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Oral hygiene in the nursing care of elderly patients

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Abstract

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Oral health is an important aspect in the nursing care of the elderly, as nurses are responsible for providing oral care to the elderly. This Bachelor's thesis aim is to identify the ways nurses implement oral hygiene.

This thesis was organized and conducted as a part of a literature review with an inductive approach of analizing the data. The authors retrieved the articles from Laurea Finna and EBSCOhost databases, which are freely offered to any student of University of Applied Sciences in Finland. The methodology was divided into 2 large sections: the first included the three phases of article selection, and the second the critical appraisal of the reviewed articles. Overall, this thorough review of the articles led to a total of ten articles that were thoroughly examined in the findings.

The findings of this thesis showed that the oral hygiene is not implemented by the nurses, as it should be. The lack of adequate training in relation to oral care, insufficient supplies, lack of ample time, and inconsistent practices were the main factors that contributed to poor oral nursing care of elderly patients in long-term care facilities or hospitals. However, the authors found evidence that there has been continuous effort to optimize oral nursing care by either providing oral care specialized training to nurses or through the implementation of various innovative nursing interventions, which are based on the introduction of kits or other oral care tools that are easily available for the nurses to use. The authors of this paper suggest that the research on how the oral nursing care should be continued, and advocate for nursing researchers to conduct more in-depth analysis of the nursing aspects of oral care.

Key words: Oral hygiene, elderly, nursing

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Abstract

Suun hygienia vanhusten hoidossa

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Suun terveys on tärkeä osa vanhusten hoidossa varsinkin, kun he eivät itse välttämättä pysty toteuttamaan tätä itse. Tämän hoito ja vastuu siirtyvät hoitajille, jotka suunnittelevat ja toteuttavat hoitosuunnitelmia. Ikääntyvät hampaat tulevat usein omien hankaluuksien kanssa, joiden hoitajien pitäisi tunnistaa. Tämä opinnäytetyö keskittyy siihen, miten hoitajat toteuttavat vanhusten suun hygienian toteutuksen.

Tässä opinnäytetyössä pyritään löytämään fokukseen tuloksia kirjallisuuskatsauksen avulla. Opinnäytetyön tekijät ensimmäisessä vaiheessa hakivat artikkeleita hakusanojen mukaan. Tässä vaiheessa löytyi lukuisia artikkeleita. Toisessa vaiheessa karsittiin artikkelit, jotka eivät suoraan liittyneet opinnäytetyön fokukseen. Tämän jälkeen oli jäljellä kymmenen artikkeleita, jotka luettiin perusteellisesti. Näistä sitten kerättiin tuloksia.

Tuloksissa ilmeni, että hoitajat ovat ylikuormittuneita ja tämän takia eivät välttämättä pysty toteuttamaan vanhusten suun hygienian hoitoa. Vanhusten reaktio hoitoon joissakin tapauksissa on este hoidon toteuttamiseen. Hoitajien lisäkouluttaminen liittyen suun hoitoon osoittautui hyvin olennaiseksi. Opinnäytetyössä suositellaan tutkimuksien suorittamista hoitotyössä, jotta olisi enemmän tietoa saatavilla.

Avainsanat: suuhygienia, vanhukset, sairaanhoito

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1 Introduction

Good oral hygiene refers to 'being free of chronic mouth and facial pain, oral and throat cancer, oral sores, birth defects such as cleft lip and palate, periodontal (gum) disease, tooth decay and tooth loss, and other diseases and disorders that affect the mouth and oral cavity' (World Health Organization 2007). Having good oral health and taking care of the teeth and the mouth daily has been shown to play a key role in preventing major diseases, ranging from cardiovascular disease to dementia and respiratory complications (World Health Organization 2012). Furthermore, good oral health allows us among other things to eat and speak properly without any problem, contributing to a better quality of living. We learn from a young age how to brush our teeth at least twice a day, and as we age the teeth, and consequently, the oral health is also influenced. Therefore, taking care of the oral hygiene routinely and documenting it and any possible changes at the individualised nursing care plan are the most basic methods of preventing any complications taken by the nurses.

Oral health care as performed by the registered nurses is divided into three major categories as outlines by RNAO (2008): oral health maintenance refers to the care and the promotion of good oral health especially for patients who have a higher risk of developing any dental related complication, oral health promotion refers to promotion of oral hygiene, and lastly oral health restoration concerning the treatment process of any dental or oral related lesion (RNAO 2008). Similar to the basics of nursing practice the oral health care is tailored by assessing the situation of the oral cavity and the teeth, inspecting thoroughly the area, creating a systematic plan in relation to the oral care, implementing the recommended intervention and reassessing its progress.

It is also significant to highlight that the nurses' workload in real life is, in fact, too high, and therefore with the help of technology that facilitates diagnosing in a clinical setting, and the health promotion, the population can be educated on various health-related subjects. However, often due to the long working hours or lack of time the nurses might implement the oral care fast or even overlook it, unless a patient is already at risk of developing or already having an oral disease or living in a long-term nursing care facility. Therefore, in the US, in the past few years the hospitals and private clinics offer their staff nurses seminars and further education on oral care (RNAO 2008).

The aim of this paper was to examine through a rigorous literature review how the nurses implement oral care to hospitalized elderly patients. For the literature review, multiple articles and researches were studied thoroughly and were, subsequently, analysed and cross-evaluated so that it is tested whether the initial hypothesis was supported or not.

2 Key definitions in oral nursing care of elderly patients

The central concepts of this thesis, such as the nurse, the elderly nursing care, the elderly patient, and the oral hygiene of an elderly patient are explained in detail

2.1 Nurse's role and responsibilities

The role and the responsibilities of nurses have changed dramatically over the past two centuries from the time of Florence Nightingale. Nowadays, nurses undergo thorough education and training before they start practicing nursing in hospitals or in the private sector.

In Finland, the term nurse, in fact, refers to the three types of nurses: the 'lähihoitaja,' 'sairaanhoitaja' and 'terveydenhoitaja.' The term 'lähihoitaja' or a 'practical nurse' refers to the nurses who complete a two-year programme in a Finnish Polytechnic School (Espoo 2017). A 'sairaanhoitaja' or a 'registered nurse/nurse' refers to a nurse who has completed a three-and-a-half-year programme in a Finnish University of Applied Sciences. Within the three-and-a-half-year programme, the nurse would complete seven mandatory clinical trainings, in which the final training is a ten-week long intensive clinical. A 'terveydenhoitaja' or 'public health nurse' refers to a nurse who has completed a four-year programme in a Finnish University of Applied Sciences. If the nursing student or the registered nurse wish to continue their studies and become a public health nurse, the requirement is to complete an extra semester of extensive clinical training, focusing on the duties of public health nurses.

In this paper, the use of the terms 'nurse' or 'registered nurse' refers to the job and the responsibilities of the registered nurses who are working with elderly patients in hospitals or long-term care facilities. This is, primarily, because the literature review, which is conducted by nursing students, encompasses the main duties of the nurses in a hospital and in long-term care facilities with emphasis on the oral care of the elderly patients. Specifically, the nurse's role is to perform daily oral assessments and to identify the potential risk factors that may result in the development of oral health diseases (Nursing Times 2009). A careful inspection of the oral cavity should follow once tooth brushing, flossing, and oral rinsing has been completed (Nursing Times 2009). Afterwards, the nurse should incorporate the need for special attention of oral hygiene in the Nursing Care Plan of the patient (Nursing Times 2009). If there is any need for further evaluation or consultation with either the doctor or the dentist, it will be included in the patient's Nursing Care Plan (Nursing Times 2009).

In Finland, the practical nurse oversees the basic nursing care of patients, therefore they are also trained to identify any changes in the oral health of the patients, and document them in the patient's Nursing Care Plan. However, the registered nurse has greater knowledge of oral

hygiene, e.g. he or she is trained to identify infections in the oral cavity and the face. Therefore, the nurses are able to prevent possible complications in the oral care of the patients.

