Implementation of an Oral Care Protocol on an Acute Geriatric Inpatient Unit

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A DNP Project Manuscript
Submitted in Partial Fulfillment of the Requirements for the
Doctor of Nursing Practice Degree

University of Maryland School of Nursing
May 2020

Abstract

Background: Hospital acquired pneumonia is the second most common hospital acquired infection, and is responsible for 20-33% of mortality rates from infection. Patients with HAP also have higher 30-day hospital readmission rates compared to patients without a hospital acquired infection. Nationwide, hospital acquired pneumonia accounts for 32.5-35.4 million discharges annually. According to the Centers for Disease Control, 5-7% of hospitalizations due to pneumonia end in death. The oral cavity is a high reservoir for infection, and evidence-based practice suggests oral hygiene interventions to prevent hospital acquired pneumonia. Hospital acquired pneumonia is more common in at risk individuals, and there are four routes of transmission: (1) through aspiration of oral contents (food, oropharyngeal secretions, or gastrointestinal contents), (2) from infectious sites, (3), from inhalation of aerosols that are infected, and (4) from extra-pulmonary sites. Aspiration of infectious organisms remains the number one way to acquire hospital acquired pneumonia, so reducing oral bacteria is critical in hospital acquired pneumonia prevention.

Local Problem: The focus site had no oral care protocols in place. Oral care supplies that were used were not ones recommended by evidence-based practice.

Interventions: This project was implemented over a 12-week time span beginning in September of 2018. Education sessions were provided to staff to ensure appropriate use of oral care equipment. A five-question pre and post education test was administered to measure retention of information. Staff documented each time oral care was performed in addition to documenting all of the supplies that were used. Oral care compliance was measured through point prevalence, and hospital acquired pneumonia incidences was tracked through manual extraction of infection data. Hospital acquired pneumonia percentages was calculated using the number of hospital acquired pneumonia incidences divided by the number of patient visits.

Results: Pre-implementation oral care compliance rates were (May-Aug) 36%. Post-implementation rates were (Sep-Dec) 52%. The average pre-pneumonia rate (May-Aug) was 25.8 and average post pneumonia rate (Sep-Dec) was 29.6. In addition, the average pre implementation aspiration pneumonia rate (May-Aug) was 7.3, and the average post aspiration pneumonia (Sep-Dec) was 5.5. The average grade on the pre-test was 77.8% and 82.5% on the post-test.

Conclusion: There was a 16% increase in oral care compliance with implementation of this quality improvement project. In addition, there was an appreciative decrease in aspiration pneumonia rates with the increase in oral care compliance. However, there was a surge in non-aspiration pneumonia rates in October in November. From the results of this quality improvement project, one can conclude there is a potential decrease in hospital acquired pneumonia from oral care compliance. The mixed results of this project suggest more research is needed to determine if comorbid conditions (i.e. influenza) affect hospital acquired pneumonia rates.

Background

Prevention of hospital acquired pneumonia (HAP) is often under reported, but it has the potential for fiscal savings and improvement in quality of life (Quinn et al., 2014). HAP is the second most common hospital acquired infection, and is responsible for 20-33% of mortality rates from infection. Patients with HAP also have higher 30-day hospital readmission rates compared to patients without a hospital acquired infection. (El-Rabbany, Zaghlol, Bhandari, & Aarpazhooh, 2014). Nationwide, HAP accounts for 32.5-35.4 million discharges annually (Baker & Quinn, 2018). HAP plays a role in increased length of stay with high rates of morbidity and mortality. According to the Centers for Disease Control (CDC, 2015), 5-7% of hospitalizations due to pneumonia end in death. HAP can be fatal especially in older adults (Ewan, Sails, Walls, Rushton, & Newton, 2015).

The oral cavity is a reservoir for infection, and can contain a high number of bacteria. Evidence based practice suggests oral hygiene interventions prevent HAP. HAP is more common in at risk individuals. Aspiration of infectious organisms remains the most common way to acquire HAP (El-Rabbany et al., 2014). The three key risk factors for aspiration pneumonia are oral bacteria, factors putting a patient at risk for aspiration (dysphagia, decreased level of consciousness), and certain characteristics of the patient such as increased age and comorbidities (Ewan et al., 2015). In a normal hospital stay, there are major changes that occur in a patient's microbial flora. Some studies have shown oral bacterial colonization as early as 48 hours after admission to a hospital (Quinn & Baker, 2015). Healthy adults can micro aspirate while sleeping due to factors such as supine positioning and central nervous system suppressant

drugs. In patients that are hospitalized, micro aspiration in combination with decreased mobility and changes in oral flora puts patients at risk for HAP (Quinn & Baker, 2015).

Reducing oral bacteria is critical in HAP prevention. There was a study that concluded that HAP was diagnosed 74% of the time when oral care was not documented (Quinn & Baker, 2015). This confirms that missed oral care leads to high microbial loads and changes in oral flora. Quinn & Baker (2015) demonstrated that a nurse led oral care program to prevent HAP reduced its incidence by 60% thus saving the hospital over $2 million in one year.

In a community hospital in Maryland where this quality improvement study was implemented, there was a steady rise in aspiration pneumonia rates, making a change in current practice necessary. Although, it is standard practice to administer oral care to hospitalized patients, there was not an oral care protocol in place for staff to follow on units where patients are not ventilated. The purpose of this DNP project was to develop and implement the use of an oral care protocol on an acute geriatric inpatient unit in order to decrease HAP incidences. Short-term goals of the DNP project included: implementation of an oral care protocol and increased staff knowledge of HAP by 50% through staff education by September 2018, and 50% of patients at risk for aspiration with documented oral care by November 2018. Long-term goals of the DNP project included: reduction of overall hospital acquired pneumonia by 90% by December 2018.

Literature Review

The need for aggressive oral care in hospitalized patients is very important in preventing HAP and was the main focus of this literature review. This review begins with generalized evidence on how oral care decreases bacteria and increases quality of life. The review then evaluates evidence-based oral care protocols implemented in hospitals to decrease the risk of pneumonia.

