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Oral Hygiene in Intensive Care Units: A Survey on Protocol

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ORAL HYGIENE IN INTENSIVE CARE UNITS: A SURVEY ON PROTOCOL

by

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**B.S., DENTAL HYGIENE, THE UNIVERSITY OF NEW
MEXICO, 2017**

THESIS

Submitted in Partial Fulfillment of the
Requirements for the Degree of

**Master of Science
Dental Hygiene**

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Dedication

I dedicate this thesis to my Tata, Jean Ithurria, who taught me the value of hard work and the resiliency to never give up. And who's own battle with terminal brain cancer and experience in the ICU sparked my passion for the integration of oral health professionals into the critical care setting.

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ORAL HYGIENE IN INTENSIVE CARE UNITS: A SURVEY ON PROTOCOL

By

Kayla Gallegos

B.S., Dental Hygiene, The University of New Mexico, 2017

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Abstract

The purpose of this study was to learn about various Intensive Care Units' current oral hygiene care protocols, nurses' values, and interests in interprofessional collaboration with a dental professional. An online survey was created and intended recipients included 1,696 members of the Trauma ICU Nurses/Critical Care Medicine Facebook page. Participants were asked about their value of oral hygiene, oral hygiene education, and interest in interprofessional collaboration. Of the 1,696 nurses 34 (2%) opted to participate in this survey study. Findings from this study suggest that these nurses' value oral health in themselves and in patients. Half of the survey participants reported that their nursing education did prepare them in performing oral hygiene care, but also reported that they did not have proper resources for assistance. The sample of nurses were receptive to interprofessional collaboration with dental professionals to assist in hands on learning as well as steps to ensure accountability.

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Chapter I

Introduction

One population particularly affected by poor oral health are bedridden and hospitalized patients. More often than not, extended hospital stays result in hospital-acquired infections. One of the most common ailments is hospital-acquired pneumonia, which typically results as a consequence of frequent silent aspiration¹. Silent aspiration occurs when foreign particles are inhaled into the lungs without knowledge and no expulsion, such as coughing occurs. Hospital-acquired pneumonia is the second most common nosocomial infection, prolonging patient care in the hospital². The term 'aspiration pneumonia' has long been used, but this condition is also known as 'hypostatic pneumonia' and deglutition pneumonia³. It may be thought the most likely causative organisms are ones that typically reside in the oral cavity. The bacteria found in the oral cavity of patients with periodontal disease can be virulent and opportunistic if inhaled into the lungs or travel to other organs of the body.

The likelihood of acquiring aspiration pneumonia while on mechanical ventilation is greater than in hospitalized patients that are not ventilated⁴. This leads to increased days in intensive care units, as well as an increased risk of mortality⁴. Although protocols for nurses to provide oral health care seem to be in place, the adherence to them is not well documented. This study aims to assess the oral health protocols in hospitals.

Statement of the Problem

Do Intensive Care Units have oral health protocols?

Do registered nurses provide daily oral hygiene care?

Significance of the Problem

As we gain more insight on the link between oral health and systemic health it is important that we recognize how oral health professionals can be integrated with within medical facilities, especially hospitals. Often patients in hospitals, particularly in critical care units, succumb to secondary infections and not their original cause of hospitalization. Pneumonia is the second most common nosocomial infection in critically ill patients, affecting 27% of all critically ill patients and 86% of nosocomial pneumonias are associated with mechanical ventilation and are termed ventilator-associated pneumonia (VAP)⁴. Aspiration pneumonia is also the second leading cause of death among residents living in nursing homes. This patient population is similar to patients staying long term in hospitals and intensive care units (ICU). A lack of adequate oral hygiene during hospitalization increases the plaque and the bacterial levels in mouths of patients, which increases their risk of aspiration pneumonia if inhaled. Basic oral hygiene tasks will help decrease the build up in the mouth, thus decrease the incidence of aspiration pneumonia caused by oral bacteria and plaque.

Operational Definitions

- Periodontal disease: an inflammatory disease encompassing 8 classifications of disease that range from tissue inflammation to ligament and bone destruction
- Periodontitis: progression of periodontal disease that affects the soft and hard structures that support the teeth
- Aspiration pneumonia: aspiration of foreign particles such as food, liquid, or bacteria that cause infection in the lungs without knowledge and no expulsion, such as coughing
- Hospital-acquired pneumonia: any pneumonia contracted by a patient in a hospital at least 48–72 hours after being admitted
- Ventilator acquired pneumonia: infiltrate, consolidation, cavitation, or pleural effusion in conjunction with either new onset of purulent sputum or change in character of sputum. May also develop when an organism isolated from blood, or the isolation of an etiologic agent from a specimen is obtained via suction aspiration through the endotracheal or tracheostomy tube
- Long-term care: extended medical and rehabilitative care to individuals with clinically complex problems, such as multiple acute or chronic conditions, that need hospital-level care for relatively extended periods
- Intensive care unit: Intensive care units cater to care for patients with severe and life-threatening illnesses and injuries, which require

constant, close monitoring and support from specialist equipment and medications in order to ensure normal bodily functions

- Nosocomial: Originating or taking place in a hospital, acquired in a hospital, especially in reference to an infection, specifically one that was not present or incubating prior to the patient's being admitted to the hospital, but occurring within 72 hours after admittance to the hospital
- Deglutition: the act, power, or process of swallowing.

Chapter II

Review of Literature

Introduction

This review of literature aims to review oral hygiene protocols focused on decreasing the incidence of ventilator-acquired pneumonia in Intensive Care Units (ICU) present in hospitals. Medical and dental literature was reviewed using the PubMed/MeSH search engines to access the database Medline focusing on keywords such as “ventilator acquired pneumonia”, “aspiration pneumonia”, “intensive care units”, among several others. General information and statistics regarding the pathology and incidence of ventilator-acquired pneumonia will be discussed. The role of bacteria, with the inclusion of bacteria specific to periodontal disease will be explored, as well as an overview of the current systems used to provide oral hygiene care to ventilated patients.

Aspiration Pneumonia

Aspiration pneumonia is a lung infection that develops after food, liquid, or vomit gets into the lungs. This can occur either when food or liquid is aspirated, or inhaled, into the lungs or from the stomach, where fluids back up into the esophagus and enter the lungs. If the aspirated material is unable to be coughed up, bacteria can grow in the lungs and cause an infection⁵. As with all diagnoses, early detection can make a huge difference in treatment and outcome. Signs and symptoms of aspiration pneumonia include fever, cough, which may or may not bring up mucus, sputum that is pink or frothy, bluish skin around the mouth or the fingertips, trouble swallowing, shortness of breath, rapid or noisy breathing, chest

pain or a rapid heartbeat, confusion, fatigue, changes in alertness, voice changes such as gurgling and hoarseness, and loss of appetite that may result in weight loss.

Once aspiration pneumonia is suspected, there are multiple tests performed to confirm the initial diagnosis. These tests include chest radiographs, pleural fluid analysis (looking for bacteria, amount of protein, and cancerous cells), sputum culture and sensitivity, bronchoscopy, thoracentesis (sample of fluid is removed with a needle inserted between the ribs), thoracic CT, and ultrasound of the chest. Bacteria most commonly found in individuals with aspiration pneumonia include: *Pseudomonas aeruginosa*, *Bacteroides forsythus*, *Escherichia coli*, *Enterobacter cloacae*, *Staphylococcus aureus*, *Haemophilus influenzae*, *Klebsiella pneumoniae*, *Streptococcus pneumoniae*, and *Porphyromonas gingivalis*. This list of bacteria includes two red complex oral microbial pathogens *P. gingivalis* and *B. forsythus*.

The red complex contains the most virulent oral bacteria. According to the journal article *Dental Plaque Revisited: Bacteria Associated with Periodontal Disease*, the bacteria associated with periodontal diseases are predominantly gram-negative anaerobic bacteria and may include *A. actinomycetemcomitans*, *P. gingivalis*, *P. intermedia*, *B. forsythus*, *C. rectus*, *E. nodatum*, *P. micros*, *S. intermedius* and *Treponema sp*³. More than 700 bacterial species or phylotypes have been detected in the mouth; some beneficial and others the causative organisms of gingivitis, periodontitis, and dental caries⁶.

In the study, *Periodontal Infections and Community-Acquired Pneumonia: A Case–Control Study*, the aim was to evaluate if the presence of periodontal infections (PI) is associated with community-acquired pneumonia (CAP) in a group of patients admitted to a hospital. This study found that chronic periodontitis (CP) was more frequent in patients with CAP (case: 61.4 %; control: 41.4 %). The presence of moderate or severe CP increased the risk for CAP [odds ratio (OR) = 4.4, 95 % confidence interval (CI) = 1.4–13.8], even when adjusted for age, ethnicity, gender, and smoking. Moderate and severe chronic periodontitis were associated with CAP in this study¹. Periodontitis can develop after systemic disease, can be exacerbated by systemic disease, and can negatively affect any systemic disease. Of concern is the number of Americans who have periodontal disease. According to The American Academy of Periodontology and the Centers for Disease Control one out of every two Americans aged 30 and over have periodontal disease. It has been estimated that 47.2%, or 64.7 million American adults, have mild, moderate or severe periodontitis, the more advanced form of periodontal disease, increasing to 70.1% in adults over 65⁵. These statistics are alarming especially as we gain more insight on the link between oral health and systemic health. This could also mean that half the American population is at an increased risk for developing VAP if required to be on mechanical ventilation.

