

Integrative Review on the Initiation of a Systematic Oral Care Education Program

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

By

Toni Rochelle Thomas

Liberty University

Lynchburg, VA

December 2020

Integrative Review on the Initiation of a Systematic Oral Care Education Program

A Scholarly Project

Submitted to the

Faculty of Liberty University

In partial fulfillment of

The requirements for the degree

Of Doctor of Nursing Practice

by

Toni Rochelle Thomas

Liberty University

Lynchburg, VA

December 2020

Abstract

Hospital-acquired infections, such as non-ventilated hospital-acquired pneumonia (NVHAP), are significant patient safety concerns. The lack of oral care in the non-ventilated acute care patient population is a significant contributor to NVHAP. The nursing staff is on the front line in providing oral care to hospitalized patients but often lacks knowledge and understanding regarding the relationship between oral care and NVHAP. Searching MEDLINE, PubMed, CINAHL, and EBSCO databases for current, peer-reviewed, scholarly articles for English language articles between 2010-2020 led to supporting findings. These findings revealed missed oral care as the most common modifiable risk factor contributing to increased hospital-acquired pneumonia incidences. Other findings revealed the impact an evidence-based educational program would have on oral care and outcomes. The influence of the learner's engagement with education and training has proven to have substantial benefits.

Keywords: pneumonia, oral care, non-ventilated, education

Dedication

I dedicate this to my grandmother, Josephine Watts and mother, Tina Harris. Both strong, inspirational, God-fearing women are pivotal individuals in my life. These women pour prayers, love, encouragement, and most important a solid foundation over me. It is truly an honor to have my grandmother and mother in my life and share this joyous occasion with them.

Acknowledgments

First and foremost, I want to thank my Savior and Lord Jesus Christ for never leaving me and keeping me on this path to finish. Without Him I am nothing, but with Him, *ALL* this is possible, completion of the doctorate program and graduation. I would like to take this opportunity to acknowledge my team of supporters: my husband, Deon Thomas, Sr., and children (Deon Jr., Brandon, Corey, and Aliyah) who sacrificed their time, attention, and needs to afford wife/mom the opportunity to complete the task the Lord placed upon me. We all can now admit it was not easy, yet we can breathe a sigh of relief.

Next, I would like to acknowledge another set of supporters who pushed me, encouraged me, advised me, and more importantly prayed for me. Carrie Percell, Brittany Kilgore, Dr. Melissa Goodwin, Dr. Janice Hall, Dr. Valerie Wright, Dr. Hannah Harris, my aunt Beverly Watts, and my closest friend/cousin Marquita Hayes. I could not have accomplished this journey without you. Each one of you hold a place near and dear to my heart. I Love You All!

I would like to also acknowledge the gentleman who planted the seed to begin this journey, Elder Tonnie Brown. Unbeknownst to him, one day after church he stopped and talked to me about going back to school and getting a doctorate degree. His exact words were, “Dr. Toni, now that has a nice ring to it. And I know you can do it and great things. Your mother and grandmother would be proud.” And from that day, I could not rest, until I began the process, and here I am, at the end. Thank you, Elder Brown, for believing in me when I did not.

Last but not least, I would like to acknowledge Dr. Lynne Sanders for her patience, encouragement, and inspiration she had with over these past 2 years. I am truly grateful for my chair, Dr. Sanders, and her dedication in continuing to work with me during this process.

Table of Contents

Dedication.....	4
Acknowledgments	5
List of Tables	8
List of Abbreviations	9
Introduction.....	10
Background.....	11
Incidence of Non-Ventilated Hospital-Acquired Pneumonia (NVHAP)	11
Lack of Oral Care	11
Education	12
Problem Statement.....	13
Purpose of Integrative Review.....	13
Significance of the Project.....	14
Clinical Questions.....	14
Project Goals.....	15
Methods	15
Framework	16
Problem Identification	17
Data Collection	18
Literature Search.....	19
Data Evaluation.....	20
Data Analysis.....	20
Presentation of Results.....	23

Evaluation Methods	24
Results.....	24
Study Selection	24
Study Characteristics	27
Results of Individual Studies	27
Synthesis of Results	29
Discussion.....	29
Summary of Evidence.....	29
Limitations	31
Implications for Research	31
Implications for Practice.....	31
Conclusion	32
References.....	34

List of Tables

Table 1 Inclusion and Exclusion Criteria.....	21
---	----

List of Abbreviations

Evidence-based Practice (EBP)

Hospital-acquired pneumonia (HAP)

Hospital-acquired infection (HAI)

Licensed Practical Nurse (LPN)

Non-ventilator hospital-acquired pneumonia (NVHAP)

Nursing Assistant (NA)

Registered Nurse (RN)

Ventilator-acquired pneumonia (VAP)

Initiation of a Systematic Oral Care Education Program: An Integrative Review

Introduction

Research has shown that hospital-acquired infections (HAIs) account for 1.7 million cases per year, costing the healthcare system \$45 billion annually, with many predictors that link to the cause of these infections. Referred to as a nosocomial infection, HAIs are classified as hospital-acquired after the patient's hospital stay exceeds 48 hours. Although HAIs are treatable, these infections are the leading cause of mortality in the inpatient hospital setting and are an enormous financial burden to the hospital organization (Vilela et al., 2015).

The prominent cause of infection is poor hand hygiene in between patient care. Hand washing alone contributes to \$42,000/per life savings for healthcare organizations (Graves et al., 2016). Other causes of HAIs involve improper sterile technique, cross-contamination, immobility, air transmission, and skin flora (Tsai & Caterson, 2014). Surprisingly, recent research suggests poor oral care as an apparent cause of hospital-acquired pneumonia (HAP) of non-ventilated patients (Munro et al., 2018).

Acknowledging a general knowledge deficit of the frontline staff impacts NVHAP tremendously. A knowledge gap exists on the relationship between oral care and NVHAP prevention. Providing an evidence-based education program on oral care will reduce incidences, impact prevention, and ultimately change practice (Forsell et al., 2011). The doctorate candidate will take the evidence researched and support changing practice in the inpatient setting by educating frontline staff on the simple yet powerful preventive oral care measures on NVHAP. Therefore, the student has reviewed and analyzed literature on the lack of oral care, the effectiveness of educating nursing staff, and various teaching methods used to implement and sustain learned practices.

