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Assessing the Need for a New Oral Care Protocol in the Non-ventilated Patient Population

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Pneumonia is an inflammatory respiratory disorder of the parenchymal portions of the lungs primarily caused by bacteria. Pneumonia is a leading cause of morbidity in the world today. Hospital acquired pneumonia develops following admission to the hospital, accounts for approximately 15% of all nosocomial infections, and is second only to urinary tract infections as the most commonly acquired hospital infection (Tablan, Anderson, Besser, Bridges, & Hajjeh, 2003).

Hospital acquired pneumonia is classified as pneumonia that was neither present nor incubating at the time of admission. The etiology can be bacterial, fungal, or viral in origin. Patient risk factors for development of non-ventilator hospital acquired pneumonia (NV-HAP) include patients who are elderly, malnourished or have a low body mass index, have a neurological impairment, and patients who require assistance with activities of daily living (Quinn et al., 2013; Barnes, 2014). Older adults are at a particularly high risk of developing an infection as a result of aspiration of oral bacteria (Gomes-Filho, Passos, & Seixas, 2010). With an annual average of 13.6 million discharges of adults ages 65 or older, it is important to find ways to diminish their risk of acquiring NV-HAP (Centers for Disease Control and Prevention, 2010).

Although ventilator associated pneumonia (VAP) has been heavily studied, little research on NV-HAP has taken place. Most hospitals have infection control monitoring in place to prevent VAP but oftentimes no such monitoring is in place for NV-HAP. Research studies indicate there is a significant incidence of underreported cases of non-ventilator associated pneumonia and preventing the occurrence of NV-HAP saves lives, decreases hospital stays, and decreases healthcare costs (Quinn et al., 2013).

Literature Review

Patients at risk for aspiration have increased chances of developing hospital acquired pneumonia and require a plan of care to help decrease the risk of nosocomial infections (Quinn et al., 2013). Patients who have orders to consume nothing by mouth (NPO) and patients who are bedridden have higher rates of aspiration pneumonia than those who are not because they are dependent on others to perform oral care for them (Maeda & Akagi, 2014). Changes in physical and mental status, as well as impaired saliva flow can lead to neglected oral hygiene leading to increased dental problems (Yip & Smales, 2011).

The mouth serves as the perfect environment for the growth of bacteria. A study by Azarpazhooh and Leake (2006) explained how bacteria from the oral cavity is linked to the development of respiratory diseases in at risk patients. The microorganism DNA that is implicated in the development of pneumonia contains similarities to the DNA of microorganisms present in biofilms found on teeth (Heo, Haase, Lesse, Gill, & Scannapieco, 2008). The association between the oral cavity and development of respiratory disorders has been linked to both aspiration of oral bacteria and modification of the respiratory tract due to the presence of salivary enzymes that interact with the mucosal surfaces of the respiratory tract (Gomes-Filho, Passos, & Cruz, 2010). Further, the combination of bacteria containing plaque coupled with the enzymes present in the patient's saliva can create an optimal environment for pathogens such as *Staphylococcus aureus* and *Pseudomonas aeruginosa*.

The importance of mechanical brushing was noted by Gomes-Filho et al. (2010) in a study that found that the implementation of antibiotics alone did not produce the results of CHG. In a study involving elderly tube-fed patients, Maeda and Akagi (2014) found a decrease in NV-HAP cases after the implementation of an oral care protocol that included brushing the teeth and

gums with a 0.2% chlorhexidine solution, moisturizing the mouth with glycerol polymethacrylate gel, and massaging the salivary gland. A literature review by Roberts and Moule (2011) noted oral care protocols that used tooth-brushing in conjunction with chlorhexidine produced a reduction in rates of pneumonia. However due to limitations and inconsistencies between studies it was recommended that more research be conducted (Roberts & Moule, 2011).

In a systematic review performed by El-Rabbany, Zaghlol, Bhandari, and Azarpazhooh (2015), various studies were examined in an attempt to determine an oral care procedure that resulted in a reduction of hospital acquired pneumonia cases. This particular review was not limited to NV-HAP, but included Ventilator-Associated Pneumonia cases as well. The oral care interventions in these studies included dental care performed by professionals. Various methods of dental care were examined including dental care using sodium bicarbonate; regular toothbrushing; using chlorhexidine; using antibiotic solutions; and dental care with iodine swabs. The setting of the studies included intensive care units and long-term care facilities. The review determined that oral care with Chlorhexidine solutions resulted in a significant decrease in rates of infections. However, while some of the studies showed a decrease in rates of infection after the use of Chlorhexidine solution, seven of the 28 studies did not show a significant difference between the two methods. This could be due to the small sample size of the study participants.