Incidence and Mortality

There are considerable amounts of research that confirm the link between aspiration and aspiration pneumonia. “Aspiration needs to be divided into

apparent aspiration, as when choking while swallowing during meals, and silent aspiration of unnoticed nasal, throat and periodontal secretions that mainly occur at night,”⁷. Aspiration pneumonia can occur in any individual, but because apparent aspiration is fairly uncommon with the exception of Mendelson syndrome; ingestion of food is not a critical component. In comparison, airway reflexes decrease at night, as well as inhibition of swallowing reflexes from sedatives and psychotropic agents¹, which makes silent aspiration of nonfood particles possible. Aspiration pneumonia is the second most common nosocomial infection in hospitals, and accounts for 13% to 48% of infections in nursing home residents⁶. Pneumonia is the second most common nosocomial infection in critically ill patients, affecting 27% of all critically ill patients. In addition 86% percent of nosocomial pneumonias are associated with mechanical ventilation and are termed ventilator-associated pneumonia (VAP)¹⁷.

There is no denying that hospital care is utilized largely; in 2009 there were 39.4 million hospital stays and the average of acute care hospital stays in 2012 was 4.5 days⁵. Acute care is concerning because it means that a brief, yet severe ailment was being treated. Acute care includes intensive care units with approximately 55,000 critically ill patients being treated daily and 5.7 million annually¹⁰. Included in this number are patients who are on ventilators or other life supporting mechanisms, as well as patients who cannot adequately perform their own oral hygiene tasks. Ventilator-associated pneumonia occurs when oral secretions containing bacteria are able to get into the lower airway because the integrity of the oropharynx and trachea are compromised¹¹.

In early studies it was found that 10%-20% of patients on ventilation tubes developed ventilator-associated pneumonia, with more recent publications stating 1 to 4, but up to 10 cases per 1,000 ventilator days¹². Mortality rate in these individuals is multifactorial; it is based upon immune function prior to pneumonia as well as the volume and content of aspiration. According to DeLegge, there was a 62% mortality rate in 47 patients who had a witnessed event of aspiration, and the mortality rate of one lobe aspiration was approximately 40% whereas two-lobe aspiration was around 90%. Based upon these numbers it can be said that there is an issue at hand and prevention protocols must be put in place. Overall, "mortality rates in the ICU are 2 to 3 times as great in patients with VAP as in patients without VAP."¹³ It can be stated that VAP is the leading cause of morbidity and mortality in intensive care units¹⁴.

Prevention and Intervention

Although there were no published protocols found in place to prevent aspiration pneumonia in all individuals, there were some protocols found to prevent the occurrence in the elderly population. Preventive interventions are focused on reducing oral bacteria colonization and preventing aspiration. It is first and foremost important that providers direct attention to any signs and symptoms that may be present especially in high-risk individuals, as well as take simple precautions to prevent aspiration. According Metheny, it is important that feeding measures be taken into careful consideration. Making sure bites are small, placing the patient at 90 degrees, avoiding rushing, and making any necessary changes based on the individual¹¹.

Dental hygienists know how important it is to integrate oral health into systemic health care and even more so when the immune system is compromised. “Since [oral hygiene care] has been shown to reduce colonization of virulent bacteria and the incidence of pneumonia (in addition, intensive oral hygiene also improves the sensitivity of the cough reflex, by improving the changes caused by germ pollutant mucosa and nerve endings),”¹⁵ it is imperative that it is included in one’s total health especially when in the hospital for long periods of time or in nursing homes.

The importance of keeping the oral cavity healthy is stressed to all patients, but additional education is often provided to patients who have other systemic diseases; this should be no different for patients in the hospital. “Missing teeth and poorly fitted dentures predispose patients to aspiration by interfering with chewing and swallowing, [and] infected teeth and poor oral hygiene predispose patients to pneumonia following the aspiration of contaminated oral secretions”¹⁶.

This means that it is critical that an oral hygiene routine is implemented in order to prevent and maintain aspiration pneumonia. Pneumonia remains the second leading cause of death in nursing home residents¹⁷. The accumulation of dental plaque and colonization of oral surfaces and dentures with respiratory pathogens serves as a reservoir for recurrent lower respiratory tract infections. Control of gingivitis, periodontitis and dental plaques has been effective in reducing the rate of pneumonia, but the provision of dental care for institutionalized elderly is inadequate, with treatment often sought only when

patients experience pain or denture problems. Often if patients were not complaining of dental pain or had no visible symptoms, oral hygiene was dismissed especially because of time constraints¹⁸.

Direct mechanical cleaning is thwarted by the lack of adequate training of nursing staff and residents' uncooperativeness¹⁶. This same problem can be applied to hospital settings with oral care falling behind in importance compared to other healthcare routines performed by nurses and nurse technicians. As dental professionals, this is concerning to say the very least. A study done by Fagon et al. compared mortality rates of carefully match subjects and controls on ventilators, of which 48 had nosocomial pneumonia and 48 presented with their illness alone. The mortality rate of those with pneumonia was 54.8%, whereas those with their illness alone was 27.1%¹⁵. Leading to a distinguished reason to promote oral hygiene as a preventative agent against aspiration pneumonia.

Hospital Oral Health Products

One common system used to provide oral hygiene to ventilated patients is the Sage Q-Care® Rx Oral Cleansing & Suctioning Systems, which provides comprehensive 24-hour oral care focused on cleaning, debriding, suctioning and moisturizing the oral cavity. The kit includes a toothette, as well as a toothbrush that hooks up to suction to assist in the removal of buildup after detached from oral structures. It also includes single-dose bottle of Chlorhexidine Gluconate 0.12%¹⁹. Each intubated patient gets a kit for the entire day, which requires following the steps set forth by the company. A published 4-year study using an oral care protocol including Q-Care® Oral Care Systems saw a 33% reduction in

VAP, plus fewer vent days, shorter length of stay and decreased mortality rates¹³. Garcia et al. studied two groups of patients who were receiving mechanical ventilation for more than 48 hours. The first group received no intervention (no oral assessments, no suctioning of the subglottic space, no toothbrushing, and suctioning of secretions in the oral cavity), whereas the second group received intervention using the Sage Q-Care ® product. The intervention included an oral cavity assessment, deep suctioning every 6 hours, oral tissue cleansing every 4 hours or as needed, and toothbrushing twice daily. As a result, the rate of ventilator-associated pneumonia decreased from 12.0 per 1000 ventilator days before the intervention to 8.0 per 1000 ventilator days during the intervention ($P = .06$)¹³.

Chlorhexidine gluconate is an antimicrobial mouth rinse often prescribed to patients with varying levels of periodontal disease. It is even more commonly prescribed in individuals presenting with active periodontitis. Just as we prescribe this oral rinse for patients who are able to brush, it is recommended that an oral antiseptic be used for ventilated patients. Chlorhexidine is a broad-spectrum antibacterial agent that inhibits the growth of bacteria²⁰, therefore controlling infection and the risk of aspirating harmful bacteria into the lungs. One study evaluated the effectiveness of chlorhexidine used in reducing incidences of VAP compared to placebo or standard care for its prevention. Although there was a reduction in incidence of VAP, it was recommended that a stronger concentration, 2% rather than 0.12%, would be more effective in reducing VAP. The author also stated, "Studies analyzing the effectiveness of chlorhexidine in

reducing VAP suffer from a number of methodological issues. There is substantial clinical heterogeneity, with different patient populations, concentration and frequency of application of chlorhexidine and definition of VAP.”²⁰ In practice, chlorhexidine is never used alone for patients with active periodontitis, but as an adjunct to help attack the bacterial infection from a multifaceted standpoint rather than just scaling.

Chapter III

Methods and Materials

Introduction

This descriptive research survey was used to evaluate Intensive Care Unit nurses:

- a) Values on oral health
- b) Views on patients receiving oral hygiene while staying at the hospital
- c) Time to provide quality oral hygiene
- d) Receptiveness to adding a preventive oral health professional to the team

With the use of a feedback survey, this study aimed to identify ICU nurses' thoughts and professional opinions in regards to the care and management of hospitalized patients' oral health. This assessment was used to help define this information.

Sample Description

Study participants included a convenience sample of ICU nurses on the Trauma ICU Nurses/Critical Care Medicine Facebook page.

Research/Survey Design

Intensive care unit nurses from across America received an invitation to participate in an online survey through REDCap via an online post on the Trauma ICU Nurses/Critical Care Medicine Facebook page. This is a closed group, which requires admittance from the page administrator who has verified each individual. Written permission was obtained from the page administrator. Included was a brief description of the survey and a link to access the survey. The survey took

approximately 5-10 minutes to complete and participants were given 2 weeks to complete the survey. After the first week a reminder was sent as to give individuals who had not yet participated a chance to do so.

The institutional review board (IRB) of the University of New Mexico did grant approval for this study prior to distribution. This survey included multiple-choice items, closed-ended and open-ended questions and was designed to explore four main themes:

1. Nursing staffs' values on their own oral health.
 - How many times per day do you brush your teeth?
 - How often do you floss your teeth?
 - On average, how many times per year do you have preventive dental care i.e. a dental cleaning with dental hygienist?
2. Nursing staffs' views on oral hygiene received by patients while staying at the hospital.
 - If a patient is able to perform daily tooth brushing when hospitalized, are they encouraged to do so while under your care?
 - Who helps patients that are unable to perform their own tooth brushing during a hospital stay?
 - Do you feel comfortable performing tooth brushing on a patient?
 - Do you feel like your nursing education prepared you in performing oral hygiene care on a patient?
 - Do you feel patients who have daily tooth brushing are at a reduced risk for additional health complications or disease exacerbation?