Background

While exploring various infections encountered at the hospital level, many overlook NVHAP and focus on ventilated acquired pneumonia (VAP) (Passaro et al., 2016). Pneumonia ranks as the eighth leading cause of death in the United States and is considered a serious contributor to individuals' illness and death, not on ventilators. A physician typically diagnoses this common infection after careful review of a chest X-ray (CXR). After the CXR confirms pneumonia, the physician begins a treatment regimen of antibiotics to combat the infection (Lyons & Kollef, 2018).

Incidence of Non-Ventilated Hospital-Acquired Pneumonia (NVHAP)

NVHAP is an understudied disease that has gained healthcare providers' attention in recent years (Quinn & Baker, 2016). With approximately 35 million people per year at risk for developing NVHAP, the incidences of the HAI are rising near the rate of confirmed VAP cases (Munro & Baker, 2018). Additionally, The Center for Disease Control and Prevention (CDC) notes NVHAP accounts for 70% of HAP, close to the mortality rate of VAP (Quinn & Baker, 2016).

Lack of Oral Care

Providing oral care at regular intervals is a simple modifiable risk factor in the prevention of NVHAP. This simple intervention is known to improve quality healthcare and achieve desired outcomes during hospitalization (Baker & Quinn, 2018). However, Munro and Baker's (2018) study have shown that the lack of oral care on non-ventilated patients is a contributing factor in the development of NVHAP. Furthermore, regarded as a low priority, the lack of oral care potentially impacts patient outcomes, increases length of stay, and increases mortality rates. In examining the oral cavity closer, Liu (2018) noted oral care's omission contributes to a biofilm

harvesting harmful bacteria, mutating every two to three hours. The bacteria multiply to nearly 20 billion microbes in the human oral cavity and therefore, accompanied by the lack of oral care, increases a patient's risk of aspirating these toxic microbes. The aspiration of these harmful microbes becomes the causative agent in developing hospital-acquired pneumonia (HAP). Therefore, an imperative implementation of a systematic oral care process is utilized to facilitate higher quality care. Implementing oral care two to four times daily has decreased occurrences of NVHAP by 40-60% and ultimately has impacted patient outcomes significantly (Baker & Quinn, 2018).

Education

A contributing factor responsible for decreased lack of oral care includes the frontline staff's lack of experience, lack of knowledge on the correlation it has to NVHAP, and lack of certainty, which impacts proper oral care. With nursing staff as the frontline caregivers and responsible for the provision of activities of daily living, including oral care, and incidence of NVHAP increasing, researchers have recognized a knowledge gap in regards to the correlation between oral care and NVHAP occurrences (Lewis et al., 2017). Educating frontline staff is vital, as it is the frontline staff who are an essential component of the carrying out of oral care with patients. Training will enhance the frontline staff's ability to identify patients at risk for developing NVHAP, the risk for oral mucositis, inflammatory disease of the oral cavity, or patients' ability to manage their oral care (Salamone et al., 2013). Lastly, according to Jenson et al. (2018), a marked improvement occurred in the staff's oral care knowledge once staff received comprehensive teaching. Thus, an evidence-based educational program is necessary for the nursing staff's accomplishment and sustainability to perform oral care on the non-ventilated patient effectively.

Problem Statement

Aware of a knowledge gap with frontline nursing staff on the importance of preventing NVHAP, oral care is one of the most commonly missed nursing care tasks. Therefore, a review and analysis of peer-reviewed scholarly articles are prudent to execute change in nursing practice, increase patient outcomes, decrease HAI rates, and decrease NVHAP by educating nurses on oral care. Thus, an integrative literature review is necessary to integrate the literature on educating nursing staff for decreasing NVHAP occurrences.

Purpose of Integrative Review

The purpose of this integrative literature review is to dissect and analyze the literature on how educating frontline nursing staff will impact the effects of oral care and prevention of NVHAP, and the best methods for educating these nurses. This doctoral candidate was seeking to answer the practice-focused question of whether establishing an evidence-based education program on oral care of the non-ventilated patient will be useful and sustainable. With the integrative literature review, this doctoral candidate also evaluated the impact of various forms of education delivery methods on competency. Improved knowledge could help frontline staff comprehend oral care benefits and practices to prevent adverse effects on the inpatient population.

Nursing staff consists of Registered Nurses (RNs), Licensed Practical Nurses (LPNs), and Nursing Assistants (NAs) working on a medical-surgical unit at a local hospital facility with an evident knowledge gap on oral care and its effects on patients. This doctoral candidate carefully dissected and analyzed from 18 peer-reviewed, scholarly articles. These articles provided information about evidence-based practices (EBPs) and best practices for educating nursing staff on oral care concerning reducing NVHAP occurrences, the performance of proper

oral care, and the importance of frequent oral cavity cleaning. This doctoral candidate conducted a thorough literature review to determine if an evidence-based education program on proper oral care influences frontline staff's knowledge of NVHAP and reduces occurrences. The doctoral candidate anticipates the integrative literature review will significantly impact NVHAP prevention by implementing an evidence-based education program. Thus, providing education to the frontline workers impacts their understanding, knowledge, and sustainability of oral care prevention to NVHAP, as evidenced by an integrative literature review.

Significance of the Project

Evidence indicates a gap in knowledge, education, and training influence increases incidences of NVHAP in a hospital setting. Ranking the second most common HAI, pneumonia is responsible for 5–20 cases per 1,000 hospital admissions (Baker & Quinn, 2018). Magill et al. (2018) revealed HAP accounts for 25% of all HAIs, of which 65% involves NVHAP. Therefore, the lack of knowledge, education, and training on oral care and NVHAP prevention affected both the patients and the facility. Patients experience an increased length of stay in the hospital, decrease in quality of life, and lack of knowledge on oral care's association with pneumonia.