2.2 Elderly patient

According to the World Health Organization (2016), the most common interpretation of the elderly describes the "chronological age of 65 years old or older; those from 65 through 74 years old are referred to as 'early elderly' and those over 75 years old as 'late elderly.'" There have been various suggestions as to how the elderly should be defined. Not only taking into consideration the chronological aspect, but rather defining the elderly group according to the physiological changes that come as humans age in direct association to their environmental, cultural, genetic and socioeconomic characteristics (World Health Organization 2017). However, in this paper the chronological description of the elderly is adopted because the references used in this literature review define elderly as the individuals aged 65 and over.

The abstract definition of a patient describes any individual who requires professional health care. As a medical term, it refers to any individual who has accepted, is accepting or will accept medical care (MedicineNet.com 2016). In this paper, the term 'elderly patient' is used to describe elderly individuals who have been receiving care by specialized healthcare professionals, and who are not able to take care of their teeth entirely on their own.

2.3 Nursing care of the elderly

Nursing care of elders can be implemented in various nursing environments, such as nursing or retirement homes, facilities of assisted living or geriatric hospital wards. The elderly are often affected by diseases that are prevalent in the latter ages of one's life such as Alzheimer's, Parkinson's disease, dementia, arthritis, tremor and many more (Ekelund 1990). These affect the daily life of the elderly and their ability to cope with daily tasks. This is where nurses step in and aid (Ekelund 1990).

Nurses are required to promote and respect the autonomy of the patient, which is important in the implementation of oral hygiene of elderly patients (Ekelund 1990). The abilities of the patient need to be taken into consideration and promoted to the extent that the patient can independently take care of their activities of daily living and especially their own oral hygiene. This also gives them a sense of independence and control over their life, for instance it can promote and support mental and physical strength of the patient. The nurse, however, does

step in and aid where it is vital and needed. This help varies from patient to patient. Some of the areas that the nurses intervene include morning activities i.e. morning bath, helping with the oral hygiene, supporting and helping the patient get dressed, assisting while feeding, reminding or giving them their daily medications. Some patients may only need encouragement or a slight reminder from a nurse to take their medication. Whereas others may need more assistance from a nurse, depending on their conditions and capabilities.

In oral hygiene, it is essential to maintain the oral health through scheduled inspections of the oral cavity as a well as routine cleaning (Ekelund 1990)

Oral nursing care in this paper is defined as the methods the nurses use to provide oral care to the elderly patients of long-term care facilities or in hospital settings. The oral nursing care includes: assessment of the oral health, tooth-brushing, flossing, use of foam swabs, mouth wash, and denture care (Nursing Management of Oral Hygiene 2004). The elderly patients who are either in a long-term care facility or hospitalized need assistance from the nurses to take care of their oral hygiene.

2.4 Oral hygiene and common oral health complications of the elderly

Oral hygiene is the process of keeping the oral cavity clean of debri particals. Oral hygiene consists of daily gum stimulation, daily brushing, flossing and rinsing of the oral cavity (Berman, Snyder, Kozier, Erb 2007). Promotion of oral hygiene is to be done daily to ensure oral health complications do not occur. However, elderly patients are at an increased risk in aquiring dental caries and other oral health complications Berman et al. (2007). This is due to elderly patients not fully being physically capable of cleaning their own oral cavity, and, consequently, not being able to visit a dentist twice a year. The tools that are needed in oral care practices are: toothbrush, towel, cup of water, toothpaste, mouthwash, dental floss. In the cleaning of dentures the equipment needed are: denture container, washcloth, toothbrush, denture cleaner or toothpase, cup of water, container of mouth wash and towel Berman et al. (2007).

Futhermore, when oral hygiene is not being done on a daily basis oral health complications can occur especially to the elderly. It can lead to several different conditions such as periodontal disease, as mentioned in Clinician's Guide to Oral Health in Geriatric Patients by Ship (2010). Periodontal disease, (also known as periodontitis or gum disease) is caused by gram-positive, and, also, gram-negative bacteria that reside in the tissues near the tooth (Ship 2010). Some of the central features for periodontal disease are the enlargement of the gingivae, which may also appear to be gingival swelling, inflammation of the oral epithelium, and, also, in some cases periodontal pocketing, which is the formation of deepening in the gums and around the

teeth (Ship 2010). A vital mechanism of treatment of periodontal disease is brushing daily and flossing daily. It furthermore includes antimicrobial drugs, removal of debris, surgical removal of periodontal pockets and antimicrobial therapy locally (Ship 2010).

Furthermore, a vast population of the elderly are affected by another central oral disease known as candidiasis. It is caused by fungal organisms in the oral cavity known as *Candida albicans*. It is in fact the most common fungal organism that is found in the oral cavity (Ship 2010). Several factors cause the presence of candidiasis such as diabetes, immunocompromising conditions, treatments that include antibiotics or corticosteroids as well as some cytotoxic agents (Ship 2010).

The most frequent complications related to oral health of the elderly are as follows: denture-related problems, halitosis, xerostomia, dental plaque, gingival overgrowth, and aspiration pneumonia. One of the very factors that contribute to oral infections is plaque that is present in the oral cavity. Plaque is the build-up of white substance in the mouth, which can lead to the formation of oral cavities (Medicine.Net 2017). Halitosis refers to bad breath and gingival overgrowth is the abnormal growth of the tissues of the gingivae (Kapoor, Sharma, Juneja, Nagpal 2016). Xerostomia, which is usually caused by the use of medications and radiotherapy, translates into dry mouth (American Dental Association 2017). According to the American Dental Association (2017), almost 30% of the patients aged above 65 and 40% of patients above 80 years of age are diagnosed with xerostomia, and the main cause is overmedication. Xerostomia can lead to serious oral care diseases, and can largely be prevented by taking care of the patient's oral hygiene daily (American Dental Association 2017). Aspiration pneumonia is a type pf pneumonia caused by the ingestion of food or liquids into the lungs, leading to infection from bacterial overgrowth in the lungs (Drugs.com 2017). Poor oral hygiene and denture-caused problems increase the risk of aspiration pneumonia incidence amongst the elderly (Drugs.com 2017).

3 Purpose and research question

The purpose of this study was to describe how oral hygiene has been implemented in the nursing care of elderly patients.

Consequently, the research question formed was:
How the nurses implement the oral hygiene in the nursing care of the elderly patients?

4 Methodology

In this paper, the authors conducted an analytical literature review using EBSCOhost and Laurea Finna databases as the main search engines. The methodology of this literature review consists of scholarly journal selections, inclusion and exclusion criteria of given articles, and critical appraisal.

4.1 Literature review

According to Aveyard (2010), a literature review refers to the thorough research and analysis of literature sources that are linked to the topic. During a literature review, the author aims to rigorously collect data on studies that help answer the author's research question (Aveyard 2010). The research question guides the literature synthesis, and when answered, it should contribute to the improvement and further development of a new working culture (Aveyard 2010). The research question is the key component of any literature review, thus it should be centralized to one specific topic of research area (Aveyard 2010). Literature reviews provide their authors with the opportunity to explore published literature on the research topic and incorporate the findings into the review gradually and not all at once (Aveyard 2010).

This thesis dissertation uses extensive cross-examination of various scholarly sources contributes in analyzing, how nurses perform oral care on elderly patients from evidence-based practises in praxis. Furthermore, the authors wished to gain more in-depth knowledge of how oral nursing care is implemented for the elderly patients through a literature review. Additionally, the authors sought to develop their competence to comprehend without any bias the quality of the field research. The implementation of oral hygiene in elderly patients by a nurse is established in this paper by evidence-based findings. These evidence-based findings aim to support the development of the research in the field of oral nursing care.

4.2 Data collection and sample criteria

The data collection was conducted in three separate phases: in Phase I, the researchers of this paper reviewed several articles through Laurea Finna and EBSCOHost. Laurea Finna and EBSCOHost are online library databases offered for free to students of Universities of Applied Sciences in Finland. These databases contain reliable sources, such as scientific articles, student theses, research papers and online textbooks from all over the globe. The authors of this paper used the abovementioned platforms to study different articles from reliable sources with the use of various combinations of keywords, but primarily containing one or more of the following words

or word combinations: *oral care*, *oral hygiene*, *nursing*, *elderly,* and *nursing care* + *elderly*, and their synonyms, such as *geriatrics, aged*, and *dental care*. The use of the word *nurse* was a significant component that contributes to the validity of this paper, as the research question focuses on the oral care of the elderly patients from the nurses' perspective and practical research. The following table demonstrates the keywords that were used with their results in each search engine, the number of articles that were read thoroughly, and the number of articles that were selected according to the minimum inclusion criteria, as mentioned after the table.