There is a deterioration of oral health during hospitalization which increases the risk of infection and can have an effect on a patients' quality of life. There are pathways that connect the oral cavity with lung tissue, and poor oral health places the patient at a high risk for HAP. (Quinn et al., 2014). Dental plaque is the causative agent of HAP in many studies, and implementation of an oral care regimen decreases HAP incidences. Aspiration plays a role in developing HAP because 45% of adults aspirate while sleeping. HAP is increased with dental disease, dental caries, and poor oral health. Aspiration of oropharyngeal contents usually precedes HAP. (Quinn et al., 2014). Prevention of HAP can be decreased through the use of daily oral care, but oral care is frequently ignored or missed in the acute care setting. Critically ill patients and patients who cannot care for themselves rely on staff to perform oral care for them. However, there is a lack of evidence-based oral care protocols for these critically ill patients. (Barnes, 2014). Oral care may include antibiotic therapy, topical disinfection with an antimicrobial rinse and mechanical oral care. Antimicrobial rinse may consist of 0.12% chlorhexidine gluconate and 0.2% chlorhexidine gluconate gel, and mechanical oral care consist of either self-tooth brushing, or removal of plaque by a dental hygienist or staff. (Barnes, 2014).

In one systematic review and meta-analysis intended to evaluate the association of poor health and systemic diseases, investigators found that tooth brushing in combination with chlorhexidine rinses and gels decreased dental plaque and decreased pneumonia rates by 40-50% (Yip & Smales, 2012). Additional methods that were studied included electric toothbrushes with tongue scrapers, and sugarless chewing gum to provide hydration and adequate saliva flow. If there is decreased saliva production (normally caused by polypharmacy) the self-cleansing action is decreased making dental plaque thicker and more acidic. (Yip & Smales, 2012). The authors concluded that there is an association between oral biofilms and systemic diseases of the

respiratory system, cardiovascular system, skeletal system, central nervous system and

nosocomial infections. One limitation of this review article was that there were no randomized

control trials studied.

In a study performed by Quinn et al. (2014), and Quinn & Baker (2015) staff admitted

that they did not use toothbrushes provided by the hospital because the bristles fell out (this study

started in 2014 and ended in 2015). The institution then provided a soft-bristled toothbrush,

alcohol-free antiseptic mouthwash, lip moisturizer and suction toothbrushes for those at risk for

aspiration. HAP incidences were decreased by 49% after these products were introduced (Quinn

& Baker, 2015). The purpose of this study was to identify the incidence of HAP and evaluate the

effectiveness of oral care in decreasing HAP. This was a quasi-experimental design using

retrospective outcomes. (Quinn et al., 2014). The method used to quantify the incidence of

pneumonia was the International Statistical Classification of Diseases and Related Problem

(ICD-9) code for pneumonia not present on admission using the Centers for Disease Control and

Prevention (CDC) criteria to diagnose. A gap analysis was performed and an oral care protocol

was designed to decrease HAP. Investigators of this study found that HAP was underreported,

and the rate of HAP was decreased by 38% after implementation of the oral care protocol.

Although the equipment cost $117,600 during the intervention phase, $1.72 million was saved

through prevention of HAP and an additional $1.6 million was gained in avoided costs. One

limitation of this study was the short time span. It was a one-year pre and post intervention study

and this is considered short for a hospital design. A threat to validity includes a possible

Hawthorne effect where the nurses knew HAP was being studied and this could bias the results.

In a study performed by Baker & Quinn (2018), a chart review was performed in patients

with documented intervention (oral care, cough and deep breathing, elevation of the head of bed,

and incentive spirometry) who developed HAP. Investigators of this chart review concluded that

all patients carry a risk for HAP, but interventions aimed at preventing HAP are not always used.

The purpose of this retrospective chart review was to evaluate interventions used to prevent HAP

in 24 hospitals in the United States. The method used was a retrospective chart review of ICD-9

codes for pneumonia that were not present on admission to the hospital. The design was

observational. During this study, 1300 patients were diagnosed with HAP. The majority of the

patients (70.8%) were outside the intensive care unit (ICU), and did not have documented

preventative interventions aimed at preventing HAP. One limitation of this study was that it was

performed through convenience sampling which has a risk of sampling error and selection bias.

A strength of this study was the use of CDC criteria to verify non-ventilated hospital acquired

pneumonia (NV-HAP). A threat to validity was HAP may have been under reported because

immunocompromised patients are typically not tested. Another threat to validity of this study

was the missed definition of "oral care". Oral care could have been performed in other ways

such as swabs or mouth sponges; however, this was not listed as oral care and was considered

missed documentation.

In another study performed by Robertson & Carter (2013), a comprehensive oral care

protocol was developed to prevent HAP. The protocol consisted of sodium bicarbonate

impregnated toothbrushes and oral swabs. Robertson & Carter (2013) did not recommend

routine use of chlorhexidine gluconate. The purpose of this study was to evaluate the

effectiveness of an oral care protocol in decreasing HAP incidences in patients in an acute care

hospital. The study was quasi-experimental study. The setting was in an acute care hospital on a

neurosurgical unit. Patients were non-intubated with a neurological injury and at a high risk of

developing HAP. There was a statistically significant decrease ($p<0.05$) in pneumonia rates after

implementation of the oral care protocol. One limitation of this study is that it was performed on a small sample on a single unit. A larger sample may have increased understanding regarding whether tracheostomy, dysphagia or poor oral health was the cause of the HAP.

El-Rabbany et al. (2014) conducted a systematic review of 411 randomized control trials to evaluate oral care procedures proven to decrease HAP as well as ventilator associated pneumonia (VAP). The authors concluded tooth brushing decreased plaque levels and subsequently decreased the incidence of HAP and VAP. Chlorohexidine (CHG), povidone iodine and antibiotic rinses all were effective in decreasing HAP. One weakness of this review was that most of the studies had a moderate to high risk of bias.

