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Oral Screening Protocol Program: A Doctor of Nursing Practice Project

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GW | Nursing

DOCTOR OF NURSING PRACTICE PROGRAM

A DNP PROJECT

TITLE: Oral Screening Protocol Program: A Doctor of Nursing Practice

Project

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Abstract

Background: An increasing lack of compliance by Registered Nurses (RN) to perform oral health assessments leads to detrimental health concerns. Despite increase of evidence regarding abnormalities, compliance performing health exams are still compromised. Inpatient medical surgical progressive care unit (MSPCU) are even more compromised due to the patient's comorbidities. Measures to optimize oral health performed by RNs could decrease oral health detriments.

Objectives: The purpose of this project was to develop, implement, and evaluate a program in order to improve oral care by RNs and identify the abnormalities assessed. The primary aim of this project was to implement an oral screening program at Kaiser Hospital in the MSPCU inpatient population conducted by nurses.

Methods: A quality improvement (QI) project was to evaluate the effectiveness of the oral screening protocol instituted in MSPCU to improve oral cancer screening and education for RNs to provide the screenings. This project followed a pre-post test design, tracking oral care/assessments done by RNs, and trending abnormalities documented for follow-up referrals.

Results: 11 nurses completed the didactic oral screening educational session with a p-value = 0.139, therefore not statistically significant in changes between the pre and post-test. However, data supports that the program did increase nursing knowledge in oral care and screening. 50 nurses participated in completion of daily oral care and screening education. During the month of October 2023, the least amount of oral screening/care were completed whilst in December 2023 was the greatest amount of oral screenings completed. The Pearson Chi- Square was 45.084, df = 20, with a 2-sided significance of .001, therefore monthly comparisons were statistically

significant in improvement of oral screenings over time. However, the results of the screenings found no lesions or abnormalities during this period.

Conclusion: Implementation of an oral screening protocol implicated an increased base knowledge of oral care by RNs, increased screening for abnormalities, and produced increased rates of oral care completion by RNs leading to potential improved health outcomes. The hope is for RNs to continue oral screenings on patients' hospital wide to improve health outcomes.

Keywords: Oral Health, Oral Care, Inpatient Oral Care, Outpatient Oral Care, Education, Policy, Advocacy, Nursing

Introduction

Oral health is often compromised in inpatient settings, therefore leading to poor oral health in these sensitive populations. Preventative care is proactive treatment. The implementation of a standardized oral screening protocol to inpatient medical surgical progressive care unit (MSPCU) population decreases the rate of delayed care through early identification of cancer and other oral abnormalities. By implementing an oral screening in routine head-to-toe assessment done by nurses in inpatient settings, it will lead to possible oral abnormality identification. Once an abnormality is identified and validated by dentists, it may lead to optimal oral health (Barbe et. al., 2021). In addition, a reduced rate of delayed care which can lead to more optimal patient outcomes. Oral screening for at-risk individuals serves as a way to prevent oral health and/or early cancer identification. However, a lack of an oral screening tool protocol placed in inpatient settings continues to exist. This leads to deficits in basic oral care in inpatient settings thus contributing to detrimental effects in oral care.

Background & Significance

Oral cancer marks as an important global health concern in which it accounts for an estimated 275,000 cases and 128,000 deaths annually (American Cancer Society, 2021). Despite continued therapeutic approaches and medical advances, the morbidity and mortality have not improved significantly in the past three decades. According to the CDC, social determinants of health play a role in contributing oral health detriments (2021). In general, patients lack being compliant to routine dental care and overall oral health due to inaccessibility and economic instability (CDC, 2021). Patients can't afford to pay out of pocket for dental care (CDC, 2021). However, if money is allocated to oral health, physical wellbeing is improved. General practitioners are often prioritized and seen first for comorbidities over dentists for oral health.

Due to this, there is over 45 billion lost in productivity in the US each year because of untreated oral disease (CDC, 2021). It is imperative to implement a standardized oral screening protocol to inpatient PCU population, thus decreasing the rate of delayed care through early identification of cancer, oral abnormalities, and diseases.

Needs Assessment

Analysis of the oral needs assessment practices revealed important strengths, weaknesses, opportunities, and threats that were key in moving forward with successful interventions aimed at optimizing oral health. At Kaiser hospital in inpatient settings, oral care is often prioritized on the bottom of the to-do list. Nurses are multitaskers and prioritize more emergent and urgent needs first for patient care. The nurses at MSPCU are no different. The MSPCU unit have their own specific needs and challenges. One challenge is fast staff turnover. This is due to nurses transitioning for other specialties, schedules, career, and educational advancements. A couple staff members that have stayed for more than three+ years. In order to fill in the vacancy spots, new grads and new hires are utilized. New hires and new graduates are required to take additional courses to meet the MSPCU's specialty needs. Due to limited staff, orientation is often taught variously by any available preceptor. The growing discrepancy of training amongst the new staff often leads to variance in daily to-do tasks such as oral care. Although oral care is a requirement on daily flow sheets, it is often missed or not completed.