SEARCH ENGINE	KEYWORDS	TOTAL NUMBER OF RESULTS	ARTICLES READ FOR COMPREHENSIVE LITERATURE REVIEW	ARTICLES SELECTED FOR META-ANALYSIS
EBSCO HOST	oral care + nursing + elderly	319	6	1
EBSCO HOST	oral hygiene + elderly care	374	3	1
EBSCO HOST	oral hygiene + elderly nursing	155	3	1
LAUREA FINNA	dental health + elderly + nursing	30	7	2
LAUREA FINNA	Oral hygiene + nursing + geriatrics	15	5	2
LAUREA FINNA	elderly patients + oral care + nursing	160	10	1
LAUREA FINNA	oral hygiene + nursing + elderly	155	7	1

LAUREA FINNA	aged + oral + nurse	155	4	1
			TOTAL NUMBER OF ARTICLES SELECTED FOR LITERATURE REVIEW	**10**

Table 1: General information on data collection process

During phase I, the researchers read thoroughly the aforementioned number of articles, and upon group discussion, they decided to select the articles that complied with the following inclusion criteria: relevance with the research question of this paper, time of publication of the articles was set from 2010 onward, papers written in English language, and papers based on reliable sources. The review of the articles during Phase I indicated that the research on oral nursing care is ongoing, and studies have been published throughout the last few years, in an effort to optimize oral hygiene. Therefore, it was decided that the literature review should be conducted on articles published from 2010 onward.

During Phase II, the chosen articles from Phase I were further evaluated, and, in Phase III, the number of articles, amounting to thirteen, were selected for meta-analysis. The inclusion and exclusion criteria are shown in detail in the tables below:

PHASE I **ARTICLES THAT FOLLOW THE MINIMUM INCLUSION CRITERIA** **(from** 2010 onward, reliable sources, relevance to the research question)	
LAUREA FINNA N=195	EBSCO HOST N=1158
TOTAL NUMBER OF ARTICLES FROM PRE-LIMINARY REVIEW COMBINING BOTH SEARCH ENGINES	N=1353

Table 2: Phase I of data selection

PHASE II PRELIMINARY REVIEW	
EXCLUSION CRITERIA	INCLUSION CRITERIA

➢ Articles that were not relevant to the nursing practise or were written for other purposes (such as, focusing on the financial aspect). ➢ Articles that did not refer to clinical /hospital setting. ➢ Articles that the authors did not have full access rights. ….	➢ Articles relevant to the research question ➢ Articles from 2010 onward. ➢ Studies that focused on the nursing aspect of oral hygiene. ➢ Articles that focused on elderly patients.
TOTAL NUMBER OF ARTICLES FOR LITERATURE REVIEW	N=62

Table 3: Phase II of data selection

PHASE III RIGOROUS LITERATURE REVIEW	
EXCLUSION CRITERIA N=52	INCLUSION CRITERIA
➢ Duplicates (N=8) ➢ Articles that focused primarily on the education of nurses without any evidence on how the oral care is implemented in a clinical setting (N=12) ➢ Articles that focused only on intensive care units without any information about the age group of the patients (N=4) ➢ Articles that were written primarily for oral hygienists or dentists (N=24) ➢ Articles addressed to primary caregivers (N=4)	➢ Articles related to oral care implementation (N=3) ➢ Textbook about how the oral care should be implemented by nurses (N=1) ➢ Articles related to evidenced-based educational programmes and interventions of nurses and how it influences the nursing practise (N=4) ➢ Personal accounts of nursing staff in regards to oral care (N=1) ➢ Article about oral health problems as a result of certain diseases and medications (N=1)
TOTAL NUMBER OF ARTICLES FOR META-ANALYSIS	N=10

Table 4: Phase III of data selection

4.3 Critical appraisal

The selected literature for the use of the thesis have gone through a critical appraisal using the appraisal guidelines of the Critical Appraisal Skills Programme (CASP). The purpose of this appraisal was to determine the appropriateness of the health research done in each selected literature along with trustworthiness, results and relevance (CASP 2017). In total three articles were systematic review studies, three qualitative study, three cohort studies and finally one

narrative review, which could not be evaluated under the CASP (2017) model of appraisal. The article could not be evaluated due to not having an appropriate checklist questionnaire using the CASP model.

The guidelines using the CASP (2017) model were as follows: a questionnaire screening tool was used, consisting of ten to twelve questions, depending on the type of the article being used (see Appendices 1-3). All questionnaires consisted of three sections: identifying the articles results as valid, what the results were, and whether the results were helpful or useful locally. The articles used in this Bachelor's thesis were all categorized either as a systematic research article, a qualitative research article, a randomised controlled trial, a cohort study, or, lastly, a case-control study.

In grading the quality of the articles using the CASP (2017) model a mathematical fraction with the format ab will be used to gather a percentage. For this grading system, will represent the number of questions that are answered as yes and b will represent the total number of questions in the checklist. The percentage will be calculated by multiplying the fraction by 100 (% = a100b). Categories will then be addressed using a scale from A to D as follows: Category A (80-100%) Excellent, category B (60-79%) very good, category C (40-59%) good, and category D (0-40%) satisfactory. For the purpose of this thesis, only categories above C were used. The table below indicates the critical appraisal results derived from the selected data:

ARTICLE	TYPE OF ARTICLE	GRADE AND CATEGORY
Baumgartner, W., Schimmel, M., Muller, F. 2015. Oral Health In Dental Care Of Elderly Adults Dependent On Care. 125 (4), 417-426.	Qualitative research	7/10 (70%) Cat. B
Blinkhorn, F., A., Weingarten, L., Boivin, L., Plain, L., Kay,. M. 2011. An Intervention To Improve The Oral Health Of Residents In An Aged Care Facility Led By Nurses. 71 (4) 527-535.	Qualitative research	9/10 (90%) Cat. A
Coker, E., Ploeg, J., Kaasalainen, S. 2014. The Effect Of Programs To Improve Oral Hygiene Outcomes For Older Residents	Systematic literature review	8/10 (80%) Cat. A

In Long-Term Care: A Systematic Review. 7 (2), 87-100.		
Critchlow, D. 2017. Part 3: Impact of Systemic Conditions And Medications On Oral Health. 22 (4), 181-190.	Narrative Review	Ungradable
Diaz, T., Zanone, J., Charmo-Smith., C., Kamoun., H., Barrais, I. 2017. Oral Care in Ventilated Intensive Care Unit Patients: Observing Nursing Behaviour Through Standardization Of Oral Hygiene Tool Placement. 45, 559-561.	Cohort study	9/12 (75%) Cat. B
Forsell, M., Kullberg, E., Hoogstraate, J., Johansson, O., Sjögren, P. 2011. An Evidence-Based Oral Hygiene Education Program For Nursing Staff. 11 (4), 256-9.	Systematic literature review	7/10 (70%) Cat. B
Jablonski, R. 2012. Oral Health And Hygiene Content In Nursing Fundamentals Textbooks. 2012, 7.	Cohort study	10/12 (83%) Cat. A
Johnson, V., B., R.D.H., M.S., Schoenfelder, D., P., Phd, Rn. 2012. Evidence-Based Practice Guideline: Oral Hygiene Care For Functionally Dependent And Cognitively Impaired Older Adults. Journal Of Gerontological Nursing 38 (11), 11-19.	Systematic literature review	8/10 (80%) Cat. A
Lindqvist, L., Seleskog, B., Wårdh, I., Von Bültzingslöwen, I. 2012. Oral Care Perspectives Of Professionals In Nursing Homes For The Elderly. Int J Dental Hygiene, 11, 298-305.	Qualitative research	8/10 (80%) Cat. A
Maeda, Keisuke And Junji Akagi. 2014. Oral Care May Reduce Pneumonia In The Tube-Fed Elderly: A Preliminary Study. *Dysphagia* 29 (5): 616-21.	Cohort study	11/12 (92%) Cat. A

Table 5: Articles of Critical Appraisal

4.4 Inductive analysis

This paper used the inductive approach to synthesize the findings. An inductive analytical method refers to the aim of a research to create results by a thorough and well-structured analysis of raw data, making its findings simple, reliable and valid (Thomas 2006). In other words, the inductive approach explores the development of a new theory which is the product of the data found during the qualitative research.