The aim of this quality improvement project is to calculate the rates of NV-HAP before the implementation of an oral care protocol that contains Chlorhexidine. The need for the protocol will be analyzed by reviewing documentation of oral care performed on patients.

Charting compliance will be examined to consider a relationship between oral care and infection rates.

Study Questions

1. What are the rates of NV-HAP pre-implementation of the new oral care protocol containing Chlorhexidine?

2. What is the charting compliance prior to the implementation of the new oral care protocol?

3. Based on the rates and charting compliance, is there a significant need for a new oral care protocol?

Methodology

This quality improvement project was conducted following approval by the University of Arkansas Institutional Review Board (IRB) and the Washington Regional Medical Center Department of Quality Improvement. The design of the project included a retrospective electronic medical records review determining the rate of NV-HAP before the implementation of a new oral care protocol. It also examined the charting compliance by nurses in documenting oral care before the implementation of the new oral care protocol. All patient information was coded and de-identified according to the Health Insurance Portability and Accountability Act (HIPAA). Each electronic medical record reviewed was given a random case number. All data was stored on a password-protected computer. Once the charts were reviewed, there was no way to match the patient to the extracted information. All information was reported in the aggregate form so no individuals could be identified by Demographic data on patients (e.g., age, ethnicity, admitting diagnosis, comorbidities) was extracted. The rate of NV-HAP was calculated along

with percentages of charting compliance on documentation of the type of oral care and frequency of oral care. The proposed change in oral care protocol is outlined in Table 1.

Table 1. Potential New Oral Care Protocol for Non-ventilated Patients

Patients at risk for aspiration and patients who are NPO	Oral care will be performed 4 times per day between 0600 and 2200. Oral care for this population will be performed in the following manner: Brush teeth with suction toothbrush and CHG for the first and last cleaning of the day. Clean mouth with suction swab and provide mouth moisturizer for the two middle cleanings.
Patients who are not at risk for aspiration and are not NPO	Oral care will be performed three times per day after meals. Oral care for this population should be performed in the following manner: Provide patient with toothbrush, toothpaste, and other needed supplies and assist patient as required according to patient's functional ability.

Results

Data was collected from electronic medical records of patients who were discharged between March 2015 and June 2015. The total number of patient medical records randomly reviewed was 139 charts. The records reviewed were from every unit of the hospital (Figure 1). The units included were Labor and Delivery, Emergency Department, Surgery, Intensive Care Unit, Coronary Care Unit, Cardiac unit, Medical Surgical Unit, Joint Center, and Neuro-Progressive Unit.
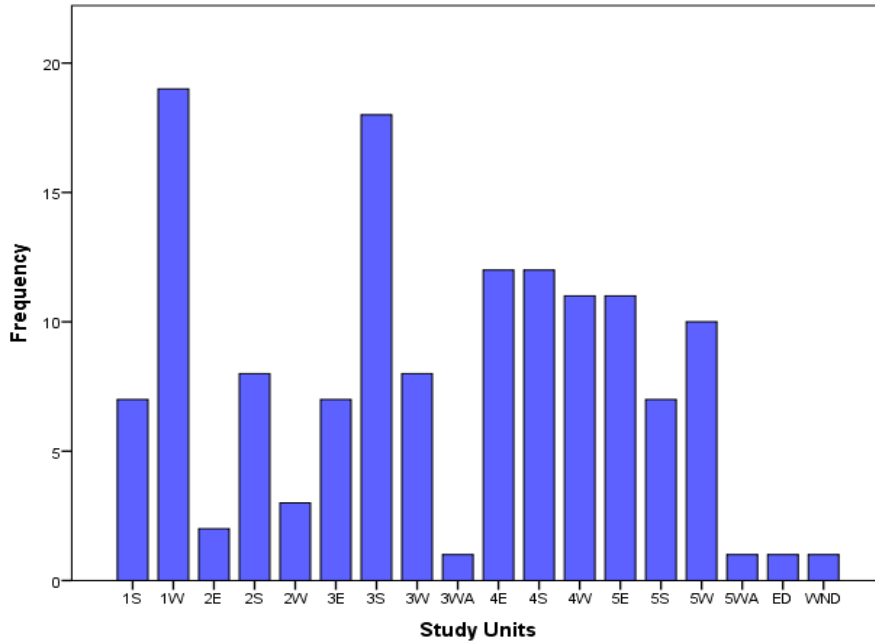
Figure 1. Distribution of patients included in the study by admission unit.