3. Nursing staff's perception on time to perform quality oral hygiene.
 - How much time do you spend providing oral hygiene care to patients?
 - Do you feel this is enough time to provide quality oral hygiene care?
4. Nursing staffs' receptiveness of adding a preventive oral health professional to the patient care team (like a dental hygienist).
 - If you had a question regarding a patients' oral health, do you have the proper resources to assist you?
 - Do you feel that you, the care staff and patient could benefit from inter-professional collaboration with a dental provider like a dental hygienist?

These questions were used to establish this study and give more enhanced direction towards implementing a program in the future.

Potential Confounders

Potential confounders that can affect the continuity of this survey study can be group selection and group selection interaction effect. For example, when the survey respondents are asked what their specialty is, it may be possible to assess whether responses cluster by unit. Possible limitations of the survey include: the amount of quantitative and qualitative data obtained from the respondents, length of the survey, and question ambiguity.

Data Collection

Nursing staff survey responses were collected using a REDCap, an online survey and database program. The data collected was used to capture the nursing staff's opinions and thoughts about oral health practices and care of patients under their supervision at their respective hospitals. The survey was open for two weeks and could only be taken in one sitting.

Data Analysis

This study's conclusions are based on the results of the completed and submitted surveys. Responses to the survey were evaluated in relation to the four main themes (as discussed earlier/above). Multiple-choice and closed-ended questions are to be grouped and charted. Open-ended responses are grouped on likeness, interpreted and charted. Frequencies and percentages were used to summarize survey response data.

Sample Size Considerations

The convenience sample included all 1,696 surveys to member nurses on the Facebook page. Assuming a response rate of 5% to 30% it was expected that about 85 to 509 nurses would respond to the survey. Under these conditions the margin of error for description of a binary variable would be between 4% and 11%.

Chapter IV

Results, Discussion, and Conclusion

Summary of Results

The survey opened on Friday, April 5, 2019 with the Informed Consent Cover Letter and live REDCap survey link. It was posted to the Trauma ICU Nurses/Critical Care Medicine Facebook page. A reminder was posted on Friday, April 12, 2019.

REDCap recorded 34 survey participants and each survey was complete with every question answered. Overall response rate was calculated at 2.0% with a 17% margin of error.

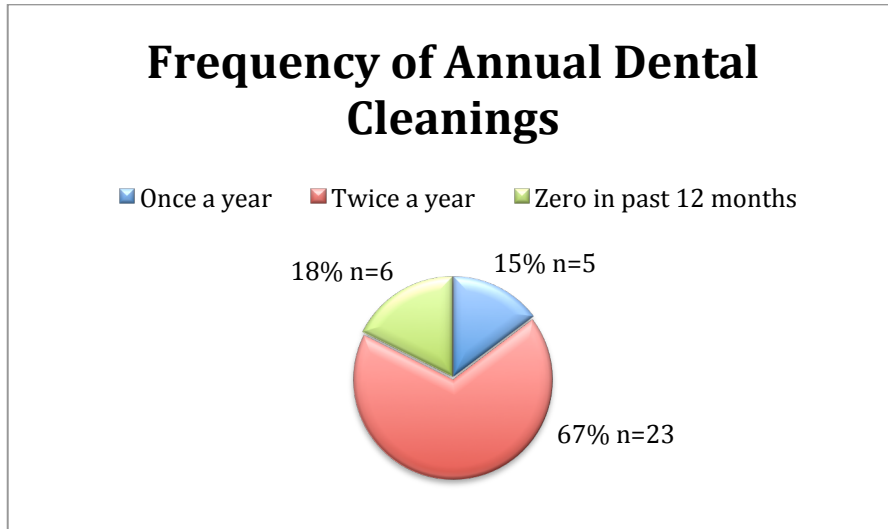
Specialty

Survey respondents reported their specialty in at least one but up to three areas. This made data analysis slightly difficult. All 34 participants worked in a variation of cardiac, trauma, general, surgical, or neurological intensive care.

Respondents Values of Personal Oral Health

A majority of respondents, 61.8% (n=21) report brushing their teeth twice a day and 67.6% (n=23) reported having a professional dental cleaning twice a year, whereas 18% (n=6) of the respondents report not having a dental cleaning in the last 12 months (Figure 1).

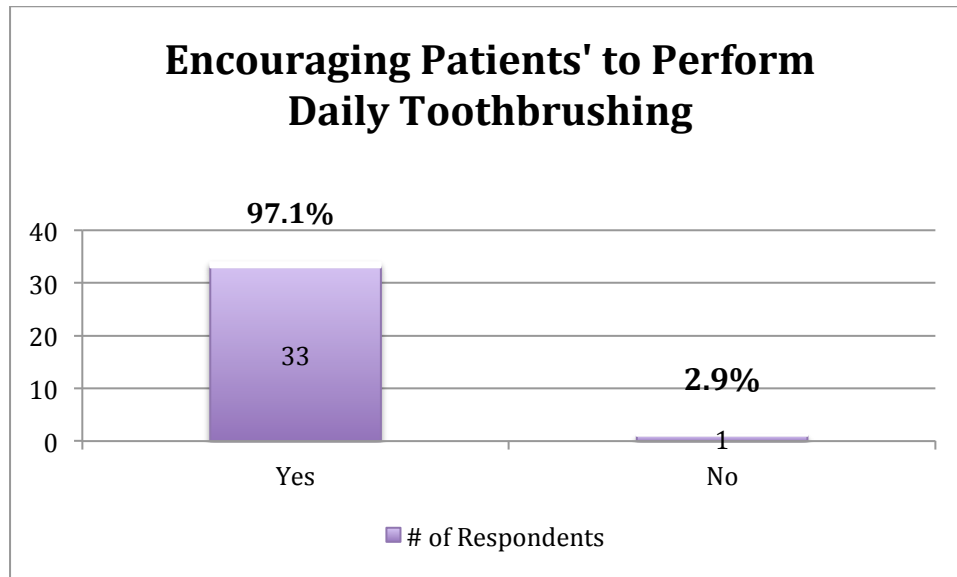
Figure 1 Surveyed Nurses Response to Personal Oral Hygiene- Frequency of Annual Preventive Dental Care



Patient's Oral Care

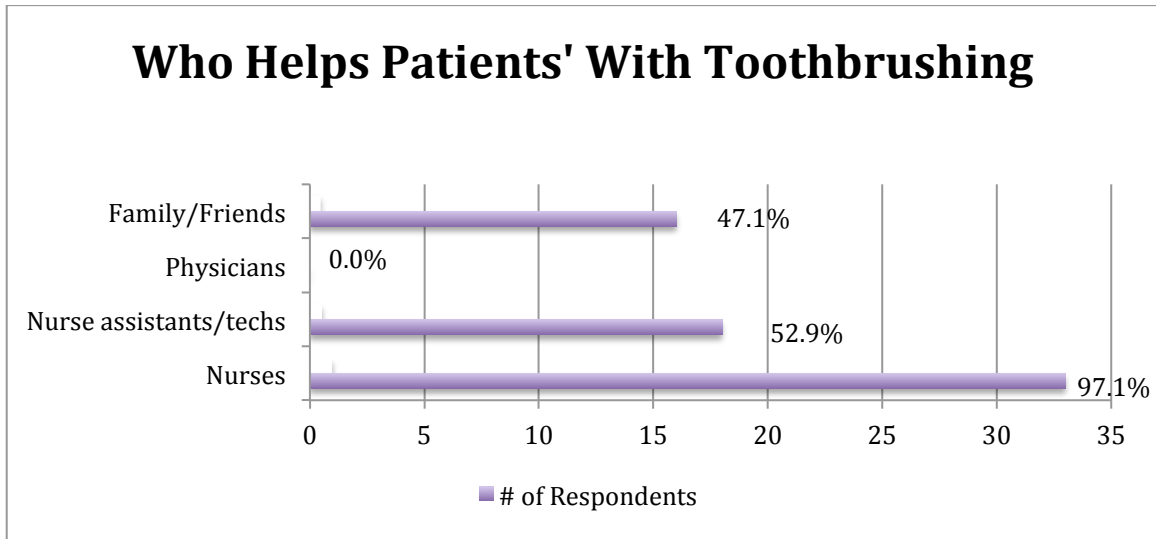
A majority of respondents, 97.1% (n=33) reported that patients who are able to perform oral hygiene tasks are encouraged to do so (Figure 2).