On the other hand, the facility continues to have incidences of NVHAP, the use of higher acuity beds, and accrue in cost to treat HAP. Providing educational tools and resources on oral care and its influence on NVHAP to the key stakeholders, frontline nursing staff, can substantially elevate nursing care practices, decrease NVHAP incidences, and drive cost down. When an oral care education program is implemented, one can expect a 40% reduction in HAP rates (Raghavendran et al., 2007).

Clinical Questions

- Does providing evidence-based education to frontline nursing staff on oral care decrease NVHAP incidences?
- Which teaching methods are best to assist adult learners and improve retention of skill?

Project Goals

The goals of this project are:

1. To explore various teaching methods to enhance the adult learner's knowledge and understanding of oral care's impact on NVHAP and sustain the nursing practice.
2. To provide evidence to support a need to change nursing practice, promote quality nursing care, and impact patients' experience.

Methods

This doctoral candidate performed a literature review search and consulted with a librarian as an expert resource. The student utilized the following databases for her search for current, peer-reviewed, scholarly articles: MEDLINE, PubMed, CINAHL, and EBSCO. A search for studies on adult learners and oral care using a combination and variation of terms *adult learner, educating the adult, teaching methods, oral care, pneumonia, non-ventilation, and effects of oral care* was performed. The search limits specified English language and publication dates between 2010 to present. The student organized applicable articles into a grid to display evidence of results (Appendix A). These searches yielded the potential of 341,897 relevant articles. Appendix B exhibits the total number of articles yielded and then excluded at each stage of the search and selection process. The student considered studies using various forms of methodologies and investigations, and omitted articles for various factors; setting of

study/research, source of abstract did not include pneumonia as a primary nosocomial infection, or oral care was not the stated intervention studied. Articles were further analyzed by the student using the qualitative methods for valid selection. Reasons for exclusion included studies before 2010, articles without full-text, duplicates, non-research articles, abstracts only, and sample size of individuals under 18 years of age. As a result, 18 articles remained for the final review (Appendix B).

Framework

Performing an integrative review involves a systematic approach of compiling and analyzing past and present literature to understand the clinical question, concern, and practice at hand. According to Toronto and Remington (2020), an integrative review varies from a narrative review and a systematic review. An integrative review allows the reviewer to examine a broad spectrum of studies, such as qualitative studies, experimental, non-experimental, and empirical studies. In an integrative review, the reviewer identifies concepts, examines stated evidence and its theories, and evaluates the process of known healthcare issues. Whittemore and Knafl (2005) informed their readers that most reviewers find it challenging to assimilate and dissect various literature sources. Therefore, Whittemore and Knafl provided researchers with the tools and process to perform a successful integrative review by following the steps: (a) identify the issue, (b) perform a search of the literature, (c) evaluate the data, (d) perform an analysis of the data, and (e) present a conclusion of findings.

PRISMA Statement

As healthcare evolves, a need exists for useful systematic reviews and meta-analyses to govern practices. Over the years, discrepancies in the report quality are seen in systematic reviews and meta-analyses. The preferred reporting items for systematic reviews and meta-

analyses (PRISMA), formerly known as the quality of reporting of meta-analyses (QUOROM), is a tool designed to assist writers in improving the quality of reporting systematic reviews and meta-analyses. This updated process allows writers to take articles through the scrutiny of a four-phase diagram to report substantial information. Initially, a flow chart was used to categorize the articles from the databases searched, and compiled to allow for a precise, quality-driven report (Moher et al., 2009).

Toronto and Remington. Similar to a systematic review, Toronto and Remington (2020) identified an integrative review as the researcher's ability to expand the interest level of the written content, contrary to a systematic review, which has a narrow focal point of interest. The integrative review may contain both theoretical and methodological literature to address the subject of the review. Exploring the impact lack of care, education, and teaching methods have on incidences of NVHAP, the student followed the six steps of an integrative review: (a) formulation of purpose or review question, (b) search and selection of literature systematically, (c) quality appraisal, (d) analysis and synthesis, (e) discussion and conclusion, and (f) dissemination.

Problem Identification

NVHAP, a hospital-acquired infection, accounts for a growing concern that impedes patient safety, cost, increased infection rates, increased length of stay, and increased inpatient mortality rate. Baker and Quinn (2018) have shown bacteria in the oral cavity accumulates over time due to lack of oral hygiene. Thus, increasing the possibility of aspirating bacteria contributes to pneumonia development.

Aware of a knowledge gap with frontline nursing staff on the importance of oral care in preventing NVHAP, the student realizes that oral care is one of the most commonly missed

nursing care tasks. Therefore, a review and analysis of peer-reviewed scholarly articles were prudent to execute change in nursing practice, increase patient outcomes, decrease HAI rates, and decrease NVHAP only by educating nurses on oral care. The knowledge gap justified the necessity to perform an integrative literature review to explore the literature to educate nursing staff to decrease NVHAP occurrences, thus, raising awareness of the commonly overlooked performance metric in most healthcare organizations.

Data Collection

Although the process of collecting data is crucial and complicated, over the years, research has been viewed as a "weak" science that lacks substance and rigor (Cope, 2013). However, collecting data for an integrative review must produce meaningful, quality, transparent content for well-designed research. The method of obtaining eligible data can be quite challenging and tedious. Therefore, the use of two or more search strategies is recommended. Using more strategies while researching and collecting data will allow many quality resources for the integrative review. Lastly, establishing clear eligible guidelines for data sources is pertinent to aid data collection (Whittemore & Knafl, 2005).

Information Sources

Initiating the search for research evidence involves the use of various strategies. The primary strategies used to extract research evidence include searching literature databases and using a lineage and descendant approach. According to Toronto and Remington (2020), potential biases can be eliminated using a broad-based approach, thus producing substantial literature for review. The student performed a computer-assisted search of the bibliographic databases MEDLINE, PubMed, CINAHL, and EBSCO from 2010 to the present. The lineage approach allows the project lead to quickly identify duplications and citations from previous studies on the

same subject. Use of the descendant approach identifies a crucial earlier study and searching forward to find similar recent studies. The set timeline was established to permit research that progressed over 10 years to be included. Lastly, the student compiled sources and used keywords and terms such as educating the adult, oral care, pneumonia, and hospital-acquired pneumonia in no particular order.