The study included 85 females and 52 males. The majority of patients were Caucasian with only a small percentage of Hispanic, African-American and Marshallese patients (Figure 2).
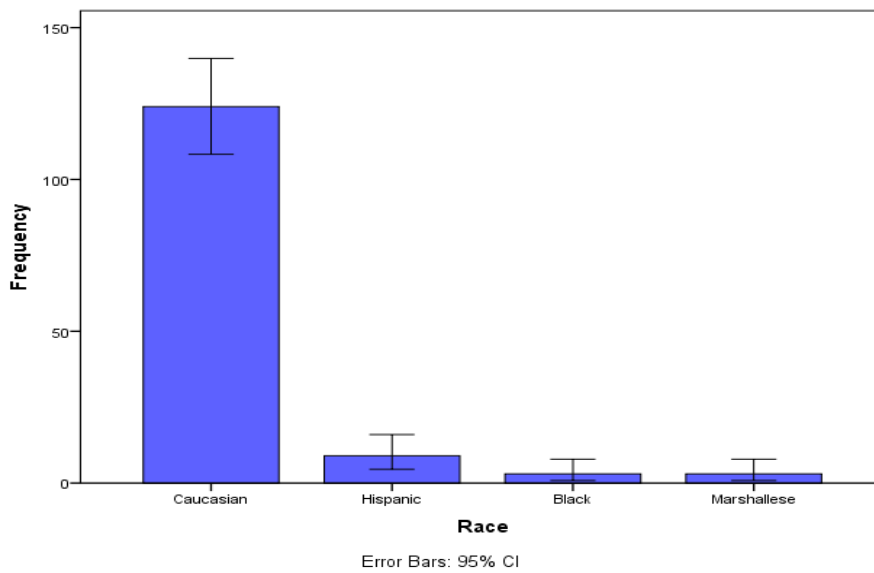

Figure 2: Number of patients by race with standard deviation.

       The average age of the study participants was 55.88 years old. The patients also had a range of diagnoses. The most frequent diagnoses included cardiac, respiratory, endocrine, and gastrointestinal diseases (Figure 3).
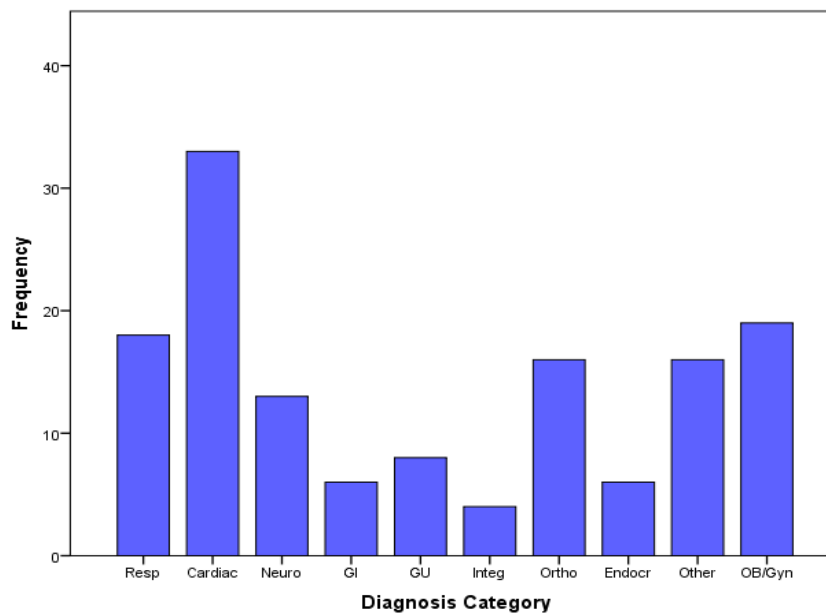

Figure 3: Number of patients per diagnosis category

       Of the 139 patient charts reviewed, 2 of the records were excluded due to their outpatient status. None of the patients reviewed developed hospital-acquired pneumonia. A more comprehensive review of records, performed by the hospital's infection control division, determined the rate of infection as 0.02%. This percentage was determined using the formula: infection percentage = number of infections/number of hospital days. The percentage included all patients admitted to the hospital during that time. Our study therefore was a small sample of the population.

Charting compliance of the staff was determined by totaling the number of instances oral care was administered/charted compared to the number of instances that it was not. A chi-square test for association was used to test for association between oral care documentation and the various hospital units. There was a statistically significant association between oral care documentation and hospital units, X^2 (4)= 14.81, p = .005 (Table 1). To measure the strength of the association a Cramer's V test was performed indicating a moderately strong association between charting compliance and units, σ = 0.329, p = .005. 0.329. These values suggest that there is a moderately strong association between the occurrences of oral care documentation and particular units in the hospital.