The authors of this paper started the research and the method analysis of this project with the assumption that deductive analysis would be more useful compared to the inductive approach. However, as the research was progressing, following the different phases (see section Data collection and sample criteria), it became evident that the deductive analysis was no longer beneficial to the study. Upon a brief meeting with the supervisor, the authors discussed with the tutor in charge the difficulties they encountered during the synthesis of the findings. It was then recommended by the supervisor that the study at that stage was leaning more towards the inductive analysis, based on which the paper was already being developed.

The data of the articles that were selected for meta-analysis were organized into two main categories based on the research question of this literature review. Based on that hypothesis, the authors were able to explore through evidence-based data: the ways the oral care was implemented by the nurses in clinical settings, the extent of the implementation, and the reasons why the proper implementation was not being applied. In a later stage, the authors discovered that the oral care is not regularly implemented due to specific reasons. Therefore, the second main category of the data consisted of the different nursing training approaches and various implementation methods that have been used to improve the quality of oral care that was provided to the elderly patients by the nurses.

5 Findings

Through the collection of literature sources, ten articles were rigorously reviewed and cross-examined to determine the ways of "how nurses implement the oral hygiene in the nursing care of the elderly patients." Then the findings were divided into two main categories based on their content: the first category consisted of the reasons why there is inconsistent implementation of daily oral care by the nurses, and the second referred to the continuous effort to improve this situation by providing adequate training to the nurses. The rationale for this division was that throughout the ten reviewed articles the common ground for poor hygiene was that the oral care was not applied by the nurses as it should have been daily or in some occasions it was completely neglected.

5.1 Evidence of how oral care is implemented by nurses

The thorough analysis of the evidence from the select articles suggested that nurses do not follow a homogeneous plan on oral care, which results in the increase of oral health diseases among the elderly patients of long-term care facilities or hospitals. The main determinates were as follows: irregular oral care practises, problems in the supplies and how the management played an important role for insufficiencies, lack of time and of in-depth knowledge on oral care by the nurses.

5.1.1 Inconsistent oral care practises

According to Critchlow (2017), halitosis and periodontal disease were shown to be related to poor oral hygiene in the elderly patients with dementia (primarily those with moderate to severe cognitive dysfunction). Additionally, patients with dementia could hesitate in the removal of their dentures, which need to be cleaned by a nurse, and it could lead to an increasing risk of acquiring denture stomatitis (Critchlow 2017). This usually comes as a result of aggressive behavior, which impedes the implementation of basic oral nursing care, such as toothbrushing, tongue brushing, and flossing (Johnson and Schoenfelder 2012).

The correlation between oral infections and general health complications were evident due to the lack of implementing daily oral hygiene practices in the elderly (Baumgartner, Schimmel and Muller (2015). Patients that have dysphagia with neurodegenerative disease had a higher amount of carcinogenic microbes such as *S.mutans, S. sobrinus* and *Lactobacilli*, which enabled aspiration pneumonia and other diseases to cultivate in the biofilm that is not daily cleaned from the oral cavity with basic oral hygiene by nursing staff (Baumgartner et al. 2015, Critchlow 2017). This resulted in serious health complications for the elderly patients, such as aspiration pneumonia and lower bronchia (Baumgartner et al. 2015).

In the study of Diaz, Zanone, Charmo-Smith, Kamoun, and Barrais (2017), it was found that poor oral health of elderly patients in an intensive unit was contributed to the lack of regular and daily oral care practises by the nursing staff. Additionally, the frequent changes in nursing staff along with the lack of a oral care protocol have been shown to cause further problems in keeping a regular schedule for dental care (Diaz et al. 2017).

5.1.2 Management and availability of supplies

According to the qualitative study of Lindqvist, Seleskog, Wårdh and von Bültzingslöwen (2012) in nursing homes in Sweden, the care manager's role is to ensure that there is high quality of care provided in the facility, finance and staff management. The care managers are not directly involved with the care of the patients, however, they are always kept up-to-date during the weekly meetings about the nursing matters of each unit (Lindqvist et al. 2012). However, the care managers are responsible to ensure that all necessary equipment and supplies are provided, and any lack thereof accumulates to the inconsistency of providing adequate oral hygiene.

The role of the management and how it directly affects the quality of the care provided in any hospital unit or long-term care facility was, also, examined by Diaz et al. (2016). Substantial evidence that the poor oral health of the elderly patients was not only attributed due to the lack of routine oral care implementation, but to the lack of sufficient equipment and supplies, which was primarily caused by poor financial management, was found by Diaz et al. (2017). Blinkhorn, F. A., Weingarten, L., Boivin, L., Plain, J., Kay, M. (2011) revealed how a long-term care facility which consisted of nine large wards had a lack of oral hygiene equipment. Specifically, the storage of the oral hygiene equipment, that was being used by the elderly patients, was not done correctly, thus affecting the quality of the supplies (Blinkhorn et. al 2011).

5.1.3 Overburdened nurses and inadequate knowledge of oral care

Nurses under stress were incapable of providing daily oral hygiene to elderly patients consistently, dedicating only a few minutes to basic tooth-brushing (Baumgartner et. al 2015). Specifically, the nurses in the study of Baumgartner et. al (2015) were aware that due to the great amount of responsibilities, routine dental hygiene was not prioritized over other tasks that were needed to perform. This situation was caused due to time restraints, as the nurses could not allocate more than two minutes for appropriate tooth brushing (Baumgartner et. al 2015).

Similar situations were, also, observed in the study of Diaz et al. (2017), while they were collecting information so that they identify the reasons why oral care was not implemented properly in the unit.

Blinkhorn et. al (2011) reported that at the referenced long-term care facility the policies and protocols did not clearly outline the role of the nurses in relation to the oral hygiene implementation of the patients. As a result, the responsibilities of oral care were to be performed by assistant nurses who were not adequately trained in oral hygiene (Blinkhorn et al. 2011). Blinkhorn et. al (2011), also, stated that the knowledge base of the nurses that were working at the long-term care facility were lacking in oral hygiene and the importance of daily oral hygiene.

In regard to diabetes type 2, Critchlow (2017) explicitly cites that poor oral hygiene can lead to periodontal disease, which research has shown that it has more serious implications for type 2 diabetic patients (Critchlow 2017). Patients with diabetes type 2 can more frequently be affected by candidal infections and drug-induced xerostomia (Critchlow 2017). Therefore, Critchlow (2017) emphasized that the nursing team should be well-trained to identify the risk factors of developing oral disease especially on the three abovementioned patient groups, and prevent them by following the basic oral care routine.

The authors of this paper, also, found in Jablonski's study (2012) that in undergraduate and graduate studies, oral health and hygiene education occupied just one hour or less in the curriculum. Textbook materials in fundamental nursing had limited information or no information on oral hygiene and or lacked the appropriate evidence-based practices in oral health and hygiene (Jablonski 2012). Certain nursing fundamental textbooks did not describe or instruct student nurses on how to implement oral hygiene appropriately and with the right equipment (Jablonski 2012).

5.2 The role of proper oral care training for nurses

The authors identified that there is substantial ongoing research on optimizing oral care methods with training for nurses by dentists and/or oral hygienists. Several researches that were reviewed for the purpose of this thesis included information on how specialized training of oral hygiene for the elderly specifically assisted the nurses to better implement oral care.