Despite the high staff turnover, the culture on the unit is safe and thriving as Kaiser and the MSPCU unit takes pride in its staff members. Due to teamwork and learning-focused culture, the environment for new grads and new hires is exceptional. This culture only promotes staff to partake in additional educational courses to be specialty certified leading to be highly educated and knowledgeable staff members. By doing so, the patient care is exceptional.

Since the staff is open-minded and enthusiastic to learning, the MSPCU will benefit in a project that enhances their patient's oral care. By implementing an oral screening protocol, it would promote optimal oral health, thus enhancing patient experience and care. The management are supportive of new initiatives, specifically this oral screening protocol. This project would enhance patient care and promote interprofessional collaboration.

Problem Statement & Evidence-Based Practice Question

There is an increasing need for oral assessments in inpatient settings due to increasing oral health detriments. The practice question and PICOT question is as follows; For inpatient MSPCU patients (P), does implementing an oral screening protocol in the head-to-toe assessment done by nurses/interprofessional (I) increase identification of abnormalities such as cancer/abscesses(O) conducted over one (1) year as compared to the traditional head-to-toe screening (C)?

Purpose Statement

The purpose of this quality improvement project was to develop, implement, and evaluate the effectiveness of the oral cancer screening program instituted in an inpatient medical surgical progressive care unit (MSPCU) setting to improve oral cancer screening and education. This project assessed factors such as oral assessment completion, basic oral health care, poor oral health knowledge, identification of oral lesions and abnormalities in the early stages, as well as interprofessional collaboration between inpatient and outpatient settings.

Aims

- The first aim was to induce increased identification of abnormalities such as lesions and abscesses in this PCU patient population.

- The second aim was to increase the rate at which a nurse is doing oral screenings amongst their patients.

- The third aim was to educate nurses and general providers about oral health and assessment, thus being able to teach oral health management to their patient population by discharge.

- Finally, the last aim was to increase the ratio of abnormalities found during this assessment to be sent out for outpatient dental referrals.

Objectives

As discussed, this project had several aims in correlation to the objectives which were established and outlined as the following;

1. By the end of the project, there would be an increase of 25% of abnormalities identified in the oral cavity.

2. By the end of the project, 25% of nurses would conduct oral screenings in their head-to-toe assessments.

3. By the end of the quarter, 50% of nurses who conducted oral assessments and screenings would teach about oral health and self-oral screenings to patients at discharge.

4. By the end of the quarter, there would be a 50% increase in abnormalities noted and sent out to outpatient dental referral.

Review of Literature

Synthesis of Literature **-** For this quality improvement (QI) project, a total of 10 full text articles addressing the impact of implementing an oral screening program on an inpatient medical surgical progressive care unit (MSPCU) in search of abnormalities to improve optimal oral health in comparison to no oral screening program instituted. The program consists of nurse

performing oral care and assessments in routine head-to-toe assessments on inpatient PCU patients, documenting the care given and any anomalies found. If any anomalies such as lesions, masses, or oral cancer is identified, it is documented and referred to a clinician that may induce an outpatient referral.

In support of the oral screening program, the following articles reviewed consists of; one randomized control trial (RCT), two retrospective observational QI studies (non-research), five cross-sectional studies, and two systematic reviews. Collectively, the RCT studied a random sample of 81 out of 341 inpatients admitted. The systematic reviews included over 45 eligible studies in the final review. For the non-research studies, two QI articles were done in inpatient settings. Five cross-sectional studies reviewed, four studies were implemented oral screenings onto inpatient settings and one study involved the implementation of an automated screening program on an institution. The following themes that were gathered were that there is a need for oral care for optimal oral health, ways to improve oral health through screening for early detection of abnormities, indications that nurses can aid in oral care, and show that oral care implementation is low cost and an effective program.

