. & Roller-Wirnsberger, R-E. & Schimmel, M. Tamulaitiene, M. & Vanobbergen, J. & Muller, F. 2018, An expert opinion from the European college of Gerontology and European

Geriatric Medicine society: European policy recommendations on Oral health in older adults. *Journal of the American Geriatrics Society*, 2018, 66, 609-613

Pihlajamäki, T. & Syrjälä, A-M. & Laitala, M.L. & Pesonen, P. & Vitanen, J. 2016, Oral health care-related beliefs among Finnish geriatric home care nurses. *International journal of hygiene*, 14, 289-294.

Porter, J. & Ntouva, A. & Read, A. & Murdoch, M. & Ola, D. & Tsakos, G. 2015. The impact of oral health on the quality of life of nursing home residents. *Health and Quality of Life Outcomes*, 2015, 13, 102.

Schwindling, F. & Krisam, J. & Hassel, A. & Rammelsberg, P. & Zenthöfer, A. 2017. Long-term success of oral health intervention among care-dependent institutionalized seniors: Findings from a controlled clinical trial. *Community Dentistry and Oral Epidemiology*, 2017, 46, 109-117.

Stancic, I. & Petrovic, M. & Popovac, A. & Vasovic, M. & Despotovic, N. 2016. Caregivers' attitudes, knowledge and practices of oral care at nursing homes in Serbia. *Vojnosanitetski pregled*, 2016, 72, 7, 668-673.

Stark, P. & McKenna, G. & Wilson, C. & Tsakos, G. & Brocklehurst, P. & Lappin, C. & Quinn, B. & Mitchell, G. 2022. Interventions supporting community nurses in the provision of Oral healthcare to people living at home: a scoping review. *BMC Nursing*, 2021, article number: 269 (2022).

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<<https://www.hammaslaakariliitto.fi/en/home/recommendations-finnish-dental-association#.ZDMg9-xBx0s>>. (Accessed on 05 November 2022).

The handbook of Quality and Service Improvement Tools 2010. NHS institute for Innovation and Improvement <<https://wessexahsn.org.uk/img/projects/NHS%20III%20Handbook%20Service%20Improvement.pdf>>. (Accessed on 25 March 2023).

Tuuliainen, E. & Nihtilä, A. & Komulainen, K. & Nykänen, I. & Hartikainen, S. & Tiihonen, M. & Suominen, A. 2020. The association of frailty with oral cleaning habits and oral hygiene among elderly home care clients. *Scandinavian Journal of Caring Sciences*, 2020, 34, 938-947.

Wilkins, E. (2019) *Clinical Practice of the Dental Hygienist*, 11, 321-327.

World Health Organization 2019, Oral Health 2019.
https://www.who.int/westernpacific/health-topics/oral-health#tab=tab_1
(Accessed on 18 October 2022).

World Health Organization 2015. *World report on ageing and health*, Geneva, Switzerland: WHO Press; 2015.
https://apps.who.int/iris/bitstream/handle/10665/186463/9789240694811_eng.pdf?fbclid=IwAR3oem-hI7rB66VplaDmrLsHLpBAAbHAUz86WmSjLonAax42lOpg3yHJjKGg
(Accessed on 18 October 2022).

Zenthöfer, A. & Dieke, R. & Wege, K. & Rammelsberg, P. & Hassel, A. 2013. Improving oral hygiene in the long-term care of the elderly- a RCT. *Community Dentistry and Oral Epidemiology*, 2013, 41, 261-268.