Oral hygiene training for nurses was performed in order to improve clinical oral hygiene skills, by changing negative attitudes and perceptions, using scientific evidence as a theoretical base

(Forsell, M., Kullberg, E., Hoogstraate, J., Johansson, O., Sjögren, P. 2011). In Forsell et al. (2011), lectures and visual material, practical training and knowledge-based sessions were mainly used to train nurses in a long-term care facility. In the educational training session, the nurses performing daily oral health hygiene for the elderly were given thorough guidelines about the standardardized oral hygiene procedures and "received hands-on training in tooth-brushing techniques" (Forsell et. al. 2011). Next, groups of four to eight nurses had one detailed consultation with a dental hygienist on how cognitive behavioral therapy techniques can contribute to the overall oral care experience of the elderly patients (Forsell et. al. 2011). The final session was a ninety-minute theoretical training, related to oral health and evidence-based information on the importance of oral hygiene, and how daily oral hygiene routine can decrease the risk of pneumonia and lower respiratory tract infections in the elderly (Forsell et. al. 2011). After the completion of the oral health training, the incidents of gingivitis among the elderly patients were shown to be significantly decreased, thus simultaneously contributing to the promotion of proper oral hygiene (Forsell et. al. 2011).

Three different types of training sessions used in Coker, E., Ploeg, J., Kaasalainen, S. (2014) scholarly journal were reviewed. The types of training sessions were divided into single in-service education sessions, train-the-trainer approach, and active involvement of a dental hygienist to supplement nursing care Coker et. al (2014). The single in-service training session consisted of a sixty to ninety-minute training and educational session with a dental health promoter or a dental hygienist and a dentist (Coker et. al 2014). The information given in this session was related to the equipment that can aide in the use of optimized oral care methods, as well as the ways of using this equipment (Coker et. al. 2014). Moreover, a live demonstration and practical training in oral health hygiene for the elderly focused on the adoption of oral care plans that were individualized for each of the elderly patients (Coker et. al. 2014). The outcomes of the single in-service education session pointed out that the incidents of denture plaque, denture stomatitis, and gingivitis were seen to be significantly reduced upon reassessing the oral cavity in the elderly patients at six months (Coker et. al. 2014).

Furthermore, the train-the-trainer approach was a training session that consisted of a one hour training program, which consisted of an information segment on oral hygiene, a presentation on how to implement proper oral hygiene on elderly patients, and knowledge based documents were given to the nurses (Coker et. al. 2014). The nurses were then assigned to train other staff members in the long-term care facility during a free one hour educational training session (Coker et. al. 2014). The results from this approach, as described by Coker et. al. (2014), were that the some of the nurses did not implement the knowledge in praxis, due to the lack of attendance to the training sessions.

The final training session that was organized included the active involvement of a dental hygienist to educate in detail the nurses on treatment plans, oral health hygiene equipment (Coker et. al. 2014). A dental hygienist performed the cleaning and scaling of elderly patients oral cavity every six months. The training highlighted the importance of removing dentures at night from the elderly's oral cavity was significantly important in the prevention of oral pathogens (Coker et. al. 2014). The results of that thorough training contributed to significant decrease in oral health complications and oral pathogen developments such as denture stomatitis and mucosal yeast (Coker et. al. 2014).

5.2.1 Evidence-based new oral care interventions

Oral bacterial microbes indicate links to cardiovascular disease, lower respiratory tract infections and aspiration pneumonia (which has increased mortality rates among the elderly) (Maeda and Akagi 2014). Therefore, Maeda and Akagi (2014) developed an oral care intervention approach that was given to one group of patients with limitations in their food consumption. The oral care intervention method included (Maeda and Akagi 2014): tooth-brushing and oral mucosa cleaning with a sponge brush and a solution, hydration of the mouth, and salivary gland massage. This study (Maeda and Akagi 2014) highlighted that the group that received oral care intervention daily for almost two years had shown decreased rates of aspiration pneumonia at the end of the study. In the same study (Maeda and Akagi 2014), the group of patients who did not receive the abovementioned intervention showed little to no decrease in aspiration pneumonia rates.

Furthermore, Diaz et al. (2017) researched how the use of a compact oral care kit resulted in an increased rate of regular oral care intervention by the nurses. The oral kit included a suction device, toothbrush with hydrogen peroxide solution, suction swabs with alcohol free mouthwash and two deep suction catheters, missing parts of which would need to be replaced by a nurse at the end of each day (Diaz et al. 2017).

In the practical implementation study of Johnson and Schoenfelder (2012) researched a solution to improve the inconsistencies in the dental practises, aiming to decrease the risk factors of the elderly institutionalized patients who could develop serious oral diseases. Johnson and Schoenfelder (2012) divided the implementation into five steps: First, the use of Oral Health Assessment Tool or OHAT (shown in Figure 1), then an evaluation of oral hygiene-including proper documentation, followed by efficient communication and consistent implementation methods of oral care, creation of a relevant oral hygiene nursing care plan or OHCP, and lastly analysis of various oral care methods with the aim to prevent oral complications (Johnson and Schoenfelder 2012). The results of this five-step method not only helped the nursing staff to

better identify the risk factors, but also to plan and effectively prevent serious oral diseases of the hospitalized elderly patients.

ORAL HEALTH ASSESSMENT TOOL (OHAT) for NON-DENTAL PROFESSIONALS
Primary Care

Patient/Client:

Initial assessment ○ Repeat assessment ○ 1 ○ 2 ○

Date:

*NOTE: A Star * and underline indicates referral to an oral health professional (i.e. dentist, dental hygienist, denturist) is required.*

Category	0 = healthy	1 = changes	2 = unhealthy	Score	Action Required	Action Completed
Lips	Smooth, pink, moist	Dry, chapped, or red at corners	Swelling or lump, white/red/ulcerated patch; bleeding/ ulcerated at corners*		1=intervention 2 =refer	☐YES ☐ NO
Tongue	Normal, moist, pink	Patchy, fissured, red, coated	Patch that is red and/or white, ulcerated, swollen*		1=intervention 2 =refer	☐YES ☐ NO
Gums and Tissues	Pink, moist, Smooth, no bleeding	Dry, shiny, rough, red, swollen around 1 to 6 teeth, one ulcer or sore spot under denture*	Swollen, bleeding around 7 teeth or more, loose teeth, ulcers and/or white patches, generalized redness and/or tenderness*		1 or 2 = refer	☐YES ☐ NO
Saliva	Moist tissues, watery and free flowing saliva	Dry, sticky tissues, little saliva present, resident thinks they have dry mouth	Tissues parched and red, very little or no saliva present; saliva is thick, ropey, resident complains of dry mouth*		1=intervention 2 =refer	☐YES ☐ NO
Natural Teeth ☐ Y ☐ N	No decayed or broken teeth/ roots	1 to 3 decayed or broken teeth/roots*	4 or more decayed or broken teeth/ roots, or very worn down teeth, or less than 4 teeth with no denture*		1 or 2 = refer	☐YES ☐ NO
Denture(s) ☐ Y ☐ N	No broken areas/ teeth, dentures worn regularly, name is on	1 broken area/tooth, or dentures only worn for 1-2h daily, or no name on denture(s)	More than 1 broken area/tooth, denture missing or not worn due to poor fit, or worn only with denture adhesive*		1 = ID denture 2 = refer	☐YES ☐ NO
Oral Cleanliness	Clean and no food particles or tartar on teeth or dentures	Food particles/ tartar/ debris in 1 or 2 areas of the mouth or on small area of dentures; occasional bad breath	Food particles, tartar, debris in most areas of the mouth or on most areas of denture(s), or severe halitosis (bad breath)*		1=intervention 2 =refer	☐YES ☐ NO
Dental Pain	No behavioural, verbal or physical signs of pain	Verbal and/or behavioural signs of pain such as pulling of face, chewing lips, not eating, aggression*	Physical signs such as swelling of cheek or gum, broken teeth, ulcers, 'gum boil', as well as verbal and or behavioural signs*		1 or 2 = refer	☐YES ☐ NO
					Completed by:	

REFERRAL ☐ Referral to oral health professional Date _____ Name _____
INTERVENTIONS ☐ Chronic disease management ☐ Acute illness management ☐ Medication review ☐ Patient/Client/Family education
☐ Referral to health professional ☐ MD ☐ Nurse/NP ☐ Dietician ☐ OT ☐ SW ☐ Community worker ☐ Other _____
NOTES:

Figure 1: OHAT tool (Johnson and Schoenfelder 2012)

Blinkhorn et al. (2011) study introduced an oral-hygiene trolley system to the nursing staff of a long-term care facility, in order to improve the frequency of oral care in their patients. The oral-hygiene trolley (see Figure 2) consisted of all oral hygiene equipment and supplies, with an established outline on the practical use of the trolley for daily oral hygiene (Blinkhorn et al. 2011). The trolley-based system, also, involved training sessions in oral hygiene with questionnaires being given to the nurses and related oral hygiene assessment tools, so that the patient's oral cavity baseline was to be examined at three and twelve month intervals (Blinkhorn et al. 2011).