Four of the 10 of the collective studies indicate a need for oral care in inpatient settings. Each article has a specific population indicating that the respective population would benefit from oral healthcare, but their primary diagnoses compromise their oral health and their ability to complete oral care. In general, the more severe the morbidity whether related to mental or physical, the more oral health depreciates (Schuyler et. al, 2017; Ni Chroinin et. al., 2016; Hayashi et. al., 2019, Mun et. al, 2017). Schuler et. al. (2017) found that the inpatients with the most severe mental disability and/or traumatizing event have also neglected their oral health. Ni Chroinin et. al. (2016) indicated that poorer oral health was more common in inpatients

diagnosed with dementia or renal impairments. Hayashi et. al. (2019) utilized multiple screening tools involving assessing mental health and physical health comorbidities and determined that the more severe it is, the worse their oral health was as well. Mun et. al. (2021) did a QI study that indicated that those with more severe diagnoses clearly need assistance in oral care. Overall, it's imperative that nurses assist in oral care as well as do an oral assessment during their head-to-toe assessment since oral health is lacking at both inpatient and outpatient settings as shown through these articles.

Three out of the 10 articles indicated that through oral screening whether done by the patient or by a health professional, it can lead to early detection of oral cancer and other abnormalities (Walsh et. al; Macey, 2015; Shah et. al., 2020). The studies that have focused on implementation of oral examinations in physicals by health care providers has been beneficial to early detection of oral cancers leading to confirmed diagnosis by dentists (Macey, 2015; Walsh et. al., 2020). Both Walsh et. al., 2021 and Macey, 2015 indicated that being proactive and implementing an oral screening is beneficial as it can lead to early identification of oral lesions and other abnormalities. Shah (2020) indicated that oral screening through mouth self-examinations can be beneficial as the preliminary step to early identification of oral abnormalities and aids in oral health awareness.

Three studies indicated that implementing an oral health screening program is effective and low-cost to implement thus leading to improved oral health care (Daniel et. al., 2022), Haresaku et. al., 2020; Thankappan et. al., 2021). In 2022, Daniel and colleagues did a QI study driven by nurses following and completing routine oral. They found success in improved oral health through increasing rates of oral care completion (Daniel et. al. 2022). In addition, they indicated that the study was low-cost and simple to implement across all wards (Daniel et. al.,

2022). Thaankappan et. al. (2021) did a systematic review and concluded that oral cancer screening is cost effective and provides effective parameters in finding abnormal, malignant lesions in hospital/community settings. Haresaku et. al. (2020) and reported that nurses can aid in oral health. Nurses can perform oral care and assessments and if indicated, document and alert providers and outpatient referrals. All the evidence supports that nurses can perform oral assessments and document abnormalities and ultimately facilitate early identification and treatments.

EBP Translation Model

John Hopkins Nursing Evidence Based Practice Model - The evidence-based practice model used was the John Hopkins Nursing Evidence Based Practice Model. This model originated by a nursing research counsel that dedicates the advancement of evidence-based practice and to the frontline nurses who strive daily to improve patient care outcomes through the translation of evidence into practice (Dang & Dearholt, 2018). The evidence model utilized three phases: practice question phase, evidence phase, and translation phase (Dang & Dearholt, 2018).

The practice question phase includes defining the practice problem. This DNP project reflected off the practice question as "Does implementing an oral screening program in inpatient PCU settings increase identification of oral abnormalities?' Currently, there is no oral screening program instituted in the organization, thus prompts the practice question.

When the practice question was identified, the evidence phase was commenced. The evidence phase was used to identify the studies to guide change in oral screening assessments and promoting general optimal oral health (Dang & Dearholt, 2018). The literature showed that there is benefit in being proactive in oral care, thus highlighting the importance of performing oral care and assessments to identify any oral abnormalities in the early stages.

The translation phase was then reflected by the selected literature. The evidence reflects that there was a generalized need for oral health in conjunction to physical health. The literature reflects that oral care was often negated due to other comorbidities. In addition, the literature reflects that routine oral assessments could lead to early detention of abnormalities. Through education, self-oral assessments may be beneficial to identifying oral lesions or other abnormalities in the early stages as well as broadening oral health knowledge. The plan of instituting an oral screening program in inpatient settings was supported by the evidence. This includes nurses in the MSPCU performing oral assessments in their routine head-to-toe assessments. This project was supported by both the senior leadingship/managers, DNP advisors, and MSPCU unit at Kaiser Hospital. The implementation of the plan, evaluation, reporting, taking the next steps, and dissemination the results were the final steps of the evaluation phase (Dang & Dearholt, 2018). After the program was instituted, the results were collected and disseminated by the DNP coordinator, evaluated, and reported.

Logic Model - To effectively evaluate this project, a logic model was used. The logic model is a tool that increase the probability that a project implemented would be successful upon implementation (Taylor-Powell & Henert, 2008). A logic model is a systematic and visual way to present the underlying relationship between the input of resources to operate the project, activities throughout the implementation, and the output of data from it. By doing so, the outcomes would come to fruition (Taylor-Powell & Henert, 2008).