Eligibility Criteria

The student applied eligibility requirements to the sources to identify a setting, target audience, and inclusion criteria. Data sources that took place in an acute care inpatient hospital setting was the eligibility requirement for the project. The scholarly project's target audience consisted of frontline staff, RNs, LPNs, NAs, and patients. The target population consisted of non-ventilated inpatient adult clients, at least 18 years of age, without an admitting diagnosis of pneumonia. The inclusion criteria of the target audience and population permit a broad overview throughout the clients' hospitalization and the evaluation of outcomes.

Literature Search

Embarking on the journey of searching electronic databases can seem like a daunting and overwhelming task. However, ensuring precise keywords and terms is critical to producing substantial and meaningful articles pertinent to the clinical issues and questions at hand. Searching MEDLINE, PubMed, CINAHL, and EBSCO using keywords and terms such as adult learner, educating the adult, teaching methods, oral care, pneumonia, hospital-acquired pneumonia, and effects of oral care on pneumonia yielded thousands of results. Although a large number of the articles' results did not pertain to the clinical issue or question, a large sample of articles remained to analyze.

Overall, after applying the inclusion criteria to the comprehensive computer-based

search, a total of 341,897 articles from all electronic database search engines emerged. Once the exclusion criteria are applied to identify the most valuable relevant sources pertinent to the clinical question and concern present and duplicate articles removed, the total results were reduced to 706 potential articles.

Data Evaluation

During the data evaluation phase, the researcher must obtain quality data using a practical extraction approach. Hence, this student performed a strategic selection of reported data for the literature review. The student incorporated diverse conceptual and empirical sources, along with primary and secondary sources in the evaluation. Understanding no set requirements exists to evaluate and interpret data in literature reviews, the student further explored the quality data extracted using methodological rigor and informational value (Whittemore & Knafl, 2005). Furthermore, to minimize biases and enhance the search's reporting, the student used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist and reporting guideline (Toronto & Remington, 2020).

Data Analysis

Whittemore and Knafl (2005) shares that the data analysis phase requires the reviewer to order, code, group, and synopsise the primary sources to draw a unified conclusion about the researched question. A literature review process is utilized to assist with the organization of the numerous studies methodically. Furthermore, during the data analysis phase, the student created a table organize the resources, abstract, and appraise relevant data to support the clinical question (see Table 1). This data collection was kept throughout the data analysis, and each source was cited for guaranteeing systematic integrity while the synthesis of evidence is performed (Toronto

& Remington, 2020).

Table 1

Inclusion and Exclusion Criteria

Inclusion	Exclusion
Publication from 2010-2020	Publication prior to 2010
Subjects aged 18+	Subjects under 18 years of age
Healthcare workers (RNs, LPNs, NAs)	Non-nursing/Healthcare workers not listed in the inclusion definition
Inpatient hospital setting	Outpatient setting
Hospital-acquired pneumonia	Ventilated-acquired pneumonia
Adult learner	
Oral Care	Foreign language
English language	Non-research articles (i.e., editorials, briefings, fact sheets, commentaries)
Full-text articles	Abstract articles only

According to Whittmore and Knafl (2005), the data analysis stage of an integrative review is the least established, yet one of the most challenging components of the review, with the potential of errors. The data analysis stage allows for a detailed, unbiased understanding of the sources of the literature review. The thorough dissection of sources and synthesis of evidence are both goals of the data analysis stage. The data analysis is achieved using four methods: data reduction, data display, data comparison, conclusion drawing, and verification.

Data Reduction

Reducing 23,707 articles to a manageable number to perform an integrative literature review requires multiple steps. Data reduction emphasizes and arranges data from the primary sources to allow information pulled from the search to be reviewed and verified (Toronto &

Remington, 2020). This reduction is the beginning of the laborious process of selecting, focusing, enhancing, and extracting vital information from the articles. The critic must identify relevant articles versus nonrelevant and organize those articles into groups and subgroups according to significance, topic, year, setting, research method, etc. However, the process to reduce the sizable data begins with a logical process of organizing, categorizing, and analyzing these articles. The student placed each article in a binder and classified into a relevant subgroup: nursing, oral care, non-ventilation, or education. In the nursing subgroup category, further dissection takes place, exploring the settings of the study. The critic then establishes grouping if the study took place in hospital settings versus nursing homes, or if the study involved registered nurses only or included ancillary staff (i.e., LPN or NAJ). For the education subcategory, a reduction is taken a step further into learning methods and teaching methods. Additional categorizing occurs by dissecting the various learning and teaching methods and grouping similar methods.

Within each subgroup, the critic further divides all articles into subcategories according to the type of evidence of the article, and the method used to research (i.e., case study, retrospective study, cohort study, qualitative or quantitative study), setting, and findings. The critic places the final arrangement of articles into chronological order. The reduced arrangement allowed the critic to thoroughly evaluate and compare the study's variables (Whittemore & Knaf1, 2005)

Data Display

The next phase of data analysis is the data display. According to Whittemore and Knaf1 (2005), data display allows the critic to compile a representation of condensed extracted data from the respective source into a presentation (i.e., graphs, charts, matrices). Various forms of

the display may be utilized with each subcategory. The display allows the visualization of trends, variations, and differentials across the primary sources of data extracted. The display also serves as a basis for interpretation and understanding.

Data Comparison

The third phase of data analysis involves data comparison. During this phase, the critic examines the data display, assessing patterns, themes, differences, and relationships of the compressed extracted data from the primary sources. Data comparison allows clarity and understanding of the practical and hypothetical support developing from early interpretive efforts. The critic develops a table to display pertinent data comparison, valid information, and data patterns acknowledged and analyzed. Once completed, the display of data comparison allows a vision to draw conclusions and verification of the pertinent information analyzed (Whittemore & Knafl, 2005).