In conclusion, there are many oral care procedures utilized in the hospital setting to decrease the risk of HAP. Based on the review of literature, tooth brushing is proven to decrease plaque which decreases oral bacteria (Quinn et al., 2014; El Rabbany et al., 2014). Administration of an oral care moisturizer is critical to decrease plaque and facilitate saliva production. Although CHG, povidone iodine and antibiotic rinses were performed in studies with a moderate to high risk of bias, they are proven to decrease HAP as well. However, Robertson and Carter (2013) did not recommend routine use of CHG. Finally, oral swabs are effective in decreasing HAP in dependent patients at risk for aspiration.

Theoretical framework

The DMAIC (Define, Measure, Analyze, Improve and Control) model is the most

commonly used version of the six-sigma model of quality control (Aveta Business Institute,

N.D.) In the defining phase, an organization defines what they need initially and look for areas

of improvement. In the measuring phase, data is stored at the beginning so results of a program

can be compared (Aveta Business Institute, N.D.) In the analyzing phase, all of the data that was

stored is carefully analyzed and looked at for areas of improvement. The improvement phase is

when changes of improvement are detailed. In the control phase, clinicians will oversee a

program that was implemented, and monitor for any signs of obstacles with quick intervention

(Aveta Business Institute, N.D.)

The DMAIC model was used for this DNP project, because the organization defined that

a change was needed because of the increased rates of hospital acquired pneumonia (HAP)

including aspiration pneumonia. The measuring phase entailed the director of infection control

(DIC) comparing the organization rates of pneumonia to the state's average by using Maryland

Hospital Acquired Conditions (MHAC) information. This was information that was stored for

implementation of an oral care protocol. The analyzing phase involved the organization carefully

looking at the fine details. The DIC and the nurse manager looked at the reasons why HAP was

increased on an inpatient geriatric unit. HAP was increased on the unit because patients were

either not receiving oral care, or oral care that was performed was not getting documented. The

analyzing phase also involved the author administering education to staff (nurses, clinical

technicians, nurse educator and patient advocate) on the importance of oral care in preventing

HAP. Next, the DIC and the DNP student looked at what was being done on the unit, and

researched evidence-based practice (EBP) to determine the gaps. There was no oral care protocol

in place, and the equipment that was being used did not meet the standards according to the

evidence. The organization was using hard bristled toothbrushes, non-antiseptic mouthwash, and

fluoride toothpaste. The literature suggests use of soft bristled toothbrushes, fluoride toothpaste,

antiseptic mouthwash, suction for those at risk for aspiration, and a mouth moisturizer. In the

improvement phase, the DIC, the nurse educator, the staff nurses and clinical technicians, and the

patient advocate came together to develop a specific oral care protocol to decrease HAP using the

equipment suggested by EBP. The director of infection control and the author tracked the rates of

HAP in the organization after implementation of the oral care protocol, and compared them to

the data that was stored prior to implementation in the control phase.

DNP Project Implementation Plan

Project Type and Sample

This quality improvement project was carried out on a geriatric inpatient unit in a community hospital located in Maryland. This project involved the development and implementation of an oral care protocol for patients to decrease rates of hospital acquired pneumonia. Inclusion criteria for patients included age >18 and admission to the unit during the 12 week implementation period.

Procedures and Timeline

This project took place over a 12-week time period. The nurse manager ordered oral care kits from a company called Sage prior to implementation of this quality improvement project. Week one also involved the Project Director training staff through a short PowerPoint presentation. Staff were educated on the background of HAP, the importance of oral care in preventing the incidence of HAP, and the appropriate equipment to use based on patient demographics (Appendix A). In addition, a pre-test was administered (Appendix C) to registered nurses and clinical technicians and a dayshift unit champion was also recruited during week one.

Weeks two through four involved ongoing education by this author, weekly oral care compliance chart audits by the unit champion, and manual extraction of oral care compliance data by the author and the DIC. Weeks two through 12 involved implementation of the oral care protocol conducted on all patients on the unit. During this time, the Project Director was present to monitor compliance rates through staff reviews. Staff provided all patients with a patient brochure (see Appendix D) for patient education to increase patient compliance, and the DIC and the author monitored rates of HAP infection and oral care compliance throughout the duration of the implementation period.

Data Collection

RN and CT staff documented oral care in EPIC under "daily cares". Oral care was performed according to patient demographics (see Appendix A). Staff documented each time oral care was performed and the equipment that was used to provide oral care (toothbrush, mouthwash, suction, mouth moisturizer, toothpaste). HAP rates were tracked by the DIC for three months during the implementation period of the oral care protocol, and oral care compliance was tracked through point prevalence. In addition, a pre-test was administered prior to implementation and a post-test was administered post implementation.

Data Analysis

Based on the HAP results after implementation of the DNP project, the author coded data into an excel spreadsheet. Using descriptive statistics, HAP percentages were calculated using the number of HAP incidences divided by the number of patient visits, and then multiplying by 1000. Oral care compliance percentages were calculated by dividing the number of times oral care was performed by the number of times oral care should have been performed. An average was calculated for the pre-tests and post-test scores by adding the test scores and then dividing by the number of participants.

Human Subjects Protection

Permission to implement this DNP project was granted by the organization and the school of nursing after submission to the Institutional Review Board (IRB). This project was considered a non-human subjects research project by both organizations. In addition, the DNP student did not share Protected Health Information (PHI).

Plan for Sustainability

This DNP project was continued after the implementation phase. Unit champions have remained available to provide ongoing chart audits and education to staff, and the DIC has continued to monitor HAP rates and oral care compliance on the unit and hospital wide.

Results

Staff education sessions started mid-September. Oral care compliance was tracked weekly through point prevalence. The numerator is the actual number of times oral care was performed, and the denominator is the number of times that oral care is expected to be performed. Staff were expected to perform oral care twice a day at minimum. Prior to implementation of this quality improvement project, oral care was performed on the unit 36% of the time in May, 43% in June, 38% in July, and 35% in August. Post implementation rates were: 54% of the time in September, 47% in October, and 53% in November. Oral care compliance increased from an average of 36% pre-implementation to an average of 52% post implementation.