Focusing on short-term outcomes, the baseline data was explored to understand that there is a need in prioritizing oral health care in inpatient MSPCU patients with supporting literature evidence. Medium-term outcomes consists of performing oral assessments in routine head-to-toe assessments done by nurses in the Kaiser MSPCU unit. This resulted in long-term outcomes in

increasing chances of optimal oral health through early identification of oral abnormalities. The

sustainability of the overall final project was confirmed by the use of the logic model and was

disseminated as such to all interested parties.

Methodology

Setting - This project was set at Sunnyside Kaiser hospital in the critical care arena MSPCU

located in Clackamas, Oregon. This is a 303-bed, general care hospital. The population studied

were the nurses that conducted oral assessments on the inpatient MSPCU patients from June

2023-December 2023. There was a didactic educational classroom portion in unison to data

collection on the MSPCU floor.

Participant Recruitment - The target population were the nurses at Sunnyside Kaiser hospital

who were working at the critical care arena in the MSPCU. For the QI project, all registered

nurses employed at the unit were included. Interested nurses were registered for the program and

checked in regularly throughout the project. During the implementation of the program, most

nurses opted to do a 1:1 educational session. This was due to scheduling challenges.

Inclusion Criteria:

- A voluntary interest to participate in the study.

- Must be 18 years or older.

- Speak and write in English.

- Current nurses employed at Kaiser hospital where the program is offered.

- Employment as a registered nurse on an adult inpatient medical surgical progressive care

  unit (MSPCU) within the organization

Exclusion Criteria:

- Other providers outside of nursing staff

- Employment as a registered nurse in areas within the organization other than adult

  inpatient MSPCU

Ethical Consideration – This educational intervention was considered a QI project, therefore

does not meet the elements of GWU's IRB approval and therefore was exempted. Additionally,

since the project site does not have its own IRB, an agreement with the project site to conduct the

study was obtained. Participation was strictly voluntary, and participants were able to drop out

anytime if they wished to without being pressured or obligations. Consent was assumed with

participation in the program. Privacy was always provided for the participants during recruitment

and data collection. There were no anticipated risks or harm to participants in this study. No

costs or compensation were given to study participants. Participants were given the DNP

student's contact information (phone number and email) in case they had any questions or

concerns.

To protect the confidentiality and identification of participants, each room/participant

was assigned a unique study code which was given to the participant to keep and instructed to

write the code on all data collection materials. Participant's demographic information (name,

unit, and unique study code), was listed on a separate document and stored in the DNP's

student's password protected personal computer at home. Access to this information was

restricted only to the DNP student. Data was cleared, verified for accuracy, and entered Excel

and SPSS for storage and data analyses. All de-identified data was destroyed upon completion of

the project requirements.

Costs and Compensation Budget – No specific budget was set aside for the development of this

project and or was necessarily needed to perform the study. The organization was expected to

pay the associated people involved such as nurses and providers based on their own personal

salary and schedule. The DNP project coordinator presented didactic information during the core

staff normal work hours. The program participants attended the educational program during

work hours and received their regular hourly rate for attending the class. The hourly rate for a

nurse varies depending upon how long he or she has worked within the organization. The

resources needed such as the electronic health record (EHR) had already been instituted within

the hospital, thus no budget was needed nor allocated for this area. The supplies needed for oral

care were already instituted in the hospital. There was no specific oral care tool outside of the

hospital needed.

<div align="center">**Project Intervention**</div>

Methods – This was a quality improvement (QI) project, in which the project involves an

educational component that taught nurses how to conduct an oral assessment thoroughly and

learn the ability on how to identify and document abnormalities. A pre-test and post-test same-

subject design was used to evaluate the knowledge change among the nurse participants. After

the educational sessions, the participating nurses performed oral care and assessments in their

routine head-to-toe assessments on inpatient MSPCU patients. During this assessment, nurses

were to document the oral care and assessment given and note any abnormalities if found. If any

abnormalities such as lesions, masses, or oral cancer is identified, nurses documented and

referred to a clinician that may start an outpatient referral.

Didactic Education - The didactic education was designed to provide nurses the information on

how to conduct an oral assessment as well as learn how to identify lesions or any other

abnormalities in inpatient MSPCU patients. This classroom component was approximately 15

minutes to conduct. In addition, there were smaller learning sessions that supplement for those

that cannot make a session. In each educational session, there was a pre and post-test for

knowledge baseline for data collection. To this date, most nurses elected to do individual

educational sessions. This included 1:1 educational session with the DNP project coordinator.

Individual nurses completed the pre-post-test after the educational session and completed packets

are turned into the DNP Project Coordinator at their earliest convenience.