Figure 2 Surveyed Nurses Who are Encouraging Patients' to Perform Daily Toothbrushing



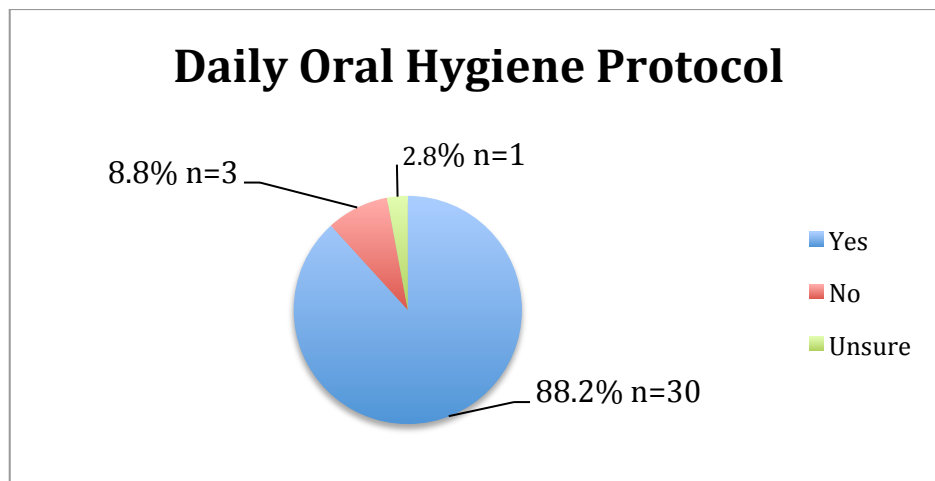
Thirty-three (97.1%) surveyed nurses' report helping patients with toothbrushing, 18 (52.9%) mention nurse assistants or techs, and 16 (47.1%) mentioned family and friends also assist patients with toothbrushing (Figure 3).

Figure 3 Surveyed Nurses Response to Who Helps Patients with Toothbrushing



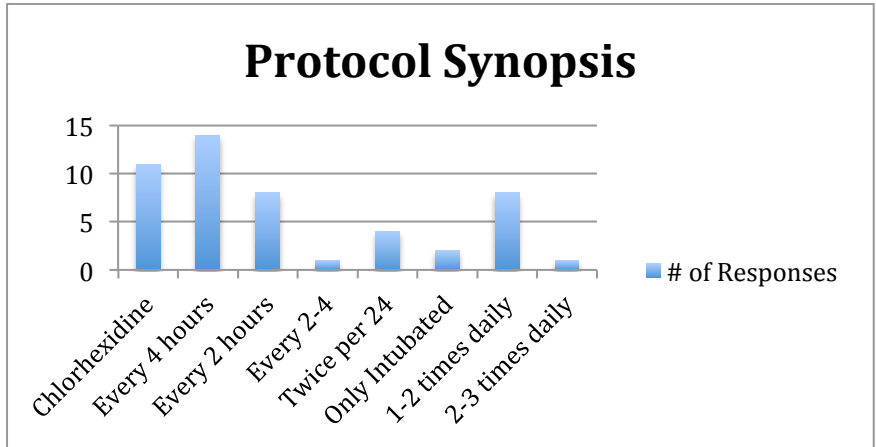
When asked if respondents had an oral hygiene protocol in place, 30 (88.2%) reported they did, 3 (8.8%) so they did not, and 1 (2.9%) was unsure (Figure 4). When those who said they did not have a protocol were asked if their units were in need of one, 100% said yes.

Figure 4 Surveyed Nurses Who Have a Daily Oral Hygiene Protocol



When asked to briefly describe their protocol, the 30 respondents who said yes to having a daily protocol all answered. A full table can be found at the end of the section (Table 3) and a condensed version is seen here (Figure 5).

Figure 5 Condensed Version on Daily Protocol Descriptions



Overall, 32 (94.1%) felt that they had the right supplies to provide daily oral hygiene to patients, 1 (2.9%) felt that they did not and 1 (2.9%) did not answer. Respondents were next asked about the supplies that have in their units. 34 reported having suction (100%), All 34 participants (100%) reported having suction and toothbrushes , 32 (94.1%) reported having sponges and chlorhexidine, and 8 reported other (23.5%) (Figure 6). Seven respondents reported that other supplies would better enable them to perform oral hygiene tasks (Table 1).

Figure 6 Surveyed Nurses' Current Oral Hygiene Supplies

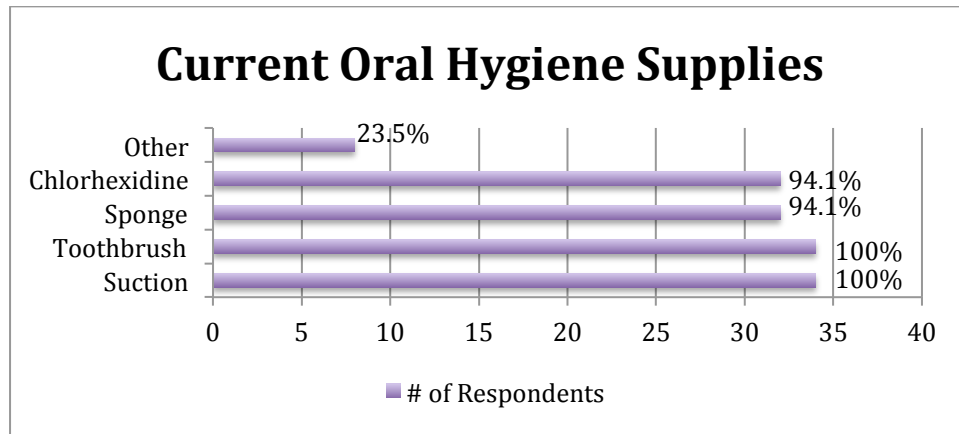
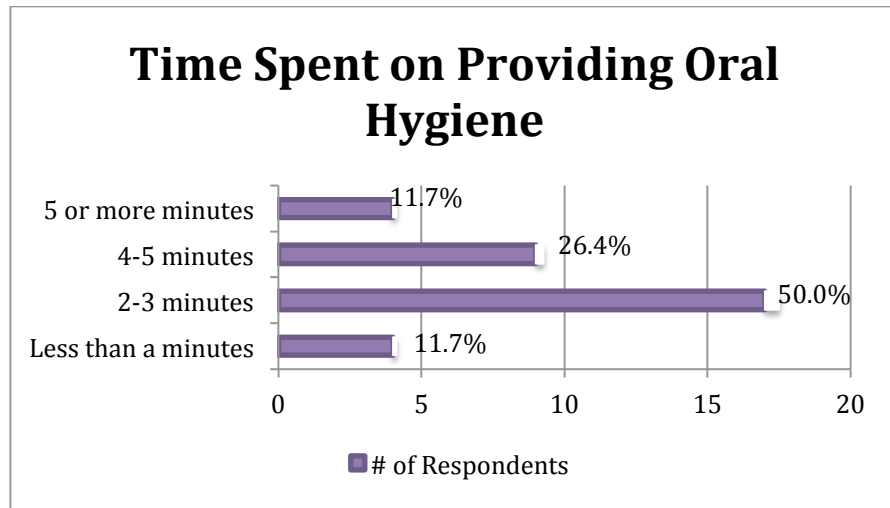


Table 1 Other Supplies that would be of Benefit

Supplies to Better Enable
Oral care kits for those that are intubated. They are very helpful where I work.
Mouthwash & denture supplies
Mouthwash
Kits, even if put together by aids or UAP
If there was something that would help open their mouths to actually be able to get in there better it would make my life easier.
We use a combo pack to include a yankaur. This is replaced Qd by night shift.
Suction toothbrush and toothette

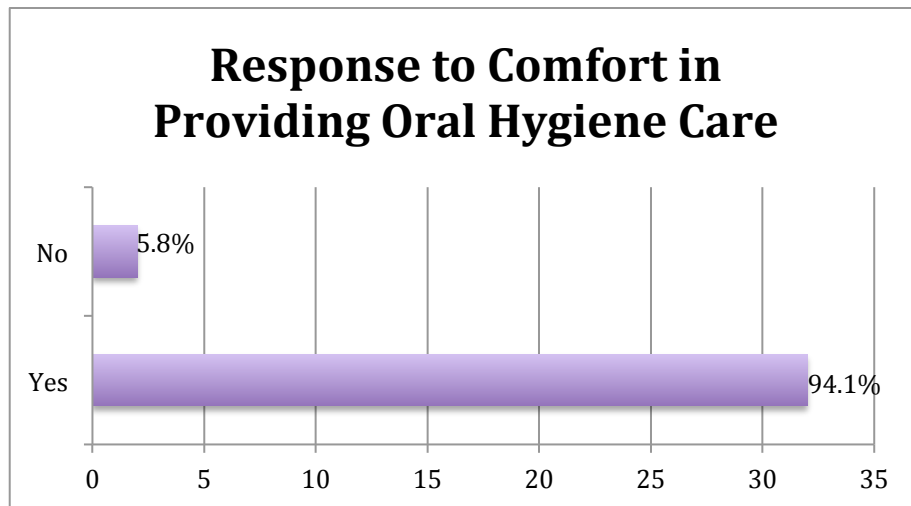
When the respondents were asked how much time they or someone else spent on providing oral hygiene care to patients 17 (50%) reported 2-3 minutes, 9 (26.4%) reported 4-5 minutes, 4 (11.7%) reported 5 or more minutes, and 4 (11.7%) reported less than a minute (Figure 7). Respondents were asked if the time they spent on providing oral hygiene care was enough time. Majority, 30 (88.2%) said yes and 4 (11.7%) said it was not enough time.

Figure 7 Surveyed Nurses Report on Time Spend Providing Oral Hygiene



Next respondents were asked about their comfort in providing oral hygiene care to patients. Thirty-two (94.1%) said yes and 2 (5.9%) said they were not comfortable (Figure 8). One respondent said they were scared or unsure and another said it was not their specialty or priority.