Table 1

Test for Association between oral care documentation compliance and hospital unit

	Value	df	Asymp. Sig (2-sided)
Person Chi-Square	14.814	4	.005
Likelihood Ratio	16.458	4	.002
Linear-by-Linear Association	8.494	1	.004
Cramer's V	.329		.005

Due to the large number of individual units, unit results were combined by location within the hospital. The first floor data, consisting of the Labor and Delivery unit of the hospital revealed oral care documentation compliance 11.5% of the time and non-compliance with oral care 88.5% of the time. The second floor data, consisting of the ICU, CCU, and One Day Surgery noted documentation compliance with oral care 38.5% of the time and non-compliance 61.5% of the time. The third floor data, consisting of the Cardiac Unit demonstrated a 55.9% documentation compliance and a 44.1% non-compliance rate. The fourth floor, consisting of the

Medical Surgical Unit had a 40% compliance rate and a non-compliance rate of 60%. Finally,

the fifth floor data, consisting of the Joint Center and Neuro-progressive Unit demonstrated a

55.2% compliance rate and a 44.8% non-compliance rate. The 3rd floor demonstrated the highest

oral care documentation percentage of the total floors and the 1st floor with the lowest oral care

documentation compliance (Table 2).

Table 2

Oral Care Documentation by Floor/Combined Units

		Documented Oral Care	Did Not Document Oral Care	Total
First Floor	Count	3	23	26
	Percentage	11.5%	88.5%	100%
	Percentage within all floors	5.3%	28.7%	19%
Second Floor	Count	5	8	13
	Percentage	38.5%	61.5%	100%
	Percentage within all floors	8.8%	10%	9.5%
Third Floor	Count	19	15	34
	Percentage	55.9%	44.1%	100%
	Percentage within all floors	33.3%	18.8%	24.8%
Fourth Floor	Count	14	21	35
	Percentage	40%	60%	100%
	Percentage within all floors	24.6%	26.3%	25.5%
Fifth Floor	Count	16	13	29
	Percentage	55.2%	44.8%	100%
	Percentage within all floors	28.1%	16.3%	21.2%

Discussion

As stated in the results section, the percentage of non-ventilator associated hospital acquired pneumonia within the institution studied was 0.02% for patients admitted during the four months studied. This rate for the time period studied was substantially below the national average of 15% for hospital-acquired infections. If this rate held constant for the year, it might influence the decision whether to implement a new oral care protocol that might be more costly and time intensive.

However, the results of the study do indicate that there is a need for increased documentation of oral care performed in the units. The low percentages of documentation reflect the need to determine a documentation procedure for oral care. The hospital does not currently have a specific oral care protocol for non-ventilated patients, which is reflected in the broad range of oral care documentation across various units. As the results section demonstrated, the oral care documentation ranged from 11.5% to 55.9%.

There may be many reasons the range of oral care differed significantly from floor to floor. One reason could very well have been the lack of oral care protocol for all patients. Another reason for decreased documentation in some areas, such as the first floor, may have been the shorter length of stay of patients in the hospital than others. The first floor encompassed the labor and delivery units. Obstetrical patients generally have a shorter period of stay than those in the cardiac or medical surgical units (3rd and 4th floor). The oral care documentation may have also differed based on patient care priorities. In labor and delivery, the hygiene documentation was more focused on perineal care than oral care. As these patients are generally healthy, nurses may not have been focused on this aspect of patient care.

Limitations

The study was limited by the small sample size that was used during collection of data. This was due to the review of only a small portion of the charts from each month. The limitation was evident upon comparison of the rate found in this study (0%) and the more large-scale, comprehensive chart review performed by the hospital using all patients from each month (0.02%)

Transfer of patients from one unit to another was not taken into account when calculating the percentages of oral care documentation by unit. For example patients may have been transferred from the ICU to the cardiac floor as they got progressively better, but the calculation of their oral care would have been included with the cardiac floors percentages alone and not the ICU percentages. This causes the ICU's oral care documentation to appear lower than it was and the Cardiac unit's documentation to appear higher than it was. It should also be taken into account that some particular units, such as the ER, do not have as many opportunities to perform or document oral care because the patients are not present in the department for long periods of time but rather are transferred to other units. .

Implications/Conclusion

While the results of the study do not support the need for implementation of a new oral care protocol on the basis of an increasing infection rate, there does appear to be a need for an oral care protocol to improve documentation compliance in the hospital. The lack of consistency of documentation from unit to unit reflects the lack of an established structure and protocol for documentation. Establishing an oral care protocol would give nurses a framework for when and how to provide and document oral care. It is also recommended the hospital monitor any actions taken and to review documentation compliance rates and NV-HAP rates on a routine basis. While the incidence of NV-HAP was low during the period of this study, it remains a widespread

and significant health care issue in the United States. Vigilance in the prevention of this

nosocomial infection is the only way that hospitals can prevent this condition. Charting

documentation is an important part of that vigilance.

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