Resources/Tools/Instruments - A pre and post program knowledge assessment was conducted on

the participating nurses to assess for knowledge change on oral health. Participant feedback was

obtained at the end of the education session as well as the program itself. These tests helped to

understand the level of knowledge each participant has at baseline and after receiving education.

Several open-ended questions were added to understand the participant perspective questions and

concerns for the project overall. This was done to measure the strengths and weaknesses of the

program.

In addition to the educational session, the participants were taught how to use an oral

screening tool called the Primary Care Oral Assessment Tool (PCOAT) to navigate through any

abnormalities found for documentation. This physical screening assessment tool consists of

assessing patients in low-high risk categories as well as documentation section for the nurse upon

examination (Scherr et. al. 2020). A study by Scherr et. al, suggests that there was an increased

need in oral screening assessments via oral screening tools in sensitive populations for proper

documentation and usage (2020). See Appendix D.

If there were any abnormalities or lesions noted, a progress note was made by the nurse

that included description, location, and measurements of the abnormality. Documentation would

be placed in the electronic health record (EHR) system. After documentation, nurses were to

notify the MD of the oral abnormality. The MD would make the appropriate referral and

document once completed.

Collection of Data - The pre-tests and post-tests by individual nurses were collected after the education sessions via paper format. The study participants were asked to complete these prior to the start of the class. At the end of the class, study participants were asked to perform a post-test. During these tests, it was assessed how to properly conduct an oral assessment and documentation on oral abnormalities. The program was offered on 2-4 occasions in 15-20-minute classes as well as supplemental, condensed version for participants unable to make a session. The program was offered on several occasions over the course of several months, with a target start date on Oct 1st, 2023, and a target end date of January 2024 for analysis.

Documentation from the EHR system regarding oral assessment completion and any abnormalities were found in the MSPCU patient population would be obtained. The documentation was listed under the oral assessment tab in the EHR system as well as free-text format in the progress note section. Documents were emailed to DNP Project Coordinator.

The DNP Project Coordinator had access to the survey results and EHR system. This individual ran reports with the test results to give to the primary and second for data analysis. These reports were de-identified and anonymous, so that the tests would not be linked to individual participants.

Expected Measured Outcomes - This project consisted of both process and outcome measures. The process measures were percentages of nurses that conduct oral screenings during their assessments. The outcome measures were the accounted oral abnormalities found and referred out. The expected outcome measures included pre and post-test level of knowledge in oral health and assessment, rate at which a nurse is doing oral screenings amongst their patients, and the ratio of abnormalities found during this assessment for referrals. According to Mant, process measures are more sensitive to differences in the quality of care while outcome measures are

better for intrinsic interest and can reflect for all parts of care. (2001). Due to this, outcome indicators can be improved if efforts are made to standardize data collection, therefore have the power to detect real differences in quality (Mant, 2001).

Project Timeline & Gantt Chart -

Task	Start	End
Education Day	1-Oct 23	15 Oct-23
Supplemental Education	15-Oct-23	30-Oct-23
Monthly Check-ins	1-Nov-23	1-Dec-23
Data Collection	1-Oct-23	31-Dec-23
Data Analysis	1-Jan-24	7-Jan-24
Completion Final Report	7-Jan-24	20-Apr-24
Present Findings	9-Apr-24	1-May-24