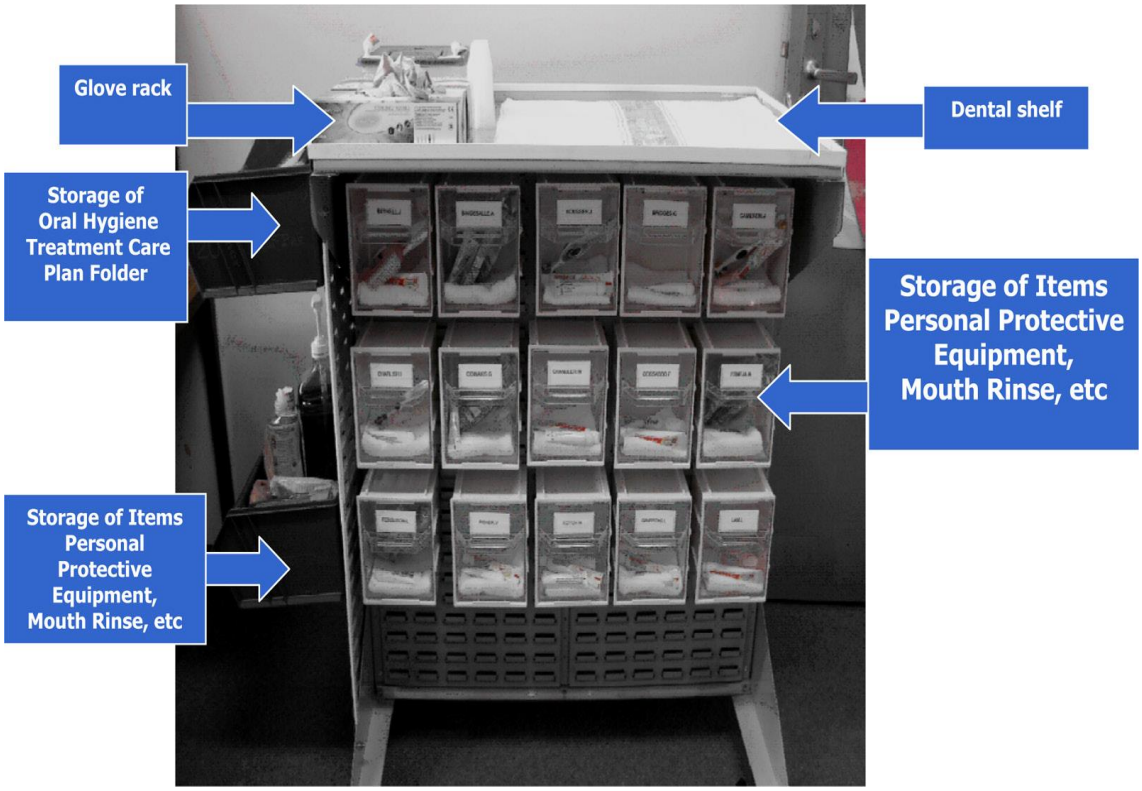

Figure 2: Oral care trolley (Blinkhorn et al. 2011)

The review of the authors of this paper indicated that the success of each intervention approach depended, also, on proper documentation of each intervention at each patient's Nursing Care Plan, which eventually facilitated the internal communication among the nursing staff. Furthermore, weekly nurse meetings and efficient communication were contributing factors to better quality of dental care, resulting in prevention and/ or significant reduction of developing serious oral diseases.

6 Discussion

This section includes a detailed assessement of the findings, a review on the trustworthiness of this paper, and an analysis on the ethical aspects of this literature review.The authors discuss the restrictions of the paper, along with suggestions on what could be researched further in the future by other nursing researchers.

6.1 Discussion on the findings

Through the collection of literature sources, that were retrieved from Laurea Finna and EBSCO Host, and were related to the research question, "how nurses implement the oral hygiene in the nursing care of the elderly patients?" the findings were evaluated for this thesis. The articles indicated that oral care was not being consistently implemented by registered nurses to the elderly. Training was essential in ensuring adequate oral hygiene routines were being implemented daily, in order to prevent oral diseases and or other health conditions such as aspiration pneumonia. However, the findings indicated that nurses are overburdened in their daily routines with patients and oral hygiene is not taken into consideration nor is it set as a priority. This is problematic since a vast majority of elderly patients daily basic needs are not being met.

The common denominator of the findings was that based on sufficient evidence oral care is not provided regularly by the nurses. Many different reasons contribute to this situation. However, the most interesting aspect, which, in fact, generated debate among the authors of this thesis, were the inadequate knowledge of oral care and the nurses' lack of time in providing oral care properly. As two of the authors have professional experience in elderly care, it was discussed that indeed due to the lack of time, many times the oral care routine had to be completed fast.

Furthermore, the shortage or unavailability of oral hygiene supplies in the hospitals and long-term care facilities deemed to be correlated with the lack of proper oral hygiene in the elderly. The simple use of a tooth brushing, flossing and rinsing method, in cleaning the oral cavity daily, prevents further oral health complications. Promotion of oral hygiene in the elderly is missed due to not having oral hygiene supplies available when needed. In one of the studies it shows that by introducing an oral health hygiene trolley the supplies and equipment are on hand, allowing for proper oral hygiene being implemented. The improvements and benefits or daily oral hygiene for the elderly can be seen with less accounts of visible plaque and gingivitis (Blinkhorn et al. 2011).

In the researched articles, training nurses in a hospital, in an intensive care unit or in a long-term care facility was the most common reference point. The articles mentioned that the basic knowledge and training of nurses in oral hygiene from an academic university was questioned. The question that was being stated was whether or not the nurses were being adequately educated on oral health hygiene when completing their bachelor degree in an academic setting. When investigating the materials for educating nurses, for example, text books in nursing fundamentals, in a university setting lacked information on oral hygiene was noted. The lectures and amount of in class learning on oral health hygiene was limited. This limitation, which is the lack of time of oral health education in an academic setting, could be a factor in the lack of consideration of oral hygiene in elderly patients in a hospital, in an intensive care unit or in a long-term care facility.

Lastly, by using an Oral Health Assessment Tool, when assessing elderly patient's oral cavity, nurses at hospitals and long-term care facilities can better apply the oral care that is required. This assessment tool in conjunction with daily oral hygiene routine would help aide in preventing oral health complications such as aspiration pneumonia and oral candidiasis.

6.2 Trustworthiness

As this literature review follows the principles of qualitative research analysis, the trustworthiness of the paper is based on its credibility, reliability, transferability, and objectivity (University of California Santa Cruz 2017).

Credibility is directly linked with the research question by indicating whether it is defined well or not, requires rigorous analysis, refers to the purpose of a study, and whether the articles that were reviewed for this paper had been peer-reviewed by fellow researchers after their publication (University of California Santa Cruz 2017). Additionally, two of the authors have almost a year of professional experience each, working with elderly patients as Registered Nurses – which adds to the credibility of this literature review, as they have already professional experience with the ways oral care is implemented for the elderly patients. Regarding the data, it was collected with the use of two platforms, Laurea FINNA and EBSCO Host, which are provided to Laurea nursing students for free. Both platforms contain articles, books or research papers published for scientific purposes - therefore the establishment of credibility was performed by systematically researching, and finally comparing several articles before choosing the ones that would be used according to the inclusion criteria, as described under the data collection and selection criteria (see Paragraph 4.2). The emphasis for the selection of the articles was to ensure that the data derived from different sources, and they were relevant to the research question. To demonstrate the credibility of the sourced used for this literature

review, the authors observed in detail the consistency of the results published by different authors in different settings/ countries. In order to improve the quality of this paper, it was necessary for the authors to meet with their supervisors, and discuss the contradictions in some of the results, as well as to unravel the authors' dispositions.