Other data that was collected were grades from the pre and post tests. A total of nine staff members participated in the pre-tests (registered nurses and clinical technicians). A grade of 80% was expected to pass, and grades ranged from 60%-100%. Seventy-eight percent of staff passed and 22% of staff failed the pre-test. A total of 8 staff members participated in the post-tests. Grades again ranged from 60-100% with a 78% pass rate. The average grade on the pre test was 77.8% and the average grade on the post test was 82.5%.

Overall HAP rates (aspiration pneumonia and non-aspiration pneumonia rates combined) were calculated pre implementation phase and post implementation phase. HAP rates were calculated by dividing the actual number of infections by the number of patient days, and then multiplying by 1000. The average pre-implementation HAP rate (May-Aug) was 33.0, and the average post-implementation rate (May-Aug) was 35.1. was Pre implementation rates were as follows: May 28.99, June 32.92, July 38.46, and August 31.57.

Prior to implementation of the oral care protocol, oral care compliance rates were 20-30%. However, during implementation of the oral care protocol, oral care compliance climbed to 50%. Improvement is necessary for success, and there was definitely progress with the implementation of this DNP project. Aspiration PNA rates have continued to decrease at a steady rate.

Barriers and Facilitators of Change

One unintended barrier was the high rates of refusal from patients. Patients received an oral care brochure on admission that explains the importance of oral care, and the consequences of missed oral care; however, refusal rates remained elevated. There was a surge in overall HAP rates in October and November although the oral care compliance rates remained above rates pre implementation.

One barrier encountered was the delay in receiving the oral care products on the unit. The DIC stated she informed vendors that the geriatric unit would be the first to receive the products. However, she had to put in another ticket and the products were delivered the following week. This caused a two-week delay in implementation. Another barrier was the lack of a night shift champion until mid-semester. There was an active day shift champion that audited charts to ensure that staff were performing oral care. Another barrier was the lack of allotted time. A one-hour education session was planned to be administered to staff, however, there was only an opportunity to deliver a five-minute huddle, given on a daily basis at 0700. To overcome this, this author developed a short five slide PowerPoint presentation that was given in the huddle. This was done at the discretion of the nurse manager. It was very important to get the nurse manager involved, because a unit is only as strong as the leader. The last barrier was when patients refused oral care. Oral care was not performed and this affected oral care compliance

rates. The brochure became a component of the admission packet given to patients when they

are admitted on the floor.

Some facilitators of this change include the nurse manager, the oral care champions, and

the DIC. The nurse manager was amenable to change in order to improve the HAP rates, and

was flexible and available to administer education. The oral care champions were active and

involved with auditing charts and reminding staff to perform and document oral care, and the

DIC monitored oral care compliance and HAP rates.

Discussion

The purpose of this quality improvement project was to determine if aggressive oral care impacted HAP rates in a community hospital located in Maryland. This project was implemented on one unit and the results were only from geriatric patients. This is an important limitation. It was predicted that HAP rates would decrease as oral care compliance increased. The HAP rates were separated in two sections: aspiration pneumonia and non-aspiration pneumonia. Initially, there was a steady decrease in non-aspiration pneumonia rates as oral care rates increased; however, there was a surge in non-aspiration pneumonia rates in October and November. This increase could be affected by the beginning of influenza season. Figure 2 depicts the same increase in October and November of 2017 as well. Pneumonia is the most serious and is the leading complication of influenza (Ishiguro et al., 2017). In one study performed by Ishiguro et al (2017), approximately half of the patients developed pneumonia as a sequela of influenza. In addition, high rates of pneumonia correlate with morbidity and mortality from influenza epidemics (Ishiguro et al., 2017). Influenza cases were not tracked, so more research is needed to determine this effect with this study. The rates of aspiration pneumonia continued to decrease as oral care compliance increased throughout the duration of this project, and this was a strength. The results of this study supported the results of previous research performed by Quinn and Baker (2015) who cited a 74% HAP rate when oral care was not performed.

There was a combination of oral care products studied to determine the most effective oral care protocol. The oral care products used in this project was similar to the products used in a similar study performed by Quinn and Baker (2015). These authors reported a 49% decrease in HAP rates after using products suggested by evidence-based practice. In the implementation phase of this quality improvement project, staff was required to document oral care in the EHR

by following a specific algorithm based on patient demographics (Appendix A). Staff had to

select which products they used, but this information was not tracked by the author.

Oral care compliance was tracked by auditing the EHR. One limitation of oral care

compliance was when independent patients refused oral care, despite education by nursing staff.

According to Salamone, Yacoub, & Mahoney (2013), physical activity decreases and comorbid

conditions increases as the population ages, and these are factors that contribute to a patients'

decreased ability to perform activities of daily living (ADL's), including oral care. Some of the

common comorbid conditions in the elderly include diabetes, congestive heart failure, renal

disease, glaucoma, and cataracts (Salamone, Yacoub, & Mahoney, 2013). In this quality

improvement project, when oral care was refused it was essentially documented as not done.

This was considered a limitation of this study, because the calculations of oral care compliance

could have been separated into certain groups: refused, not performed and performed. However,

a key strength would be the 16% increase in oral care compliance in the implementation phase.

Another limitation of this project was the termination of a staff member. The staff

member who tracked oral care compliance left the organization at the end of the implementation

period. This affected numerator and denominator rates for December 2018, and the result was an

overall percentage. In addition, this project was implemented in a 12 week time span on a single

unit, and these were both limitations. The final limitation of oral care compliance was the time

allotted for education sessions. Initially, the author planned to administer an in-depth education

session to all staff. However, five minutes was the allotted time due to time constraints. This

author had to teach key points (brief background, importance of oral care and algorithm), but oral

care depends on the nurses' knowledge of best practice (Salamone, Yacoub, & Mahoney, 2013).