Conclusion Drawing and Verification

The final phase of data analysis, conclusion drawing and verification, takes the previous stages and forms data interpretations. The critic draws conclusions and assumptions from the presentation, moving the informative efforts from illustrating patterns and relationships to more depth concepts from specifics to general. In this final phase, the patterns, similarities, and differences of each variable are identified with a gradual explanation of a small overview that incorporates each variable database of the integrative review.

Presentation of Results

The presentation stage allows the illustration of the integrative review's conclusion reportable in a table or a flow diagram. A flow of diagram outlines the systematic approach of the literature search, literature analysis, and selection of the inclusion sources (Appendix B). A

narrative summarizes information from the sources and outlines evidence used to support the conclusion reported. On the other hand, the table's utilization gives the readers a clear understanding and depiction of the conclusion drawn on the sources. The table provides a visual to identify key evidence. Included in the table are background information, sources, evidence, conclusions, and suggestions (Whittemore & Knafl, 2005).

Evaluation Methods

The student used Melnyk's Hierarchy Levels of Evidence to identify the level of evidence of the articles analyzed in the review (see Appendix A). Although evidence-based articles are ideal, when deciding on articles to review, according to the Melnyk's pyramid, systematic reviews and meta-analyses are the strongest resources of support. Found at the top of the pyramid, these sources are the most trustworthy, while expert opinions are the weakest, located at the base of the pyramid (Melnyk, 2016). Also use of the PRISMA flow chart, compiling quality sources was used to evaluate content. The student used the flow chart to represent inclusion and exclusion criteria and produced 18 substantial articles for review. Lastly, the chair assisted with communications and guidance in evaluating the course of content compiled.

Results

Study Selection

An integrative literature review is an extensive and broad search that requires a variety of articles. The student researched scholarly articles are from an empirical and theoretical background from current databases, such as MEDLINE, PubMed, CINAHL, and EBSCO, in addition to the consultation with a librarian as an expert resource. The doctoral candidate performed the search for studies on adult learners and oral care using a combination and

variation of terms *adult learner, educating the adult, teaching methods, oral care, pneumonia, non-ventilation, and effects of oral care*. The limits of the search were sources in the English language and publication dates between 2010 to present. These searches yielded a potential 341,897 relevant articles. The MEDLINE search produced:

- 37 studies related to the adult learner,
- 34 articles on educating the adult,
- 86 studies on teaching proper oral care,
- 169 studies on acquired pneumonia,
- two articles on non-ventilation,
- 21 articles on HAP prevention, and
- 9,037 articles on the effects of oral care on pneumonia.

The PubMed search produced:

- 2,632 articles related to adult learners,
- 300,060 articles on educating the adult,
- 181 articles about teaching proper oral care,
- 10,128 articles on acquired pneumonia,
- 202 articles on non-ventilation,
- 2,371 articles related to HAP prevention, and
- 707 studies on the effects of oral care on pneumonia.

The CINAHL search produced:

- 432 articles related to adult learners were found,
- 8419 articles on educating the adult,
- 1070 articles on teaching proper oral care,

- 237 studies on acquired pneumonia,
- 13 articles on non-ventilation,
- 202 articles related to HAP prevention, and
- 130 articles on the effects of oral care on pneumonia.

The EBSCO search produced:

- 365 articles related to adult learners were found,
- 1,333 articles on educating the adult,
- 2,937 articles on teaching proper oral care,
- 505 articles appropriate for acquired pneumonia,
- 14 articles on non-ventilation,
- 197 articles on HAP prevention, and
- 376 articles on the effects of oral care on pneumonia.

The inclusion criteria consisted of a systematic review of original research studies in peer-reviewed English language journals centered on the nursing profession. Studies within a 10-year range, taking place in an inpatient setting (when applicable), consisting of an adult learner's population, oral care, and HAP, were included. On the other hand, exclusion criteria included articles written in foreign languages, exceeding a 10-year range, non-nursing, research on VAP, or taking place in an outpatient setting. After applying the exclusion criteria to the 341,897 articles and researched from MEDLINE, PubMed, CINAHL, and EBSCO, and the removal of duplicate articles, approximately 706 articles remained. These remaining articles varied from retrospective studies, case-control studies, cohort student and interventional and descriptive studies.

Study Characteristics

In total, the final 18 articles selected represented 46 different studies. Of the 18 articles, five studies appeared in more than one article. The final 18 selected articles represented a variety of research methods. Four studies were quasi-experimental design, two cross-sectional studies, two mixed-method studies, one qualitative study, one quantitative study, and a randomized, double-blind study.

The selected studies' sample sizes ranged from 44 to \pm 3780 subjects/participants, consisting of patients and nursing staff. Representing research on educational programs, lack of care, and teaching methods, all the articles emphasized the impact and influence of all three components at some point in the study. While all of the studies involved patients and nursing staff, 13 studies took place in a hospital setting. A larger percentage of women than men were participants in the studies, including both patients and nursing staff. In most studies, the subjects' cultures and ethnicities were well diversified (when mentioned).

Results of Individual Studies

Lack of Oral Care

The student analyzed the studies in this review and found that providing care in regular intervals is a simple modifiable risk factor in preventing NVHAP. Kalisch (2016) revealed oral care as the most commonly missed nursing task that also ranked high as a frequently missed task from a nurses' perspective. Munro and Baker (2018) study showed the lack of oral care on non-ventilated patients is a contributing factor in the development of NVHAP. Furthermore, decreased oral care potentially impacts patient outcomes, increases length of stay, and increases mortality rates. According to Lewis et al. (2017), acknowledging oral care as a significant

nursing care component will impact and improve patient outcomes.