Reliability focuses on whether the research at hand can be repeated and is accurate (Golafshani 2003). According to Golafshani (2003), reliability entails the degree to which the findings of the qualitative research are accurate, coherent over time in relation to the specifics of the research question, can be replicated with a related methodological approach. In this paper, the reliability is established by sharing this thesis with a party of opponents, whose responsibility is to provide feedback on the thesis along with the teachers in charge of supervising the work of the authors.

Transferability of a qualitative research is defined by how the findings can be implemented and transferred outside of the boundaries of the research at hand (Lincoln and Guba 1985). In regard to this review, the transferability is established through the comprehensive study of the articles that were selected for meta-analysis containing information that were studied or researched in different countries all over the world, therefore the findings of this literature review are transferable. However, it is important to highlight that this research focused on the ways nurses implement oral care for the elderly patients in hospital settings – which limits the amplitude of its findings for individuals aged 65 and over. Because the oral care as implemented by nurses is guided by the same principles regardless of the age of the people receiving it, some of the findings, can be applied, also, to younger people, for example. The main difference is that due to the natural deterioration of the teeth as humans age, the older a person gets, there is a greater risk in developing an oral disease. Furthermore, that is where some of the findings are primarily addressing the risks and the results of bad oral hygiene in elderly individuals.

According to the Association for Qualitative Research (2016), objectivity entails the responsibility of the researchers to disclose all information and truth in their findings of their research regardless of personal biases or predispositions. One of the advantages of this paper is that there were three researchers working closely together. In other words, even in cases where one of the researchers was disputing one of the findings, the other two, because they were impartial and not directly involved with the research of that specific part, they were able to observe the true phenomena. However, many modern social science researchers argue that it is almost impossible for a researcher to not become involved with his or her research, mostly unconsciously done, due to the simple fact that he or she has dedicated enough time and effort on observing phenomena. Nevertheless, the authors of this paper worked in a group as well as individually with impartiality by providing feedback to each other for any possible errors on the scope of the findings, and making recommendations for further modifications of some parts.

6.3 Ethical considerations

Qualitative research, and in this case, literature review generates ethical issues. According to Holloway and Wheeler (NSBI 1995), the most common areas of ethical issues are related to the privacy of the patients, the respect for a patient's dignity and self-determination, and the right of the patient to be fully aware and familiarized with the research that it is taking place.

The articles that the authors utilized to synthesize this thesis included some experimental studies on oral care interventions. However, in the material of the research on the newly introduced implementation-based interventions (see Section 5.2.1), it is not explicitly mentioned about the informed consent of the patients, except for the study of Maeda and Akagi (2014). In this case, the authors of this paper had to discuss whether the possible conflicts that would arise. The authors acknowledged that the evidence-based interventions were primarily addressed to the nurses, hence they included ways of how to facilitate the nurses' tasks, in optimizing the quality of oral care.

Furthermore, this thesis is the work of three participants as opposed to one or two, making it less prone to bias, hence adding to the objectivity of this paper. Three people writing this thesis ensured that everything was checked multiple times, and everyone participated equally in every section of this paper. In addition to three people working on the thesis, the authors had numerous meetings with the tutors, who supervised and were informed of the progress throughout the process of making this thesis.

Another aspect that relates to the writing process, which is vital in writing papers, was to avoid plagiarism. Everything that has been used in this thesis has been carefully referenced so that the origin of the text can be traced. When writing the actual text contexts, the authors ensured to paraphrase everything so that there is no copying from any scholarly articles used. The avoidance of plagiarism is in itself an ethical consideration, since the authors respected the work of other researchers.

6.4 Limitations and recommendations

New articles lack extensive citation due to the fact that they are new. Having articles that are 5-10 years old, citations may not be as much, comparing to an article that is 15-20 years old. For this thesis, the publishing time frame was set between 2010 and 2017. The authors decided to use contemporary articles so that the data is also contemporary and relevant. This method also ensures that the writer has the most advanced information and research regarding the topic. The use of the older articles would have possibly given fruitful information for the findings but were overlooked, to ensure that this thesis was up to date with current and relevant articles making the overall thesis of good standard and meeting the set requirements.

A great number of articles that were retrieved had to be discarded in the process because they were not matching to the inclusion criteria that was decided for meta-analysis. The aim was to find articles from 2010 onward. Multiple articles would have been significant and would have greatly contributed to the findings, however, the articles were overlooked as a consequence of not falling into the eligibility criteria within the right year range that was set for this thesis. Overall, this lead to a lesser number of articles in total, whereas preferably there could have been more.

Upon completion of the thesis, the authors succeeded in answering the initial research question, based on which the literature review was conducted: how do nurses perform oral care on the elderly patients. The findings highlighted that due to the lack of time, insufficient knowledge on oral hygiene, and management problems in relation to supplies were the main factors that contributed to the irregular oral care implementation for the elderly. However, based on that fact, many of the researchers of the articles used organized experimental studies either with the help of training or by introducing other oral care implementation methods to nurses. New researches on oral hygiene and elderly patients can take into consideration the abovementioned factors and based on them, improve ways of oral nursing care implementation in hospital settings and long-term care facilities.

A recommendation for further research would be to organize and conduct quantitative and qualitative research on the oral care of elderly patients as it is performed in hospital settings. Primarily the research could be from the perspective of the nurses, i.e. nursing researchers exploring this area of oral care of the elderly patients, and perhaps finding new solutions that would aid the nurses in providing essential oral hygiene care to elderly patients. A significant contribution would also be giving details of the actual implementation process of the oral hygiene to the elderly by the nurses as this seems to be lacking. This would mean documentation of the process from real life experiences and tracking nursing care plans that are in use. This

would provide tangible information that could very well be utilised in a Bachelor's thesis of similar nature to this one.

Furthermore, nurses that care for elderly patients in a hospital setting and in a long-term care facility should receive, from their workplace, an outlined description on what is proper implementation on oral hygiene practices for the elderly and an outlined oral assessment tool that could help identify probable oral hygiene complications. Next, each hospital setting or long-term care facility should be aware of their inventory of oral health supplies. The nursing care managers would benefit from designating one or two individuals in their ward to do weekly or monthly inventory checks on oral hygiene supplies. This would encourage oral health hygiene implementations when the appropriate equipment is available when needed. Another recommendation would be to hold monthly or quarterly seminars on new evidence-based practises on oral health hygiene for the elderly. This would build promotion and awareness on oral health of the elderly and that implementation is important in preventing further diseases and infections from occurring in a hospital setting and in a long-term care facility.

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Appendices

Appendix 1: Critical Appraisal Questionnaire type 1

10 questions to help you make sense of a Systematic Review

How to use this appraisal tool

Three broad issues need to be considered when appraising a systematic review study:

Are the results of the study valid? (Section A)
What are the results? (Section B)
Will the results help locally? (Section C)

The 10 questions on the following pages are designed to help you think about these issues systematically. The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

These checklists were designed to be used as educational pedagogic tools, as part of a workshop setting, therefore we do not suggest a scoring system. The core CASP checklists (randomised controlled trial & systematic review) were based on JAMA 'Users' guides to the medical literature 1994 (adapted from Guyatt GH, Sackett DL, and Cook DJ), and piloted with health care practitioners.

For each new checklist a group of experts were assembled to develop and pilot the checklist and the workshop format with which it would be used. Over the years overall adjustments have been made to the format, but a recent survey of checklist users reiterated that the basic format continues to be useful and appropriate.

Referencing: we recommend using the Harvard style citation, i.e.:

Critical Appraisal Skills Programme (2017). CASP (insert name of checklist i.e. Systematic Review) Checklist. [online] Available at: *URL*. Accessed: *Date Accessed*.

(A) Are the results of the review valid?