Gantt Chart
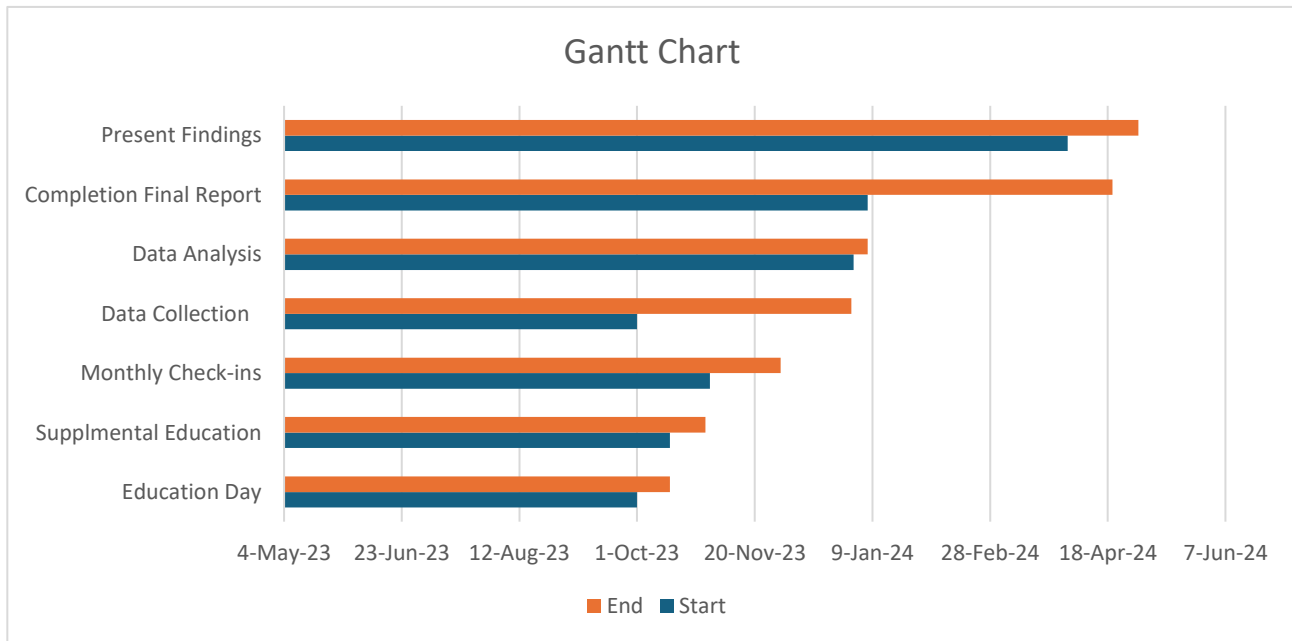
Project Timeline - This project was implemented from Oct 1st, 2023 – May 1st, 2024. The first week of the project implementation required education days where nurses signed up for a session. It would also be supplemented with compact educational sessions from Oct 15-30th, 2023 for those that can't make it to the traditional session. Monthly check-ins done by the DNP project coordinator accessed the Electronic medical records (EHR) for audits and project progression starting Nov 1st until December 31st, 2023. During this time, the DNP project coordinator assessed for oral assessment completions and any documentations on oral abnormalities found during the intervention period. Finalized data collection was collected December 15th, 2023 to December 31st, 2023. Each medical record was assessed to determine if the patient had oral care done, assessed, and if they had any oral abnormalities. Oral care and assessments were done daily. Data analysis was followed after January 1st to January 7th, 2024. Pre and posttests from same knowledge tests and oral assessments were analyzed using paired t-tests separately. Results and completion of the project were reported on April 1st, 2024. The presented findings would be disseminated by April 9th , 2024.

Software Description, Data Storage & Maintenance

Data Analysis, Maintenance & Security - Data collection was performed by the author of the DNP project coordinator. Pre and post intervention data was assessed for baseline knowledge on the topic of oral health and assessment. The tests were also tested participants knowledge on documentation on abnormalities. Descriptive statistics, percentages, frequencies, and means was generated to analyse test scores pre and post. Improvement in knowledge was determined by using a paired samples t-test to compare mean scores. Documentation in the EHR system was also be collected. Analysis was derived from descriptive statistics, percentages, frequencies, and

means from this data section as well. This consists of oral assessment completion and progress notes on any lesions identified during the assessment.

Excel – Microsoft Excel is a spreadsheet software that is utilized to store raw data and to preform basic statistical analysis (Abellnosa, 2018). The data was compiled and stored in spreadsheets for data tracking and comparison. Excel was used to collect data and compiled weekly through the Electronic Health Record (EHR) system. Data collected was then used to create data tables and charts. During weekly assessment, if there was missing or limited data, the DNP Project Coordinator increased educational sessions as well as coordination with Unit Manager Arlin Rose to encourage participants following protocol guidelines. In addition, informational data points and friendly reminders to conduct oral screenings in emails were sent weekly. In a separate spreadsheet, pre and post intervention data were assessed for baseline knowledge on the topic of oral health and assessment. The tests assessed participants knowledge on documentation on abnormalities.

Alongside the excel spreadsheet, the SPSS was used. The SPSS is termed as a statistical software used to perform advanced statistical analysis via calculating the average and the standard deviation for each process, outcome, and balance measures (Brady et. al., 2017). In addition, the SPSS was used to create a control chart to analyse the process for variation and control as well as analyse the descriptive statistic for patient demographics. SPSS was used to analyse the data and control charts were used to track trends in the process and provide a graphic view of the process. Descriptive statistics, percentages, frequencies, and means was generated to analyse test scores pre and post. Improvement in knowledge determined by using a paired samples t-test to compare mean scores. Documentation in the EHR system was collected. Analysis was derived from descriptive statistics, percentages, frequencies, and means from this

data section as well. This consists of oral assessment completion and progress notes on any

lesions identified during the assessment. This data was compiled and stored in Excel

spreadsheets for data tracking and comparison. Compiling of data, with subsequent monthly

updates of EHR system was tracked in Excel. This project was using quality improvement

metrics methods to be applied to each data section.