Education

Many contributing factors impact the lack of oral care. These factors include the frontline staff's lack of skill, lack of confidence, and lack of knowledge on the correlation oral care has to NVHAP, which increases the occurrences of NVHAP. The deficiency is crucial as the frontline caregivers are merely responsible for providing daily living (Lewis et al., 2017). Salamone et al. (2013) indicated that nursing staff views oral care as a lower priority than other care rendered. While oral care is a priority in nursing care and often overlooked, educating nursing staff is pertinent to change practice. Staff education is vital as the frontline staff is essential for carrying out oral care with patients (Safaeifard et al., 2019). More importantly, providing education to the nursing staff on oral care of the non-ventilated patient and on the process of how to safely and effectively perform the skill can effect the decrease of NVHAP (Feider et al., 2010). Education will impact the nurse's and nurse assistant's ability to identify patients at risk for developing NVHAP, as well as oral mucositis, inflammatory disease of the oral cavity, or patients' ability to manage their oral care (Salamone et al., 2013). Lastly, according to Jenson et al. (2018), staff's oral care knowledge showed a marked improvement after staff received comprehensive teaching. Thus, an evidence-based educational program is crucial to the nursing staff's success and sustainability to effectively perform oral care on the non-ventilated patient.

Teaching Methods/Strategies

Frontline staff plays intricate roles in the combat of HAIs. Nursing staff are key stakeholders, and implementing an evidence-based education program on oral care will undoubtedly improve the staff's overall oral care practices and their ability to impact clinical outcomes of NVHAP (Baker & Quinn, 2018). Whether visual, auditory, or kinesthetic, teaching

strategies are crucial elements to an educational program's success in that adult learners differ from one another (Forsell et al., 2011). According to Wilson (2012), adult learning theory indicates that employing a variety of teaching strategies enhances an individual's knowledge, skill, and overall performance structure. As adult learners undergo educational training, the learners must recognize the need for the teaching, why it is imperative to their role, and the teaching approach (M. Smith, 2013). When the teaching method complements the adult learners' needs, studies indicate a noticeable improvement of the patients' oral health and an enhancement of the nursing staff's knowledge, outlook, and performance of oral care (Park & Choi-Kwon, 2011).

Synthesis of Results

The literature reviewed indicated a lack of oral care and a deficit in frontline nursing staff's education and knowledge significantly impacts acquiring NVHAP. The literature also revealed that adult learners achieve better success in retaining and sustaining lessons taught if the necessity of the education provided is understood as well as the validity of the content learned as crucial to their roles. The literature review established a concrete foundation to construct a case for quality measures to combat and reduce incidences of NVHAP. As illustrated in the integrative review, instituting an evidence-based educational program will permit quality nursing care delivery in the hospital setting. An educational program also will provide frontline nursing staff the knowledge and ability to correlate oral care's significant impact on patients, thus promoting and improving quality nursing care.

Discussion

Summary of Evidence

In this research review, the student's findings revealed a significant correlation between the lack of oral care and increased hospital-acquired pneumonia incidences. As the provision of oral care increased, harboring microorganisms decreased. Non-ventilated occurrences of NVHAP markedly decrease by 40-60% when consistent proper oral care was provided to inpatients two to four times a day (Baker & Quinn, 2018). According to Lewis et al. (2017), acknowledging oral care is a significant nursing care component will impact and improve patient outcomes.

The student identified education in oral care and oral hygiene as a significant barrier in providing adequate oral care. Stowers et al., (2017) study on education programs, implied installation of an evidence-based education program would impact the efficiency, consistency, and sustainability of adequate oral care. Oral hygiene education is an effective method in advancing oral care knowledge, attitude, and skill of the frontline staff. This advancement allows the nursing staff to gain a full understanding of the importance and impact missed oral care has on the overall health of patients (Wu et al., 2020). Stowers et al., (2017) disclosed evidence-based educational programs that focus on providing oral care to contribute to patient outcomes rather than perform a task that improves quality oral care and maintenance delivery.

Lastly, understanding the impact lack of oral care and education have on developing non-ventilated pneumonia, S. Smith (2017) identified the most efficient and effective teaching strategy to educate nurses at the forefront. S. Smith suggested teaching methods engaging the learner, providing hands-on material, and repetition as the most successful method promoting learned material retention. Hole et al. (2016) indicated that combining teaching and learning evidence-based practices as a unit close to clinical practices can facilitate sustainable learning for the nursing staff. The increased recognition of quality in the healthcare sector connects evidence-

based practices as an essential premise and tool for ensuring optimal patient outcomes.

Limitations

This student noted several limitations throughout this review of the literature. For example, an underrepresentation of the male population was prevalent throughout the studies. Researching articles between 2010-2020 set limits when articles were published, including other limitations such as searching English-only articles, which excluded other potential studies. Studies on VAP and HAP were more prevalent in the body of literature, yet the student limited this review to articles on NVHAP. Non-ventilated acquired pneumonia was not considered in all the studies.

On the other hand, some studies included chlorhexidine as a preventive measure for developing hospital-acquired pneumonia, but further research is needed on its effectiveness and impact on prevention. Some of the studies took place in a hospital setting; however, the exact number of subjects were not included. The studies referred to the setting (i.e., 21-bed unit, 843-bed unit) rather than the number of subjects involved.

Implications for Research

Further research exploring the impact of initiating education of oral care at the school level would be beneficial. Adding specific effective teaching methods to the research would enhance the material's reception and improve the project's sustainability moving forward. Ultimately, the suggestion to further research provides a platform to elevate nursing and nursing care, and initiate quality improvement programs to demand action on providing quality evidence-based oral care.

Implications for Practice

According to Reiss (2018), external validity asks in which setting, population, and

treatment variables can a practice be generalized. Fortunately, the student's scholarly project evaluating the effects of education on oral care and the prevention of NVHAP may have high validity in the outpatient, community, and public health settings. Studies have shown a correlation between poor oral care and hospital admissions with a diagnosis of pneumonia. In other words, patients arrive at the hospital with pneumonia or a diagnosis of pneumonia within the first forty-eight hours. Thus, the diagnosis is deemed community-acquired pneumonia (Laurence et al., 2015). The goals of this literature review were to provide widespread knowledge of scientific findings and translate them into various practice areas, including public health and community settings, promoting optimal health (Brownson et al., 2018).