Although there was five minutes allotted for education, there was a 4.7% increase in average test scores between pre-tests and post-tests, and this was another strength of this project.

Conclusion

In conclusion, the results of this quality improvement project provide some interesting facts on how oral care impacts HAP, especially in geriatric patients. This author originally predicted that there would be a steady decline in HAP as oral care compliance rates went up. However, there was a tremendous increase in non-aspiration HAP rates in October and November, and this could be seasonal owing to the beginning of influenza season. On the other hand, there was a steady decline in aspiration pneumonia rates as oral care compliance increased. From the results of this project, one can conclude there is a potential decrease in HAP from oral care compliance.   The mixed results of this project suggest more research is needed to determine if comorbid conditions (i.e. influenza) affect HAP rates.

This project has the ability for sustainability in a geriatric acute unit. This project was specific to geriatrics, so it cannot be generalized outside of geriatrics. In depth staff education, consistent compliance with the oral care algorithm, and patient education is needed for future quality improvement projects of similar context. The suggested next step is to provide education, the oral care algorithm, and oral care supplies to all units in the organization. This can be done by incorporating the education in annual reviews and administering a short competency exam to all clinical staff.

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Figure 1

Aspiration PNA Rates per Month ACE Unit

	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	18-Feb	18-Mar	18-Apr	18-May	18-Jun	18-Jul	18-Aug	18-Sep	Oct-18	Nov-18	Dec-18
ASP Rate	2.93	10.8	12.6	10.8	4.73	10.5	8.83	6.89	6.69	7.95	7.69	6.76	6.17	5.55	5.20	4.97

Figure 2

PNA Rates per Month ACE Unit

	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	18-Feb	18-Mar	18-Apr	18-May	18-Jun	18-Jul	18-Aug	18-Sep	Oct-18	Nov-18	Dec-18
PNA Rate	7.82	26.55	41.23	37.00	49.24	40.98	32.01	47.07	22.30	24.97	30.77	24.80	18.52	37.74	37.42	24.85

Figure 3

Correlation between Oral Care Compliance and ASP Rates

Figure 4

ACE Oral Care Compliance by Month

	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18
Completed (Numerator)	64	40	47	56	41	18	91	
Opportunities (Denominator)	178	94	144	164	76	38	172	
Compliance (N/D)*100	35.96	42.55	32.64	34.15	53.95	47.37	52.91	45.00
Goal	90	90	90	90	90	90	90	90

Figure 5

Overall PNA Rate per Month
ACE Unit

	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	18-Feb	18-Mar	18-Apr	18-May	18-Jun	18-Jul	18-Aug	18-Sep	Oct-18	Nov-18	Dec-18
Overall PNA Rate	10.75	37.36	53.91	47.88	53.98	51.52	40.84	53.96	28.99	32.92	38.46	31.57	24.69	43.29	42.62	29.82