Screening Questions

1. Did the review address a clearly focused question? ☐ Yes ☐ Can't tell ☐ No

HINT: An issue can be 'focused' in terms of

- The population studied
- The intervention given
- The outcome considered

2. Did the authors look for the right type of papers? ☐ Yes ☐ Can't tell ☐ No

HINT: 'The best sort of studies' would

- Address the review's question
- Have an appropriate study design (usually RCTs for papers evaluating interventions)

Is It worth continuing?

Detailed Questions

3. Do you think all the important, relevant studies were included? ☐ Yes ☐ Can't tell ☐ No

HINT: Look for

- Which bibliographic databases were used
- Follow up from reference lists
- Personal contact with experts
- Search for unpublished as well as published studies
- Search for non-English language studies

4. Did the review's authors do enough to assess the quality of the included studies? ❑ Yes ❑ Can't tell ❑ No

HINT: The authors need to consider the rigour of the studies they have identified. Lack of rigour may affect the studies' results. ("All that glisters is not gold" Merchant of Venice – Act II Scene 7)

5. If the results of the review have been combined, was it reasonable to do so? ❑ Yes ❑ Can't tell ❑ No

HINT: Consider whether

- The results were similar from study to study
- The results of all the included studies are clearly displayed
- The results of the different studies are similar
- The reasons for any variations in results are discussed

(B) What are the results?

6. What are the overall results of the review?

HINT: Consider

- If you are clear about the review's 'bottom line' results
- What these are (numerically if appropriate)
- How were the results expressed (NNT, odds ratio etc)

7. How precise are the results?

HINT: Look at the confidence intervals, if given

(C) Will the results help locally?

8. Can the results be applied to the local population? ❑Yes ❑Can't tell ❑No

HINT: Consider whether

- The patients covered by the review could be sufficiently different to your population to cause concern
- Your local setting is likely to differ much from that of the review

9. Were all important outcomes considered? ❑Yes ❑Can't tell ❑No

HINT: Consider whether

- Is there other information you would like to have seen

10. Are the benefits worth the harms and costs? ❑Yes ❑Can't tell ❑No

HINT: Consider

- Even if this is not addressed by the review, what do you think?

Appendix 2: Critical Appraisal Questionnaire type 2

(A) Are the results of the review valid?

Screening Questions

1. Did the review address a clearly focused question? ❑ Yes ❑ Can't tell ❑ No

HINT: An issue can be 'focused' in terms of

- The population studied
- The intervention given
- The outcome considered

2. Did the authors look for the right type of papers? ❑ Yes ❑ Can't tell ❑ No

HINT: 'The best sort of studies' would

- Address the review's question
- Have an appropriate study design (usually RCTs for papers evaluating interventions)

Is It worth continuing?

Detailed Questions

3. Do you think all the important, relevant studies were included? ❑ Yes ❑ Can't tell ❑ No

HINT: Look for

- Which bibliographic databases were used
- Follow up from reference lists
- Personal contact with experts
- Search for unpublished as well as published studies
- Search for non-English language studies

4. Did the review's authors do enough to assess the quality of the included studies? ☐ Yes ☐ Can't tell ☐ No

HINT: The authors need to consider the rigour of the studies they have identified. Lack of rigour may affect the studies' results. ("All that glisters is not gold" Merchant of Venice – Act II Scene 7)

5. If the results of the review have been combined, was it reasonable to do so? ☐ Yes ☐ Can't tell ☐ No

HINT: Consider whether

- The results were similar from study to study
- The results of all the included studies are clearly displayed
- The results of the different studies are similar
- The reasons for any variations in results are discussed

(B) What are the results?

6. What are the overall results of the review?

HINT: Consider

- If you are clear about the review's 'bottom line' results
- What these are (numerically if appropriate)
- How were the results expressed (NNT, odds ratio etc)

7. How precise are the results?

HINT: Look at the confidence intervals, if given

(C) Will the results help locally?

8. Can the results be applied to the local population? ☐ Yes ☐ Can't tell ☐ No

HINT: Consider whether

- The patients covered by the review could be sufficiently different to your population to cause concern
- Your local setting is likely to differ much from that of the review

9. Were all important outcomes considered? ☐ Yes ☐ Can't tell ☐ No

HINT: Consider whether

- Is there other information you would like to have seen

10. Are the benefits worth the harms and costs? ☐ Yes ☐ Can't tell ☐ No

HINT: Consider

- Even if this is not addressed by the review, what do you think?

Appendix 3: Critical Appraisal Questionnaire type 3

(A) Are the results of the study valid?

Screening Questions

1. Did the study address a clearly focused issue? ☐ Yes ☐ Can't tell ☐ No

HINT: A question can be 'focused' in terms of

- The population studied
- The risk factors studied
- The outcomes considered
- Is it clear whether the study tried to detect a beneficial or harmful effect?

2. Was the cohort recruited in an acceptable way? ☐ Yes ☐ Can't tell ☐ No

HINT: Look for selection bias which might compromise the generalisability of the findings:

- Was the cohort representative of a defined population?
- Was there something special about the cohort?
- Was everybody included who should have been included?

Is it worth continuing?

Detailed questions

3. Was the exposure accurately measured to minimise bias? ☐ Yes ☐ Can't tell ☐ No

HINT: Look for measurement or classification bias:

- Did they use subjective or objective measurements?
- Do the measurements truly reflect what you want them to (have they been validated)?
- Were all the subjects classified into exposure groups using the same procedure

4. Was the outcome accurately measured to ☐ Yes ☐ Can't tell ☐ No

minimise bias?

HINT: Look for measurement or classification bias:

- Did they use subjective or objective measurements?
- Do the measures truly reflect what you want them to (have they been validated)?
- Has a reliable system been established for detecting all the cases (for measuring disease occurrence)?
- Were the measurement methods similar in the different groups?
- Were the subjects and/or the outcome assessor blinded to exposure (does this matter)?

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5. (a) **Have the authors identified all important confounding factors?** ☐ Yes ☐ Can't tell ☐ No

List the ones you think might be important, that the author missed.

(b) **Have they taken account of the confounding factors in the design and/or analysis?** ☐ Yes ☐ Can't tell ☐ No

HINT: Look for restriction in design, and techniques e.g. modelling, stratified-, regression-, or sensitivity analysis to correct, control or adjust for confounding factors

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6. (a) **Was the follow up of subjects complete enough?** ☐ Yes ☐ Can't tell ☐ No

(b) **Was the follow up of subjects long enough?** ☐ Yes ☐ Can't tell ☐ No

HINT: Consider

- The good or bad effects should have had long enough

to reveal themselves
- The persons that are lost to follow-up may have different outcomes than those available for assessment
- In an open or dynamic cohort, was there anything special about the outcome of the people leaving, or the exposure of the people entering the cohort?

(B) What are the results?

7. What are the results of this study?

HINT: Consider
- What are the bottom line results?
- Have they reported the rate or the proportion between the exposed/unexposed, the ratio/the rate difference?
- How strong is the association between exposure and outcome (RR,)?
- What is the absolute risk reduction (ARR)?

8. How precise are the results?

HINT: Look for the range of the confidence intervals, if given.

9. Do you believe the results?

☐ Yes ☐ Can't tell ☐ No

HINT: Consider
- Big effect is hard to ignore!
- Can it be due to bias, chance or confounding?
- Are the design and methods of this study sufficiently flawed to make the results unreliable?
- Bradford Hills criteria (e.g. time sequence, dose-response gradient, biological plausibility, consistency)

(C) Will the results help locally?

10. Can the results be applied to the local population? ☐ Yes ☐ Can't tell ☐ No

HINT: Consider whether

- A cohort study was the appropriate method to answer this question
- The subjects covered in this study could be sufficiently different from your population to cause concern
- Your local setting is likely to differ much from that of the study
- You can quantify the local benefits and harms

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11. Do the results of this study fit with other available evidence? ☐ Yes ☐ Can't tell ☐ No

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12. What are the implications of this study for practice?

HINT: Consider

- One observational study rarely provides sufficiently robust evidence to recommend changes to clinical practice or within health policy decision making
- For certain questions observational studies provide the only evidence
- Recommendations from observational studies are always stronger when supported by other evidence