Conclusion

Hospital-acquired infections, such as non-ventilated hospital-acquired pneumonia, are significant components that impede patient safety each day a patient is in the hospital. Missed oral care is an extensive factor contributing to increased incidences of hospital-acquired pneumonia. The provision of oral care has become obsolete, yet this minute and simple nursing task impacts patients' health and saves lives. Nursing staff on the frontline and primary caregivers rendering oral care must have the knowledge and tools to combat the increasing incidence of hospital-acquired pneumonia by simply providing oral hygiene.

Staffing education is vital as nursing staff plays a pivotal role in overseeing proper and adequate oral care to patients. With lack of staff education being the primary contributing factor to missed oral care, after lack of confidence, lack of skill, and lack of insight into the nurse's high-risk consequences of poor oral hygiene are addressed, patient outcomes improve (Lewis et al., 2017). Nurses require education on the importance of providing oral care, the effects oral care have on patients' health status, and the performance of proper oral care. When education and

training are provided, the most common modifiable risk factor, oral care, will help prevent non-ventilated hospital-acquired pneumonia and improve healthcare quality (Janssens et al., 2017).

Oral care improves with the frontline staff's knowledge of the importance and impact missed oral care has on patients. Nurses are vital stakeholders in education. In regards to oral care practices, educated nurses can improve nursing oral care practices and ultimately increase clinical and patient desired outcomes. Although education is provided, nurses need to follow a systematic evidence-based education program (Talley et al., 2016). Critical components to learning involve the learner's need to know why learning is necessary, how learning will be performed, what content and skill will be learned, and why learning is critical to their role (M. Smith, 2013). Identification of the critical components and staff's engagement and participation in learning will facilitate knowledge, retention of learned content, and likeliness of oral care consistency and sustainability (Lengetti et al., 2018).

The literature review provides evidence that education, the use of learner's engagement with teaching, and consistent oral care will reduce incidences of non-ventilated hospital-acquired pneumonia tremendously. Oral care is the most common modifiable risk factor that plays a vital role in prevention. With an efficient oral care educational program, hospitals will combat increasing numbers of hospital-acquired infections.

References

- Baker, D., & Quinn, B. (2018). Hospital acquired pneumonia prevention initiative-2: Incidence of nonventilator hospital-acquired pneumonia in the United States. *American Journal of Infection Control, 46*(1), 2–7. <https://doi.org/10.1016/j.ajic.2017.08.036>
- Brownson, R. C., Colditz, G. A., & Proctor, E. K. (2018). *Dissemination and implementation research in health: Translating science to practice* (2nd ed.). Oxford University Press.
- Cope, D. G. (2013). Methods and meanings: Credibility and trustworthiness of qualitative research. *Oncology Nursing Forum, 41*(1), 89–91. <https://doi.org/10.1188/14.onf.89-91>
- Feider, L. L., Mitchell, P., & Bridges, E. (2010). Oral care practices for orally intubated critically ill adults. *American Journal of Critical Care, 19*(2), 175–183. <https://doi.org/10.4037/ajcc2010816>
- Forsell, M., Kullberg, E., Hoogstraate, J., Johansson, O., & Sjögren, P. (2011). An evidence-based oral hygiene education program for nursing staff. *Nurse Education in Practice, 11*(4), 256–259. <https://doi.org/10.1016/j.nepr.2010.11.017>
- Graves, N., Page, K., Martin, E., Brain, D., Hall, L., Campbell, M., Fulop, N., Jimmeison, N., White, K., Paterson, D., & Barnett, A. G. (2016). Cost-effectiveness of a national initiative to improve hand hygiene compliance using the outcome of healthcare associated Staphylococcus aureus bacteremia. *PLoS One, 11*(2). <https://doi.org/10.1371/journal.pone.0148190>
- Hole, G., Brenna, S., Graverholt, B., Ciliska, D., & Nortvedt, M. (2016). Educating change agents: A qualitative descriptive study of graduates of a master's program in evidence-based practice. *BMC Medical Education, 16*(1). <https://doi.org/10.1186/s12909-016-0597-1>

- Janssens, B., Vanobbergen, J., Lambert, M., Schols, J. A., & De Visschere, L. (2017). Effect of an oral healthcare programme on care staff knowledge and attitude regarding oral health: A non-randomised intervention trial. *Clinical Oral Investigations*, 22(1), 281–292. <https://doi.org/10.1007/s00784-017-2110-6>
- Jenson, H., Maddux, S., & Waldo, M. (2018). *Improving oral care in hospitalized non-ventilated patients: Standardizing products and protocol*. Providence St. Joseph Health Digital Commons. <https://digitalcommons.psjhealth.org/publications/885/>
- Kalisch, B. (2016). Errors of omission: How missed nursing care imperils patients. *Journal of Nursing Regulation*, 7(3), 64. [https://doi.org/10.1016/s2155-8256\(16\)32323-7](https://doi.org/10.1016/s2155-8256(16)32323-7)
- Laurence, B., Mould-Millman, N.-K., Scannapieco, F. A., & Abron, A. (2015). Hospital admissions for pneumonia more likely with concomitant dental infections. *Clinical Oral Investigations*, 19(6), 1261–1268. <https://doi.org/10.1007/s00784-014-1342-y>
- Lengetti, E., Kronk, R., Ulmer, K. W., Wilf, K., Murphy, D., Rosanelli, M., & Taylor, A. (2018). An innovative approach to educating nurses to clinical competence: A randomized controlled trial. *Nurse Education in Practice*, 33, 159–163. <https://doi.org/10.1016/j.nepr.2018.08.007>
- Lewis, A., Edwards, S., Whiting, G., & Donnelly, F. (2017). Evaluating student learning outcomes in oral health knowledge and skills. *Journal of Clinical Nursing*, 27(11-12), 2438–2449. <https://doi.org/10.1111/jocn.14082>
- Liu, B. (2018). Treatment of systemic diseases and oral focal infection. *Infection International*, 6(4), 118–123. <https://doi.org/10.2478/ii-2018-0002>