Figure 6

Test Scores
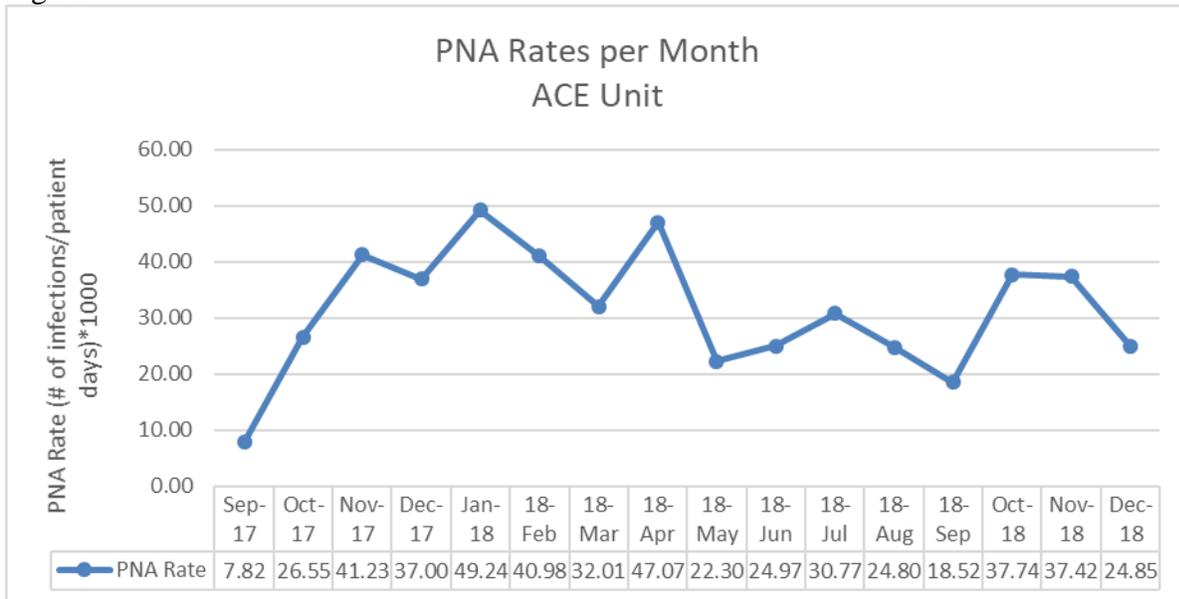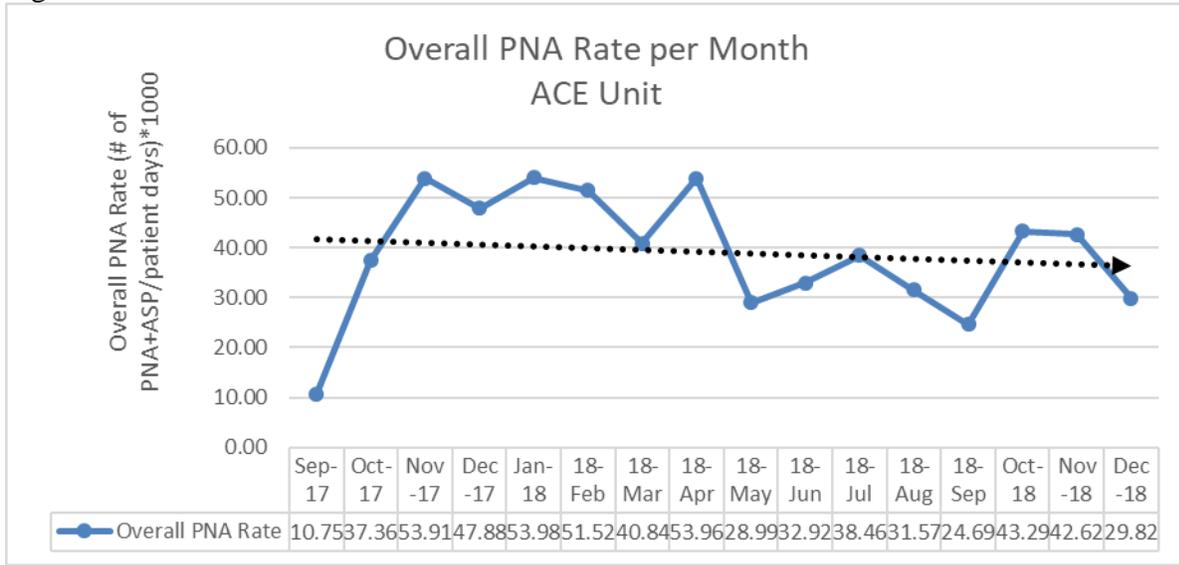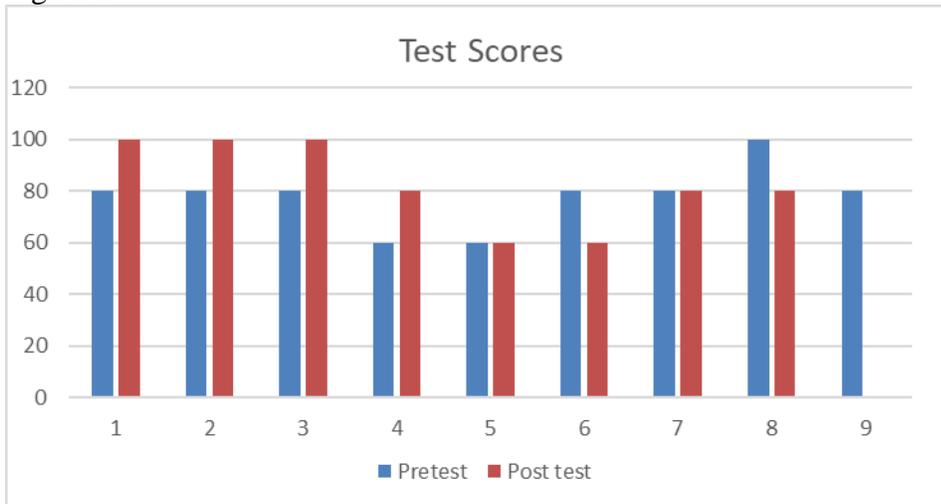
DNP Project Name: _Oral Care Protocol to Prevent Hospital Acquired Pneumonia (HAP) in Non-Ventilated Patients on a Medical Surgical Unit

DNP Project Purpose Statement: The purpose of this DNP project is to develop and implement use of an oral care protocol in a geriatric acute care inpatient unit in order to decrease HAP incidences

Short-Term SMART Objective: By September 30, 2018, there will be implementation of an oral care protocol, by November 01, 2018, 50% of patients at risk for aspiration will have documented oral care, and by September 15, 2018, staff knowledge of HAP will be increased by 50% through the use of education and post surveys.

Long-Term SMART Objective: By November 01, 2018, overall aspiration pneumonia rates will be decreased by 60%

Population/Context: Non-ventilated acute geriatric patients on an inpatient unit

Mobilize:
List of Core Team Members - Director of infection control (DIC), doctorate of nursing practice (DNP) student, staff nurses, clinical technicians, unit nurse educator, nurse manager, and Susan Shelhoss (SAGE representative)
Others I will mobilize after the draft plans have been developed include the patient advocates
The DIC has been tracking the rates of HAP in a community hospital in MD. The rates of HAP has been steady increasing, and there are currently no interventions in place to decrease the rates of HAP. The organization compared their rates of HAP to the states average by using Maryland Hospital Acquired Conditions (MHAC), and their rates of HAP has exceeded the states average. Based on evidence based practice, the DIC comes to the conclusion that the #1 way to prevent HAP is the administration of aggressive oral care. The staff nurses and clinical technicians will provide oral care to patients while the unit nurse educator and the DNP student provide education to staff. In addition, the patient advocate will advocate for patients by attending required meetings and assisting with brochures for patient education.

Assess: Currently, the organization does not have an oral care protocol in place, and there is not an individualized plan based on the patient (independent vs assistance, dentures vs no dentures, at risk for aspiration vs low risk for aspiration). Although there is not a specific oral care protocol in place, documentation of oral care is already incorporated in the EHR. However, the development of an oral care protocol is imperative to decrease rates of HAP. Through a gap analysis, the director of infection control assessed gaps in the equipment used to provide oral care. Currently the organization uses a hard bristled toothbrush, toothpaste, non-antiseptic mouthwash. Evidence suggests a soft bristled toothbrush, toothpaste, antiseptic mouthwash, mouth moisturizer for xerostomia and buildup of plaque, and suction to decrease the risk of aspiration for those at risk. Staff education will be provided by the DNP student and the SAGE representative, and the education will be evaluated through pre and post tests.