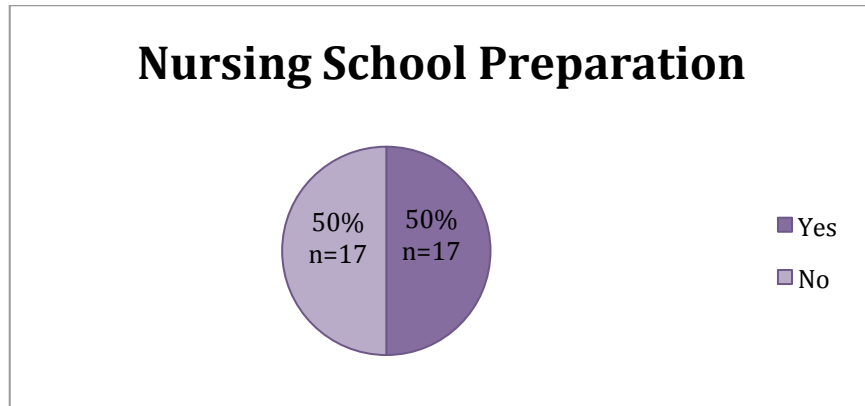
Figure 8 Surveyed Nurses Response to Comfort in Providing Oral Hygiene Care



Nurse Preparation and Interprofessional Collaboration

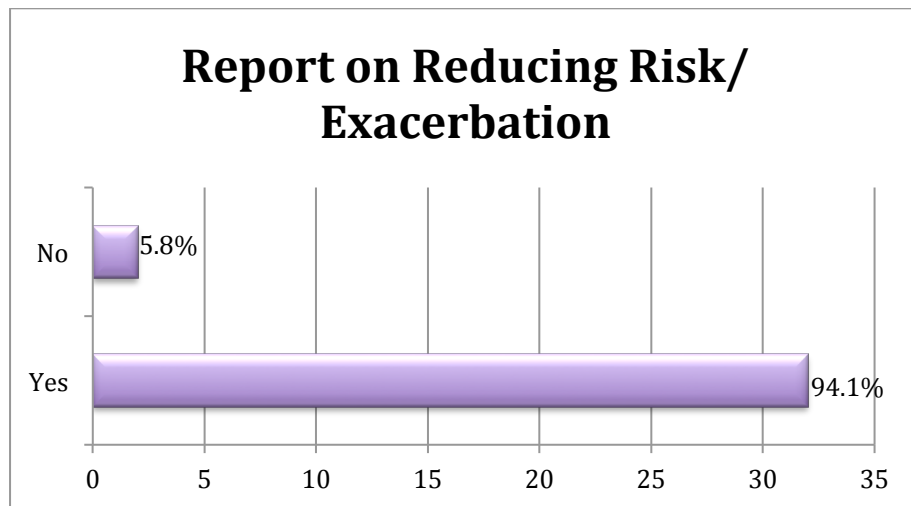
When asked if their nursing school education prepared them on performing oral hygiene tasks on patients 50% said yes and 50% said no (Figure 9).

Figure 9 Surveyed Nurses Report on Nursing School Preparation



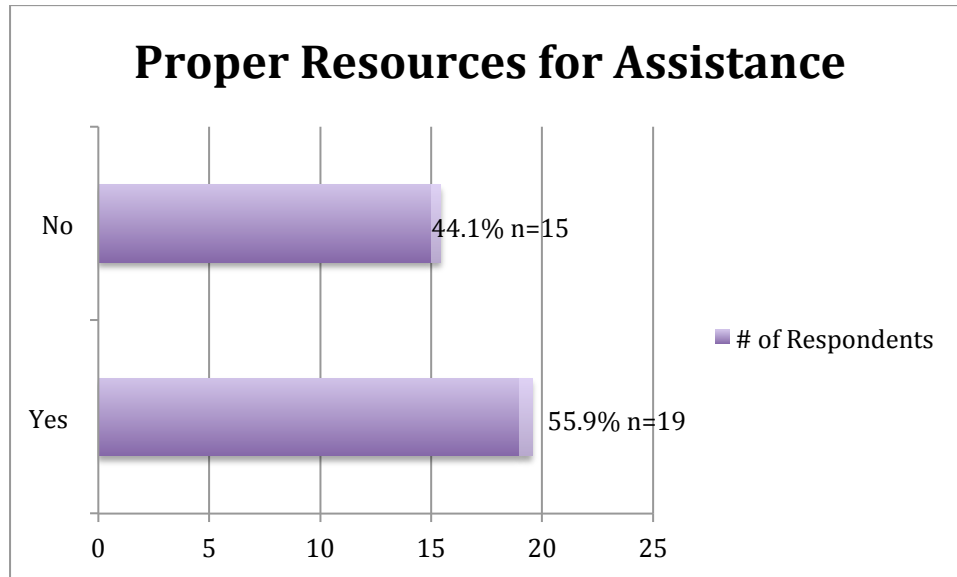
Participants were asked if they felt patients who have daily toothbrushing are at a reduced risk for additional health complications or disease/injury exacerbation. Thirty-two (94.1%) said yes and 2 (5.9%) said no (Figure 10).

Figure 10 Surveyed Nurses Report on Reducing Risk for Patients



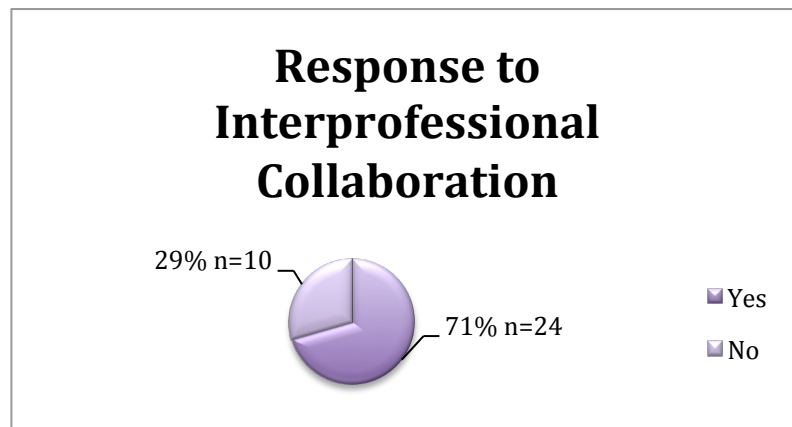
Respondents were asked whether they had proper resources to assist them if they had any questions regarding a patient’s oral hygiene. Nineteen (55.9%) said they did and 15 (44.1%) reported that they did not (Figure 11).

Figure 11 Surveyed Nurses Report on Proper Resources for Assistance



When asked about interprofessional collaboration between nurses and a dental hygienist for the patient and care staff’s benefit 24 (70.6%) of respondents reported that it would be beneficial. Whereas, 29.4% (10) reported that collaboration would not be a benefit (Figure 12).

Figure 12 Surveyed Nurses Response to Interprofessional Collaboration



Lastly, respondents were asked to provide feedback on how dental professionals such as dental hygienists, could be of assistance to ICU nurses to provide optimum oral hygiene care (Table 2).

Table 2 Feedback on Interprofessional Collaboration

Feedback
More education on WHY it's important. Many newer nurses do not understand why we need to do oral care so frequently.
After my patients are no longer icu level of care I feel like dental hygienist are appropriate to see the patient.
As a consultant in his/her discipline of orthodontia...ESPECIALLY for septic shock, cardiogenic shock, severe sepsis, DIC, septic patients with grossly visible dental carriers unresponsive to EBP aggressive treatment modalities
Our respiratory therapist can do oral care on ventilated patients but usually don't. It would be nice if someone made sure that oral care got done.
While I believe pt could benefit from this collaboration I also believe that more often than not it would be an inappropriate collaboration in the ICU. While oral care and dental care (2 very different things) are important the ABCs and Hs&Ts take priority. I do not believe this would be an appropriate concentration. I believe this is more of a primary care or med. surge consultation collaboration.
It would benefit the occasional patient that does not have adequate oral hygiene at home and needs a full cleaning or has had trauma, but I do not believe it would benefit every patient. It may be beneficial to have one or two on staff so that they could round on the patients who needed the assistance.

Table 3 Full Version on Protocol Descriptions

Briefly Describe the Protocol
CHG mouth wash.
It only applies to intubated patients using a mix of chlorhexidine and peroxide
If they are intubated, oral care must be done Q4 hours with our oral care kit (which includes chlorhexidine), patients who are not intubated require daily oral care
Every two hours or care for vented patients.
Varies based on patient condition. Intubated/sedated patient oral care every 2 hours, if independent offered twice per 24 hours.
Patients should be offered to brush there teeth 2-3 times a day if not intubated and when intubated oral care is done every 2 hours
Q4 chlorohexadine if intubated

Oral care BID if not vented, unless underlying trauma exists. Q2 to 4 hrs if on ventilator.

Q4 for all ICU pts

Q2h on ventilated patients, using chlorhexidine at least 4 time in a 24 hr period.

Chg oral care q12 , regular mouth care including but not limited to suctioning, mouthwash, toothbrushing

Daily tooth brushing on non-intubated; vented pt. every four hours

Q2 h mouth care for incapacitated or intubated patients. Able bodied patients are encouraged to brush at will or at least once daily

Only for vented pts

Only for vented patients! Q1-2 hours.