DNP Project Coordinator entered the data into Excel to capture and analyse:

- The percentage differences in base knowledge of oral care in a pre/post-test after

  educational sessions

- The number of oral cares done by nurses daily

- The number of oral lesions or abnormalities found.

- The number of follow-ups after an oral lesion/abnormality was found.

- The type of oral care done daily; Brushed, Oral Rinse, Refused

Data Entry Accuracy - During the data collection, the DNP project coordinator ensured accuracy

by double checking my data from previous weeks of collection. For the processing, the DNP

project coordinator worked with their corresponding advisors and worked along the guidelines of

Dr. Odlum for data analysis.

Security - Security was secured by having appropriate as deemed necessary to prevent HIPPA

breach through the electronic health record (EHR). Participants and patients will be de-

identified and anonymous. Survey responses were analysed using SPSS Statistics software.

Instrument/Tool – For this project, the Assessment of Quality Improvement Knowledge, and

Skills (AQIKS) was tool that generates a summative assessment of residents' ability to recall QI

concepts and applied them to a clinical scenario was used. The AQIKS tool was used to assess

the validity evidence in 3 different domains: (1) content validity; (2) internal structure, measured

by interrater reliability; and (3) impact of learner participation in a formal QI curriculum

(Doupnik et. al., 2017). In addition, the construct, content validity, and reliability were estimated

utilizing item separation indices (SI) and reliability coefficients (RC) from the educational

surveys.

Measured Outcomes

There were four outcomes measured. The first aim was to induce increased optimal oral

health and identification of abnormalities such as lesions and abscesses in this MSPCU patient

population. This was done by the number of documented oral abnormalities in inpatient MSPCU

patients divided by all the patients during the reporting period. The goal was to meet a

benchmark of 25%. The second aim was to increase the rate at which a nurse is doing oral

screenings amongst their patients. This was found by the number of documented oral screenings

done by nurses in the inpatient MSPCU patients divided by all the patients during the reporting

period. The goal was to meet the benchmark of 25%. The third aim was to educate nurses and

general providers about oral health and assessment, thus being able to teach oral health

management by discharge. This was calculated by the number of nurses conducting oral

education to inpatient MSPCU patients at discharge divided by all patients during the reporting

period. The benchmark goal was 50%. The last aim was to increase the ratio of abnormalities

found during assessments to be referred to outpatient dental clinics to determine if the

development and use of the oral assessment protocol resulted in identification of abnormalities

with proper referral. This was found by number of abnormalities noted and referred to outpatient

dental offices divided by all patients during the reporting period. The goal is to have an 50%

benchmark increase. See Appendix F.

Alignment of Aims and Outcomes **-** The first aim was to induce increased optimal oral health and identification of abnormalities such as lesions and abscesses in this MSPCU patient population – This was first done by introducing an oral screening protocol program to nurses on the MSPCU unit. The plan was to induce the amount of oral screenings/care done by nurses and completed daily. After completing an educational session, nurses are to commit to daily oral screenings and care to their assigned patient list. If any abnormalities were noted in their shift, it was documented in the EHR system. Data is then filtered and collected by the DNP Project Coordinator. The DNP project Coordinator entered data into an Excel spreadsheet for each room number on the MSPCU unit weekly. Ensuring completed oral care daily allows for optimal chances of catching an oral abnormality or lesion. The excel spreadsheet tracked the completion of oral screening, oral care, and type of care daily. SPSS analyzed the average and the standard deviation of each tracked measure used for calculations.

The second aim was to increase the rate at which a nurse is doing oral screenings amongst their patients. This was found by the number of documented oral screenings done by nurses in the inpatient MSPCU patients divided by all the patients during the reporting period. For optimal results, data was collected weekly on the completion of oral screenings and care done by nurses. Completion of the oral screening and oral care provided data on staff compliance to the oral screening protocol. The DNP Project Coordinator entered data into an excel spreadsheet for each room number on the MSPCU unit. Email reminders were sent weekly by the DNP Project Coordinator to encourage nurses to complete daily oral care and chart it in the EHR system. The spreadsheet tracked the completion of oral screening, oral care, and type of care daily. SPSS analyzed the average and the standard deviation of each tracked measure used for calculations

The third aim was to educate nurses and general providers about oral health and assessment, thus being able to teach oral health management by discharge. This was calculated by the number of nurses conducting oral education to inpatient MSPCU patients at discharge divided by all patients during the reporting period. The plan was for the DNP Project Coordinator to conduct oral screening educational sessions in the first month of implementing the project. The DNP Project Coordinator had scheduled educational sessions, but most nurses opted to do 1:1 educational session. A pre-test was given for baseline oral education knowledge, followed by the educational session, and then finalized with a post knowledge test in order to understand the differences of knowledge. After the educational sessions, the nurses were to continue on and complete daily oral care and screening amongst their daily shift assignments in the MSPCU unit. Given the new oral educational sessions, nurses were expected to educate their patients about continuing on oral care and optimal health at discharge.