Plan: Before developing an oral care protocol, the DIC picks a unit to pilot this protocol. The unit will be an acute inpatient geriatric unit. The DIC in conjunction with the DNP student will research evidence based practice protocols that prevent HAP. After reviewing EBP, the DIC summarizes findings with the unit nurse educator, staff nurses, clinical technicians, and the patient advocate. Together, staff and the DNP student develops an oral care protocol specialized by the patient demographics (dentures, independent, at risk for aspiration, etc). Based on patient demographics, oral care will consist of: toothbrush, toothpaste, antiseptic mouthwash, mouth moisturizer, and oral suction for those at risk for aspiration. The unit is stocked with necessary equipment with the exception of antiseptic mouthwash (currently stocked with non-antiseptic mouthwash). To decrease funds of ordering multiple supplies, the DIC communicates with a company called SAGE. SAGE has oral care kits consisting of a toothbrush, suction swab and a combination of mouth moisturizer and antiseptic mouthwash. The nurse manager will order these kits instead of ordering supplies separately. Independent patients will receive a toothbrush, toothpaste, and antiseptic mouthwash. They are to provide oral care independently, three times a day after each meal. Dependent patients will receive a suction toothbrush, antiseptic oral rinse and a mouth moisturizer. The clinical technician or the RN will use antiseptic rinse to moisten toothbrush and connect toothbrush to suction. Teeth will be brushed for 1-2 minutes, and an oral moisturizer will be applied afterwards. Oral care will be provided three times a day after each meal. Lastly, a denture cup, toothbrush, denture cleaner, and antiseptic mouth rinse will be provided to patients with dentures. Dentures will be removed, placed in a cup, and palate, teeth and gums are brushed. Next, the patient will rinse oral

cavity with antiseptic mouth rinse and dentures will be brushed with warm water and reinserted. Oral care will be provided three times a day after each meal. Documentation of oral care will be documented under "daily cares" in the EHR (EPIC).
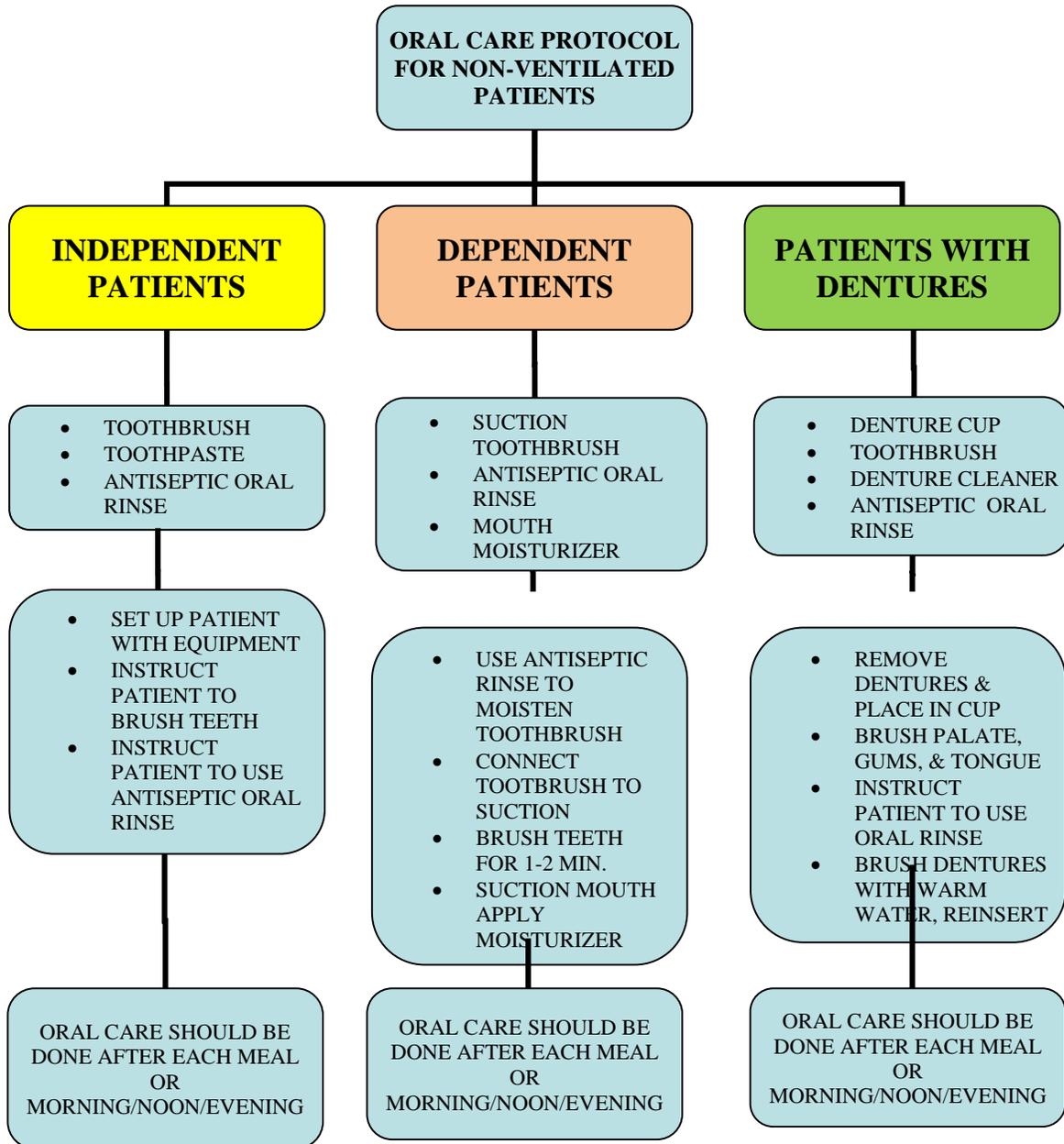**Implement:**
Step 1
Step 2:
Track:
Date: _____ Re-Assessment Date 1: _____ Re-Assessment Date 2:_____, etc.