Q4hr chg oral care. Respiratory also has q4hr chg oral care, so ideally it's alternated for q2hr chg oral care

Intubated every 4 hrs-split between RT and nurses with the oral kits provided

Bid

Chlorhex oral care kit q4H

Vented patients q4

Provide oral care to patient as needed For independent patients encourage oral care and provide set up For patients on Ventilator or pressure oxygen support provide Q4H unless contraindications (i.e. bleeding)

If they are on a ventilator then they are to receive oral care every four hours which includes CHG brushing, hydrogen peroxide swabbing, and oral suctioning once each time. If they are alert then they are encouraged to brush their teeth once during the day shift.

Vented patients receive oral care

Q4hours while vented. Q4hrs or as often as can tolerate while Bipap. BID for rest

Q shift while not on vent

Vent/bipap/npo patients- oral care q2h and prn with chg swabs and suction Other-oral care offered after meals, before bed, and prn. If patient is oriented patient can decline.

There is a kit with four toothbrush/suction kit for brushing twice a shift, and twelve swab with an mouthwash type stuff for Q2 suctioning and mouth care to prevent VAP

Every 4 hours min, preferred every 2. Can be delayed for ICP issues or agitation.

Q12h with CHG with Q4h non CHG mouthwash and mouth moisturizer

Discussion

Principle Findings

Findings from this study reveal that a majority of respondents place value on preventative oral health care with a majority seeking preventive dental care for themselves and a general understanding that patient's oral health decreases risk of aspiration, suggesting value of such care. It was also noted that most respondents both encourage and assist patients with oral hygiene tasks and serve as the primary person to do so. The protocol for Sage Q-Care® did not mention length of time to person tasks but was designed for oral tissue cleansing every 4 hours and toothbrushing twice daily. It is unclear if those that spent 2-3 minutes or 4-5 minutes providing care did so multiple times a day or just once. This leaves the debate on adequate time available up for further investigation. A majority of these nurses' work primarily in the Intensive Care Units and often have to worry about maintaining an airway especially for intubated patients and avoiding other complications like aspiration pneumonia, so they may be more attentive to this subject in comparison to nurses in other units. On the topic of comfort and education, a majority of respondents stated being comfortable with providing oral hygiene care, but half said they did not receive proper training in their respective education programs. Dental professionals can help integrate additional education before and after graduation so that nurses feel more prepared didactically and hands on once they are working in their respective field. Regardless of oral hygiene education a majority of nurses still provided such tasks in order to maintain an airway especially for intubated patients and

avoiding other complications. Eighty-eight percent stated they had a protocol in place and 29 offered brief descriptions of that protocol. Although the previous literature review was inadequate at locating current ICU protocols, there were findings from responses that suggested similarity to the Q-Care® Oral Care kits. Most involved the use chlorhexidine multiple times daily and suction. Thirty-two had toothbrushes and 34 had chlorhexidine in their units for use, but only 55.9% felt that they had the proper human resources if any questions were to arise. This is another example of how a dental professional may be of assistance. Of the respondents, 70.6% were open to interprofessional collaboration with a dental professional and 6 gave various ways and times when it would be appropriate. More education on the importance of oral hygiene and having someone to hold others accountable for providing care are just some of the examples. There must always be accountability in any office, clinic, hospital, etc. to ensure that proper treatment is being performed. This may open up the gateway or at the least a conversation on how dental professionals and nurses can come together.

Limitations

The limitations present in this descriptive study could have an impact on the given results, interpretations and future implications. The sample size of 34 respondents is too small to provide statistical evidence to justify generalizability, which limits the results and the outcome of the study.

This study was also limited in that a Facebook was the avenue to connect with ICU nurses across the nation. Some of 1,696 members may not be active on

the group and so the target size may have been much smaller. Since specialties were also self reported it is likely that some respondents may no longer be actively practicing ICU nurses. Lastly, Facebook posts tend to show on some member's timelines and others it does not, reaching less people than expected.

Recommendations for Future Studies

In future studies, it would be beneficial to find a different method to obtaining access to ICU nurses. This would broaden the number of the participants, ensure active work in intensive care units, and direct reminders can be sent. It would also be of benefit to include sections on how recently respondents got out of school; older nurses may feel like there is a lack of education for those going through nursing school in present day.

To further review oral hygiene protocol in hospitals research on individual hospitals is needed. This could encompass reaching out to ICU directors and viewing their protocol either during observation or written documents. Measuring the frequency care is provided and the quality/efficiency of that protocol may actually suggest that a change in protocol must be made.

Conclusion

Findings from this study suggest that Trauma ICU Nurses/Critical Care Medicine Facebook page nurses' value oral health in themselves and in their patients. They seem receptive to having interprofessional collaboration with dental providers like a dental hygienist to assist in hands on learning as well as someone to assist to make sure tasks are completed. Although results of this study are not generalizable it opens up conversation on what ways dental

hygienists can be integrated in hospital-like settings. More extensive research needs to be conducted to see if all hospital units have as much success in performing oral care on patients and if there is interest for interprofessional collaboration in other units as well. Although this study was not carried out as proposed the insight and knowledge gained is a step forward to providing everyone with optimum care regardless of the hospital situation they are in.

Chapter V
Article for Submission

Title Page

ORAL HYGIENE IN INTENSIVE CARE UNITS: A SURVEY ON
PROTOCOL

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Abstract

Purpose

Oral hygiene is often dismissed or undervalued in the overall health and wellness of individuals and can be detrimental to patients in hospital-like settings especially those using mechanical ventilation. The purpose of this study is to learn about various Intensive Care Units' current oral hygiene care practices and protocols, nurses' values and interests in inter-professional collaboration with a dental hygienist.

Methods

An online survey was created via REDCap and intended recipients included 1,696 members of the Trauma ICU Nurses/Critical Care Medicine Facebook page. Participants had two weeks to participate if they wished and were asked questions about their value of oral hygiene, oral hygiene education, and interest in interprofessional collaboration.

Results

Of the 1,696 nurses only 34 (2.0%%) opted to participate in this descriptive study. The result of this study revealed the majority of nurses: value oral hygiene care in themselves and in their patients and are interested in inter-professional collaboration with a dental provider like a dental hygienist. Half of the group reported that their nursing education did prepare them in performing oral hygiene care on patients, but also reported that they did not have proper resources for assistance.

Conclusion

Findings from this study suggest that Trauma ICU Nurses/Critical Care Medicine Facebook page nurses' value oral health in themselves and in their patients. They seem receptive to having interprofessional collaboration with dental providers like a dental hygienist to assist in hands on learning as well as someone to assist to make sure tasks are completed.

Introduction

One population particularly affected by poor oral health are bedridden and hospitalized patients. More often than not, extended hospital stays result in hospital-acquired infections. One of the most common ailments is hospital-acquired pneumonia, which typically results as a consequence of frequent silent aspiration⁴. Silent aspiration occurs when foreign particles are inhaled into the lungs without knowledge and no expulsion, such as coughing occurs. Hospital-acquired pneumonia is the second most common nosocomial infection, prolonging patient care in the hospital⁷. The term 'aspiration pneumonia' has long been used, but this condition is also known as 'hypostatic pneumonia' and deglutition pneumonia³. It may be thought the most likely causative organisms are ones that typically reside in the oral cavity. The bacteria found in the oral cavity of patients with periodontal disease can be virulent and opportunistic if inhaled into the lungs or travel to other organs of the body.

The likelihood of acquiring aspiration pneumonia while on mechanical ventilation is greater than in hospitalized patients that are not ventilated¹⁷. This leads to increased days in intensive care units, as well as an increased risk of mortality¹⁷. Although protocols for nurses to provide oral health care seem to be in place, the adherence to them is not well documented. This study aims to assess the oral health protocols in hospitals.

Aspiration pneumonia is a lung infection that develops after food, liquid, or vomit gets into the lungs. This can occur either when food or liquid is aspirated, or inhaled, into the lungs or from the stomach, where fluids back up into the

esophagus and enter the lungs. If the aspirated material is unable to be coughed up, bacteria can grow in the lungs and cause an infection². Bacteria most commonly found in individuals with aspiration pneumonia include:

Pseudomonas aeruginosa, *Bacteroides forsythus*, *Escherichia coli*, *Enterobacter cloacae*, *Staphylococcus aureus*, *Haemophilus influenzae*, *Klebsiella pneumoniae*, *Streptococcus pneumoniae*, and *Porphyromonas gingivalis*. This list of bacteria includes two red complex, the most virulent, oral microbial pathogens *P. gingivalis* and *B. forsythus*.

In the study, *Periodontal Infections and Community-Acquired Pneumonia: A Case–Control Study*, the aim was to evaluate if the presence of periodontal infections (PI) is associated with community-acquired pneumonia (CAP) in a group of patients admitted to a hospital. This study found that chronic periodontitis (CP) was more frequent in patients with CAP (case: 61.4 %; control: 41.4 %). The presence of moderate or severe CP increased the risk for CAP [odds ratio (OR) = 4.4, 95 % confidence interval (CI) = 1.4–13.8], even when adjusted for age, ethnicity, gender, and smoking. Moderate and severe chronic periodontitis were associated with CAP in this study⁴. Periodontitis can develop after systemic disease, can be exacerbated by systemic disease, and can negatively affect any systemic disease. It has been estimated that 47.2%, or 64.7 million American adults, have mild, moderate or severe periodontitis, the more advanced form of periodontal disease, increasing to 70.1% in adults over 65². These statistics are alarming especially as we gain more insight on the link between oral health and systemic health. This could also mean that half the

American population is at an increased risk for developing VAP if required to be on mechanical ventilation.