- Lyons, P. G., & Kollef, M. H. (2018). Prevention of hospital-acquired pneumonia. *Current Opinion in Critical Care*, 24(5), 370–378.
<https://doi.org/10.1097/MCC.0000000000000523>
- Magill, S. S., O’Leary, E., Janelle, S. J., Thompson, D. L., Dumyati, G., Nadle, J., Wilson, L. E., Kainer, M. A., Lynfield, R., Greissman, S., Ray, S. M., Beldavs, Z., Gross, C., Bamberg, W., Sievers, M., Concannon, C., Buhr, N., Warnke, L., Maloney, M. . . . Edwards, J. R. (2018). Changes in prevalence of health care–associated infections in U.S. hospitals. *New England Journal of Medicine*, 379(18), 1732–1744.
<https://doi.org/10.1056/nejmoa1801550>
- Melnyk, B. (2016). Level of evidence plus critical appraisal of its quality yields confidence to implement evidence-based practice changes. *Worldviews on Evidence-Based Nursing*, 13(5), 337–339. <https://doi.org/10.1111/wvn.12181>
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7), e1000097. <https://doi.org/10.1371/journal.pmed.1000097>
- Munro, S., & Baker, D. (2018). Reducing missed oral care opportunities to prevent non-ventilator associated hospital acquired pneumonia at the Department of Veterans Affairs. *Applied Nursing Research*, 44, 48–53. <https://doi.org/10.1016/j.apnr.2018.09.004>
- Munro, S., Haile-Mariam, A., Demirci, S., Vasudera, S., Farooqi, O., & Greenwell, C. (2018). Implementation and dissemination of a Department of Veteran Affairs oral care initiative to prevent hospital-acquired pneumonia among nonventilated patients. *Nursing Administration Quarterly*, 42(4), 362–372.
<https://doi.org/10.1097/NAQ.0000000000000308>

- Park, M., & Choi-Kwon, S. (2011). The effects of oral care education on caregivers' knowledge, attitude, & behavior toward oral hygiene for elderly residents in a nursing home. *Journal of Korean Academy of Nursing*, 41(5), 684. <https://doi.org/10.4040/jkan.2011.41.5.684>
- Passaro, L., Harbarth, S., & Landelle, C. (2016). Prevention of hospital-acquired pneumonia in non-ventilated adult patients: A narrative review. *Antimicrobial Resistance and Infection Control*, 5(43), 43–54. <https://doi.org/10.1186/s13756-016-0150-3>
- Quinn, B., & Baker, D. (2016). Preventing non-device related pneumonia with comprehensive oral care. *American Journal of Infection Control*, 44(6), S6. <https://doi.org/10.1016/j.ajic.2016.04.178>
- Raghavendran, K., Mylotte, J. M., & Scannapieco, F. A. (2007). Nursing home-associated pneumonia, hospital-acquired pneumonia and ventilator-associated pneumonia: The contribution of dental biofilms and periodontal inflammation. *Periodontology 2000*, 44(1), 164–177. <https://doi.org/10.1111/j.1600-0757.2006.00206.x>
- Reiss, J. (2018). Against external validity. *Synthese*, 1–19. <https://doi.org/10.1007/s11229-018-1796-6>
- Safaeifard, N., Areshtanab, H., Roshangar, F., Ebrahim, H., Moonaghi, H., & Janani, R. (2019). Preferred learning styles of nurses in in-service training courses in Tabriz University of Medical Sciences. *Acta Facultatis Medicae Naissensis*, 36(1), 69–78. <https://doi.org/10.2478/afmna-2019-0007>
- Salamone, K., Yacoub, E., Mahoney, A.-M., & Edward, K. (2013). Oral care of hospitalised older patients in the acute medical setting. *Nursing Research and Practice*, 2013, 1–4. <https://doi.org/10.1155/2013/827670>

- Smith, M. K. (2013). Malcolm Knowles, informal adult education, self-direction and andragogy. *The encyclopedia of pedagogy and informal education*. www.infed.org/thinkers/et-knowl.htm
- Smith, S. P. (2017). Adult learners: Effective training methods. *Professional Safety*, 62(12), 22–25.
https://doi.org/aeasseincludes.assp.org/professionalsafety/pastissues/062/12/F1_1217.pdf
- Stowers, B. A., Giblin, L., Laspina, L., & Perry, K. (2017). Perceptions of program directors and educators regarding the adequacy of oral health education in nursing assistant curricula. *The Journal of Dental Hygiene*, 91(4), 21–28.
<http://ezproxy.liberty.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarly-journals%2Fperceptions-program-directors-educators-regarding%2Fdocview%2F2186072439%2Fse-2%3Faccountid%3D12085>
- Talley, L., Lamb, J., Harl, J., Lorenz, H., & Green, L. (2016). HAP prevention for nonventilated adults in acute care. *Nursing Management (Springhouse)*, 47(12), 42–48.
<https://doi.org/10.1097/01.numa.0000508259.34475.4c>
- Toronto, C. E., & Remington, R. (2020). *A step-by-step guide to conducting an integrative review* (1st ed.). Springer.
- Tsai, D. M., & Caterson, E. J. (2014). Current preventive measures for health-care associated surgical site infections: A review. *Patient Safety in Surgery*, 8(1), 42–54.
<https://doi.org/10.1186/s13037-014-0042-5>
- Vilela, M. C., Ferreira, G. Z., da Silva Santos, P. S., & de Rezende, M. P. (2015). Oral care and nosocomial pneumonia: A systematic review. *Einstein (Sao Paulo)*, 13(2), 290–296.
<https://doi.org/10.1590/S1679-45082015RW2980>

Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546–553. <https://doi.org/10.1111/j.1365-2648.2005.03621.x>

Wilson, J. P. (2012). The adult learner: The definitive classic in adult education and human resource development. *Industrial and Commercial Training*, 44(7), 438–439. <https://doi.org/10.1108/00197851211268045>

Wu, S.-J., Wang, C.-C., Kuo, S.-C., Shieh, S.-H., & Hwu, Y.-J. (2020). Evaluation of an oral hygiene education program for staff providing long-term care services: A mixed methods study. *International Journal of Environmental Research and Public Health*, 17(12), 4429. <https://doi.org/10.3390/ijerph17124429>