Plan Developed by (List all contributors): Jean Murray (DIC), Lanaya Davis (DNP student), Mary Cohn (RN-unit nurse educator), staff nurses clinical technicians, and Susan Shelhos (SAGE representative)

_____
_____

The Institute for Perinatal Quality Improvement (PQI) grants the University of Maryland School of Nursing permission to utilize and make modifications to PQI's MAP-IT worksheet to support the DNP students learning. For permission to further modify or utilize PQI's MAP-IT worksheet in other settings contact: info@perinatalQI.org.
Reference: Guidry, M., Vischi, T., Han, R., & Passons, O. MAP-IT: a guide to using healthy people 2020 in your community. U.S. Department of Health and Human Services. The Office of Disease Prevention and Health Promotion, Washington, D.C. https://www.healthypeople.gov/2020/tools-and-resources/Program-Planning

Appendix A

ORAL CARE PROTOCOL FOR NON-VENTILATED PATIENTS

INDEPENDENT PATIENTS

- TOOTHBRUSH
- TOOTHPASTE
- ANTISEPTIC ORAL RINSE

- SET UP PATIENT WITH EQUIPMENT
- INSTRUCT PATIENT TO BRUSH TEETH
- INSTRUCT PATIENT TO USE ANTISEPTIC ORAL RINSE

ORAL CARE SHOULD BE DONE AFTER EACH MEAL OR MORNING/NOON/EVENING

DEPENDENT PATIENTS

- SUCTION TOOTHBRUSH
- ANTISEPTIC ORAL RINSE
- MOUTH MOISTURIZER

- USE ANTISEPTIC RINSE TO MOISTEN TOOTHBRUSH
- CONNECT TOOTBRUSH TO SUCTION
- BRUSH TEETH FOR 1-2 MIN.
- SUCTION MOUTH APPLY MOISTURIZER

ORAL CARE SHOULD BE DONE AFTER EACH MEAL OR MORNING/NOON/EVENING

PATIENTS WITH DENTURES

- DENTURE CUP
- TOOTHBRUSH
- DENTURE CLEANER
- ANTISEPTIC ORAL RINSE

- REMOVE DENTURES & PLACE IN CUP
- BRUSH PALATE, GUMS, & TONGUE
- INSTRUCT PATIENT TO USE ORAL RINSE
- BRUSH DENTURES WITH WARM WATER, REINSERT

ORAL CARE SHOULD BE DONE AFTER EACH MEAL OR MORNING/NOON/EVENING

Appendix B

Learning Objectives	Content Outline	Method of Instruction	Time Spent	Method of Evaluation
1.Learners will know the background of hospital acquired pneumonia (HAP), and why oral care is important in preventing HAP 2.Learners will be able to correctly identify equipment used for oral care based on patient demographics 3.Learners will know how to properly use equipment used for oral care	1.The DNP student will provide a PowerPoint presentation outlining the background and significance of HAP, brief pathophysiology of pathways that connect oral cavity and respiratory system, and how oral care prevents HAP. 2.The DNP student will present oral care protocol, and demonstrate to staff how to properly use the equipment. 3.Staff will perform a return demonstration	PowerPoint and demonstration	1 hour	Pre/post test and return demonstration

Appendix C

Hospital Acquired Pneumonia (HAP) Quiz

1. Oral bacteria are harbored in_____?
   - A. Gums
   - B. Saliva
   - C. Plaque
   - D. Cheeks

2. At minimum, how many times a day should we brush our teeth?
   - A. One
   - B. Two
   - C. Four
   - D. Six

3. What solution is recommended to rinse the oral mucosa with after brushing?
   - A. Non-antiseptic mouthwash
   - B. Anti-septic mouthwash
   - C. Warm water
   - D. Baking soda

4. Poor oral health increase the risk of HAP because of_____?
   - A. High antimicrobial loads
   - B. Accidental inhalation of food or saliva
   - C. A only
   - D. Both A&B

5. For dependent patients at risk for aspiration, which equipment is most appropriate?
   - A. Soft bristle toothbrush
   - B. Antiseptic rinse
   - C. Suction toothbrush
   - D. Fluoride toothpaste

Appendix D

The Importance of Good Oral Care During Your Stay
Good oral care will help you prevent infection while in the hospital, no matter how old you are or whether you have teeth or dentures.

Pneumonia Prevention
Pneumonia, a lung infection, can be severe and lead to a longer hospital stay and even cause death. Most pneumonias are caused by the bacteria in our mouth. Tarter and plaque on your teeth can increase the amount of bacteria present. If you accidentally inhale food or saliva, you can pull this bacteria into your lungs. This is called aspiration. More than 40 percent of healthy adults aspirate in their sleep. Brushing your teeth twice a day will decrease your risk of pneumonia.

Heart Disease Prevention / Diabetes Management
Oral care can reduce your risk of gum disease, which is associated with an increased risk of developing heart disease. Good oral care can also help manage your diabetes. Diabetics are three to four times more likely to get gum infections which could lead to pneumonia and difficulty managing your blood sugars.

Remove Bacteria
Studies have shown that oral care can reduce your risk of pneumonia while you are in the hospital, no matter how old you are, health status or whether you have teeth or dentures.

Toothbrush, fluoride toothpaste, antiseptic mouthwash and denture care items are available to you during your stay.

Good Oral Care
Brush teeth, gums and tongue with fluoride toothpaste two times per day.
Rinse with antiseptic mouthwash two times per day.

Denture Care
Brush dentures, rinse and soak in denture cleaner for three minutes at least two times per day.
Brush gums, teeth and tongue with fluoride toothpaste two times per day.
Rinse with antiseptic mouthwash two times per day.
Rinse dentures before placing them in your mouth.

Remove Bacteria
Studies have shown that oral care can reduce your risk of pneumonia while you are in the hospital, no matter how old you are, health status or whether you have teeth or dentures.

Toothbrush, fluoride toothpaste, antiseptic mouthwash and denture care items are available to you during your stay.

Good Oral Care

Brush teeth, gums and tongue with fluoride toothpaste two times per day.
Rinse with antiseptic mouthwash two times per day.

Denture Care

Brush dentures, rinse and soak in denture cleaner for three minutes at least two times per day.
Brush gums, teeth and tongue with fluoride toothpaste two times per day.
Rinse with antiseptic mouthwash two times per day.
Rinse dentures before placing them in your mouth.