In early studies it was found that 10%-20% of patients on ventilation tubes developed ventilator-associated pneumonia, with more recent publications stating 1 to 4, but up to 10 cases per 1,000 ventilator days¹⁰. Mortality rate in these individuals is multifactorial; it is based upon immune function prior to pneumonia as well as the volume and content of aspiration. According to DeLegge, there was a 62% mortality rate in 47 patients who had a witnessed event of aspiration, and the mortality rate of one lobe aspiration was approximately 40% whereas two-lobe aspiration was around 90%¹. Based upon these numbers it can be said that there is an issue at hand and prevention protocols must be put in place. Overall, "mortality rates in the ICU are 2 to 3 times as great in patients with VAP as in patients without VAP."¹⁵

Although there were no published protocols found in place to prevent aspiration pneumonia in all individuals, there were some protocols found to prevent the occurrence in the elderly population. Preventive interventions are focused on reducing oral bacteria colonization and preventing aspiration. Mechanical removal of oral debris is promoted, however direct mechanical cleaning is thwarted by the lack of adequate training of nursing staff and residents' uncooperativeness¹¹. Hospitals try to tackle this issue by utilizing the Q-Care Oral Care System, which typically includes chlorhexidine gluconate, a toothette, and suction. A published 4-year study using an oral care protocol including Q-Care Oral Care Systems saw a 33% reduction in VAP, plus fewer

vent days, shorter length of stay and decreased mortality rates¹⁵. The intervention includes an oral cavity assessment, deep suctioning every 6 hours, oral tissue cleansing every 4 hours or as needed, and toothbrushing twice daily.

Hypothesis

Critical Care Nurses place value on providing oral hygiene, but a lack of time, education, and sufficient protocol hinder them from providing optimum care.

Methods and Materials

This descriptive research study aimed to identify nursing staffs' thoughts and professional opinions in regards to the care and management of hospitalized patients' oral health. This assessment was used to help define this information.

Study participants included a convenience sample of ICU nurses on the Trauma ICU Nurses/Critical Care Medicine Facebook page. Participation involved an online survey through REDCap via an online post on the Trauma ICU Nurses/Critical Care Medicine Facebook page. This is a closed group, and required written permission was acquired from the page administrator to administer the survey. The survey took 5-10 minutes to complete and participants were given 2 weeks to complete the survey. After the first week a reminder was posted as to give individuals who have not yet participated a chance to do so.

The institutional review board (IRB) of the University of New Mexico did grant approval for this study prior to distribution. The survey was developed by the primary investigator with the help of REDCap final feedback/input from the primary investigator's thesis committee. This survey included multiple-choice

items, closed-ended and open-ended questions. This survey was designed to explore four main themes: values, time, education/views, and receptiveness to interprofessional collaboration.

This study's conclusions are based on the results of the completed and submitted surveys. Responses to the survey were evaluated in relation to the four main themes (as discussed earlier/above). Multiple-choice and closed-ended questions are to be grouped and charted. Open-ended responses are grouped on likeness, interpreted and charted. Frequencies and percentages were used to summarize survey response data.

Results

REDCap recorded 34 survey participants and each survey was complete with every questions answered. The response rate is 2.0%. The study is limited due to a very small response rate.

A majority of respondents report brushing their own teeth twice a day (21, 61.8%) and 67.6% report having a professional dental cleaning twice a year, whereas 17.6% of the respondents report not having a dental cleaning in the last 12 months. This shows that a majority does place value on their own oral health. Ninety-seven percent responded that they assist with toothbrushing and 50% do it for at least 2-3 minutes. The 88.2% who had a protocol in place described briefly their respective protocols. Thirty-two had toothbrushes and 34 had chlorhexidine in their units for use, but only 55.9% felt that they had the proper human resources if any questions were to arise. Lastly, 70.6% were open to the

thought of interprofessional collaboration and thought it would be of benefit, and 29.4% were not open believing it would not be of benefit.

Discussion

Findings from this study reveal that a majority of respondents place value on preventative oral health care with a majority seeking preventive dental care for themselves and a general understanding that patient's oral health decreases risk of aspiration, suggesting value of such care. It was also noted that most respondents both encourage and assist patients with oral hygiene tasks and serve as the primary person to do so. The protocol for Sage Q-Care® did not mention length of time to person tasks but was designed for oral tissue cleansing every 4 hours and toothbrushing twice daily. It is unclear if those that spent 2-3 minutes or 4-5 minutes providing care did so multiple times a day or just once. This leaves the debate on adequate time available up for further investigation. A majority of these nurses' work primarily in the Intensive Care Units and often have to worry about maintaining an airway especially for intubated patients and avoiding other complications like aspiration pneumonia, so they may be more attentive to this subject in comparison to nurses in other units.

On the topic of comfort and education, a majority of respondents stated being comfortable with providing oral hygiene care, but half said they did not receive proper training in their respective education programs. Dental professionals can help integrate additional education before and after graduation so that nurses feel more prepared didactically and hands on once they are working in their respective field. Regardless of oral hygiene education a majority

of nurses still provided such tasks in order to maintain an airway especially for intubated patients and avoiding other complications. Eighty-eight percent stated they had a protocol in place and 29 offered brief descriptions of that protocol. Although the previous literature review was inadequate at locating current ICU protocols, there were findings from responses that suggested similarity to the Q-Care® Oral Care kits. Most involved the use of chlorhexidine multiple times daily and suction. Thirty-two had toothbrushes and 34 had chlorhexidine in their units for use, but only 55.9% felt that they had the proper human resources if any questions were to arise. This is another example of how a dental professional may be of assistance. Of the respondents 70.6% were open to interprofessional collaboration with a dental professional and 6 gave various ways and times when it would be appropriate. More education on the importance of oral hygiene and having someone to hold others accountable for providing care are just some of the examples. There must always be accountability in any office, clinic, hospital, etc. to ensure that proper treatment is being performed. This may open up the gateway or at the least a conversation on how dental professionals and nurses can come together.

Conclusion

Findings from this study suggest that Trauma ICU Nurses/Critical Care Medicine Facebook page nurses value oral health in themselves and in their patients. Majority of participants seem receptive to having interprofessional collaboration with dental providers like a dental hygienist to assist in hands-on learning as well as someone to assist to make sure tasks are completed.

Although results of this study are not generalizable it opens up conversation on what ways dental hygienists can be integrated in hospital-like settings. More extensive research needs to be conducted to see if all hospital units have as much success in performing oral care on patients and if there is interest for interprofessional collaboration in other units as well.

References

- 1) Delegge MH. Aspiration Pneumonia: Incidence, Mortality, and At-Risk Populations. *Journal of Parenteral and Enteral Nutrition*. 2002 Jan;26(6):19–25.
- 2) Amanullah S, Talavera F. Ventilator-Associated Pneumonia: Overview of Nosocomial Pneumonias, Epidemiology of VAP, Clinical Presentation of VAP [Internet]. Mosenifar Z, editor. Ventilator-Associated Pneumonia: Overview of Nosocomial Pneumonias, Epidemiology of VAP, Clinical Presentation of VAP. Medscape; 2017 [cited 2017Apr2]. Available from: <http://emedicine.medscape.com/article/304836-overview?pa=OiQGXqSX2SGHMD8U%2BR9bQTouSalYgguG4AYtRUeeyRKsF5t8%2FocNBDXdfUWbHpoRZ2Pdu0j3xBnyQ%2BjC8Nd9DCgTLadDjW30XNFYmyptyk%3D>
- 3) Aspiration pneumonia. *Respirology*. 2009 Nov;14(2):59–64.
- 4) Koenig, S. M., and J. D. Truwit. “Ventilator-Associated Pneumonia: Diagnosis, Treatment, and Prevention.” *Clinical Microbiology Reviews*, vol. 19, no. 4, 1 Oct. 2006, pp. 637–657., doi:10.1128/cmr.00051-05.
- 5) American Academy of Periodontology. “CDC: HALF OF AMERICAN ADULTS HAVE PERIODONTAL DISEASE.” *American Academy of Periodontology*, 4 Sept. 2012, www.perio.org/consumer/cdc-study.htm.
- 6) Cabré M, Almirall J, Clavé. Aspiration Pneumonia: management in Spain. *European Geriatric Medicine*, 2011Jul;2(3):180-3
- 7) Garcia, R., et al. “Reducing Ventilator-Associated Pneumonia Through Advanced Oral-Dental Care: A 48-Month Study.” *American Journal of Critical Care*, vol. 18, no. 6, 27 July 2009, pp. 523–532., doi:10.4037/ajcc2009311.
- 8) El-Solh AA. Association Between Pneumonia and Oral Care in Nursing Home Residents. *Lung*. 2011;189(3):173–80.

Appendices

Appendix A. Informed Consent Letter

University of New Mexico Informed Consent Cover Letter for Anonymous Surveys

ORAL HYGIENE IN INTENSIVE CARE UNITS: A SURVEY ON PROTOCOL

Christine Nathe, Principle Investigator and Kayla Gallegos, graduate student from the Department of Dental Medicine, and Division of Dental Hygiene are conducting a research study. The purpose of the study is to learn about the dental hygiene protocol used by ICU nurses. You are being asked to participate in this study because you are an Intensive Care Unit Nurse and we want to know the protocol you are using as well as if you are interested in interprofessional collaboration with a dental hygienist.

Your participation will involve answering a few short questions. The survey should take about 5-10 minutes to complete. Your involvement in the study is voluntary, and you may choose not to participate. There are no names or identifying information associated with this survey. The survey includes questions such as how often do you brush your teeth? Are you comfortable providing oral care on patients? You can refuse to answer any of the questions at any time. There are no known risks in this study, but some individuals may experience discomfort when answering questions. All surveys will be anonymous. Results will be stored online via REDCap; the account is locked via password entry and will only be accessible by Christine Nathe, RDH, MS and Kayla Gallegos, RDH, BS, Masters Candidate. All data will destroyed 3 years post data analysis.

The findings from this project will provide information on ICU nurses comfort providing oral hygiene care for hospitalized patients and if nurses are interested in participating in interprofessional collaboration with dental hygienists. If published, results will be presented in summary form only.

If you have any questions about this research project, please feel free to call Christine Nathe, PI, at 505-277-8147 or Kayla Gallegos at 505-290-0441. If you have questions regarding your legal rights as a research subject, you may call the UNM Human Research Protections Office at (505) 272-1129.

By completing this survey online, you will be agreeing to participate in the above described research study.

Thank you for your consideration.

Sincerely,

Christine Nathe
Principle Investigator

Kayla Gallegos
Registered Dental Hygienist, BS, Masters Candidate

Appendix B: Survey

Confidential

Page 2 of 3

How many times per day do you brush your teeth?

Zero
 Once
 Twice
 Three times or more

On average, how many times per year do you have preventive dental care such as a dental cleaning with a dental hygienist?

I have not had a professional dental cleaning in the past 12 months
 Once a year
 Twice a year
 Three times a year or more

What type of intensive care unit do you work in?

If a patient is able to perform daily toothbrushing when hospitalized, are they encouraged to do so?

Yes
 No

Who helps patients that are unable to perform their own toothbrushing during a hospital stay? (select all that apply)

Nurses
 Nursing assistants or techs
 Physicians
 Patient's family members or friends
 Unsure

Is there a daily oral health protocol within your unit?

Yes
 No
 Unsure

Please briefly describe your oral hygiene protocol.

Do you think your unit is in need of one?

Yes
 No

Do you feel like you have the right supplies (suction, toothbrush, toothpaste) to assist you if you feel a patient may need oral hygiene care?

Yes
 No

What supplies do you currently have available to assist a patient with oral hygiene care. (select all that apply)

Suction
 Toothbrush
 Sponge
 Chlorhexidine
 Other

What supplies if not listed on the previous question would better enable you to perform oral hygiene care for patients?

How much time do you or someone else spend providing oral hygiene care to patients?

Less than a minute
 2-3 minutes
 4-5 minutes
 5 minutes or more

Do you feel this is enough time to provide quality oral hygiene care?

Yes
 No

03/21/2019 3:34pm

projectredcap.org



Do you feel comfortable performing oral care i.e. toothbrushing or other plaque removal methods on a patient?	<input type="radio"/> Yes <input type="radio"/> No
Why you do not feel comfortable performing oral care on a patient? (select all that apply)	<input type="checkbox"/> Do not know how <input type="checkbox"/> Scared or unsure <input type="checkbox"/> Not your specialty or priority <input type="checkbox"/> Other
Do you feel like your nursing education prepared you on performing oral hygiene care on patients?	<input type="radio"/> Yes <input type="radio"/> No
Do you feel patients who have daily toothbrushing are at a reduced risk for additional health complications or disease/injury exacerbation?	<input type="radio"/> Yes <input type="radio"/> No
If you had a question regarding a patient's oral health, do you have the proper resource to assist you?	<input type="radio"/> Yes <input type="radio"/> No
Do you feel that you, the care staff, and the patient could benefit from interprofessional collaboration with a dental provider like a dental hygienist?	<input type="radio"/> Yes <input type="radio"/> No
Feel free to provide feedback on how dental professionals such as dental hygienists, can assist you as ICU nurses provide optimum oral hygiene care (CE's, work alongside you, etc.).	<hr/>

References

1. Delegge MH. Aspiration Pneumonia: Incidence, Mortality, and At-Risk Populations. *Journal of Parenteral and Enteral Nutrition*. 2002 Jan;26(6):19–25.
2. Amanullah S, Talavera F. Ventilator-Associated Pneumonia: Overview of Nosocomial Pneumonias, Epidemiology of VAP, Clinical Presentation of VAP [Internet]. Mosenifar Z, editor. Ventilator-Associated Pneumonia: Overview of Nosocomial Pneumonias, Epidemiology of VAP, Clinical Presentation of VAP. Medscape; 2017 [cited 2017Apr2]. Available from: <http://emedicine.medscape.com/article/304836-overview?pa=OiQGxqSX2SGHMd8U%2BR9bQTouSalYgguG4AYtRUeeyRKsF5t8%2FocNBDXdfUWbHpoRZ2Pdu0j3xBnyQ%2BgjC8Nd9DCgTLadDjW30XNFYmyptyk%3D>
3. Aspiration pneumonia. *Respirology*. 2009 Nov;14(2):59–64.
4. Koenig, S. M., and J. D. Truwit. “Ventilator-Associated Pneumonia: Diagnosis, Treatment, and Prevention.” *Clinical Microbiology Reviews*, vol. 19, no. 4, 1 Oct. 2006, pp. 637–657., doi:10.1128/cmr.00051-05.
5. American Academy of Periodontology. “CDC: HALF OF AMERICAN ADULTS HAVE PERIODONTAL DISEASE.” *American Academy of Periodontology*, 4 Sept. 2012, www.perio.org/consumer/cdc-study.htm.
6. Aas, J. A., et al. “Defining the Normal Bacterial Flora of the Oral Cavity.” *Journal of Clinical Microbiology*, vol. 43, no. 11, 1 Nov. 2005, pp. 5721–5732., doi:10.1128/jcm.43.11.5721-5732.2005.
7. National Center for Health Statistics. *Health, United States, 2016: With Chartbook on Long-term Trends in Health*. Hyattsville, MD. 2017.
8. Critical Care Statistics [Internet]. SCCM.org. Society of Critical Care Medicine; [cited 2017Apr2]. Available from: <http://www.sccm.org/Communications/Pages/CriticalCareStats.aspx>
9. Healthcare Cost and Utilization Project (HCUP). OVERVIEW STATISTICS FOR INPATIENT HOSPITAL STAYS [Internet]. HCUP Facts and Figures: Statistics on Hospital-Based Care in the United States, 2009 [Internet]. U.S. National Library of Medicine; 1970 [cited 2017Apr2]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK91986/Dietsche> E. 60 things to know about the hospital industry | 2016 [Internet]. Becker's Hospital Review. ASC Communications; 2016 [cited 2017Apr2]. Available from: <http://www.beckershospitalreview.com/lists/50-things-to-know-about-the-hospital-industry-2016.html>
10. Klompas M, Branson R, Eichenwald EC, Greene LR, Howell MD, Lee G, et al. Strategies to prevent ventilator-associated pneumonia in acute care hospitals: 2014 update. [Internet]. *Infection control and hospital epidemiology*. U.S. National Library of Medicine; 2014 [cited 2017Apr3]. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/25376073>
11. Metheny NA. Preventing Aspiration in Older Adults with Dysphagia. *AJN, American Journal of Nursing*. 2008;108(2):45–6.

12. Cabré M, Almirall J, Clavé. Aspiration Pneumonia: management in Spain. *European Geriatric Medicine*, 2011Jul;2(3):180-3
13. Garcia, R., et al. "Reducing Ventilator-Associated Pneumonia Through Advanced Oral-Dental Care: A 48-Month Study." *American Journal of Critical Care*, vol. 18, no. 6, 27 July 2009, pp. 523–532., doi:10.4037/ajcc2009311.
14. Alp, Emine, and Andreas Voss. "Ventilator Associated Pneumonia and Infection Control." *Annals of Clinical Microbiology and Antimicrobials*, BioMed Central, Oct. 2006, www.ncbi.nlm.nih.gov/pmc/articles/PMC1540438/.
15. Fagon J-Y, Chastre J, Hance AJ, Montravers P, Novara A, Gibert C. Nosocomial pneumonia in ventilated patients: A cohort study evaluating attributable mortality and hospital stay. *The American Journal of Medicine*. 1993Mar;94(3):281–8.
16. El-Solh AA. Association Between Pneumonia and Oral Care in Nursing Home Residents. *Lung*. 2011;189(3):173–80.
17. Thomas T. Yoshikawa, Joseph M. Mylotte; Nursing Home—Acquired Pneumonia, *Clinical Infectious Diseases*, Volume 35, Issue 10, 15 November 2002, Pages 1205–1211, <https://doi.org/10.1086/344281>
18. Macentee MI, Thorne S, Kazanjian A. Conflicting priorities: oral health in long-term care. *Special Care in Dentistry*. 1999;19(4):164-172. doi:10.1111/j.1754- 4505.1999.tb01380.x.
19. "Q•Care® Oral Cleansing & Suctioning Systems." *Sage Products LLC*, sageproducts.com/oral-hygiene-for-ventilated-patients/.
20. Andrews, Tom, and Colin Steen. "A Review of Oral Preventative Strategies to Reduce Ventilator-Associated Pneumonia." *Nursing in Critical Care*, vol. 18, no. 3, 30 Jan. 2013, pp. 116–122., doi:10.1111/nicc.12002.