The last aim was to increase the ratio of abnormalities found during assessments to be referred to outpatient dental clinics to determine if the development and use of the oral assessment protocol resulted in identification of abnormalities with proper referral. This was found by number of abnormalities noted and referred to outpatient dental offices divided by all patients during the reporting period. The plan was to properly refer any noted oral abnormality and have it referred out by the physician assigned to the patient. The referral would be indicated in the daily progress note by the physician, which was then collected and added to the DNP Project Coordinator's data spreadsheet.

Each outcome measure aligned with the aim to practice optimal oral health screenings and care for inpatient MSPCU patients. The critical component of the project's success is the staff compliance in completing oral care daily. The implementation of an oral screening protocol

program is to ensure optimal oral health in inpatient settings. Data assessing the completion and

type of oral care and screening from the pilot unit was conducted over a period of four months;

October – January. This data was enough to provide enough substance on whether how

successful and impactful of the oral screening program.

<div align="center">**Results**</div>

Outcomes - The overall arching goal was to improve the oral care in the MSPCU population.

This was done by introducing an oral screening protocol program, where nurses were the

initiatives on this pilot unit. A total of 11 nurses (n=11) completed the didactic oral screening

educational session and a total of 50 nurses on the MSPCU participating in completion of daily

oral care and screening.

The first aim was to induce increased optimal oral health and identification of abnormalities

lesions in the MSPCU patient population. The outcome to this aim was to increase

documentation of oral abnormalities in in-patient MSPCU patients by 25%. To measure how

well the project met the objective, the amount of completion of oral care and screenings are done

were collected by the DNP Project Coordinator. Though oral care was completed daily, there

were no lesions or abnormalities found.

The second aim was to increase the rate at which a nurse is doing oral screenings amongst

their patients with an outcome of increased documentation of nurses conducting oral screenings

in their head-to-toe assessment by 25%. To measure how well the project met the objective, the

amount of completion of oral care and screenings are done were collected by the DNP Project

Coordinator. Data were collected weekly. The frequency, percentage as well as mean and

standard deviation were reported for each month. A paired sample t-test was conducted to

evaluate the differences between months. The mean, standard deviation, level of significance, t

value and *p*-value were reported for each question. It was found that the month of October was the poorest outcomes in terms of oral care. However, as time went on, completion of oral care was more consistent. The month of December had the most consistent data and the best results in comparison to the other months. The Pearson Chi- Square was 45.084, df = 20, with a 2-sided significance of .001.

The third aim was to educate nurses and general providers about oral health and assessment, thus being able to teach oral health management to their patient population by discharge. The outcome to this aim was to increase the percentage of nurses conducting oral education at discharge by 50%. To measure how well the project met the objective, nurses were to participate in educational sessions to provide baseline knowledge on oral care and assessment. This knowledge was then assessed by a pre and post-test. The frequency, percentage as well as mean and standard deviation were reported for each month. A paired sample t-test was conducted to evaluate the differences between pre-test and post-test results related to change in self-rated confidence and competence with acute situations. Mean, standard deviation, level of significance, t value and *p*-value were reported for each question.

In order to measure how well the educational sessions were, a pre and post-test was administrated. The answers to the questions were coded as 1 (correct) and 0 (incorrect). Data entry for the analysis of the pre-test and post-test oral screening knowledge test were coded as 1(pre-test) and 2 (post-test). The pre-test had a total of 4 questions and the post-test had a total of 5 questions. These tests were not the same format, therefore eliminating the learning curve error limitation. The mean of each test and difference of percentage changes were reported for each variable. A paired sample t-test was conducted to evaluate the difference between the pre-test and post-test results to change in knowledge about oral screening and care in the nursing role.

Using this data, the mean, standard deviation, level of significance, t-value, and p-value were reported for each question. The mean of the pre-test was 38.64 correct and post-test mean was 52.73 questions correct. The standard deviation is pre-test is 30.34 and 40.27 in post-test. This supports that the mean test score was higher after the intervention. The p-value equals 0.139.

In addition to the pre and post-test in the educational course, there were some questions involving whether the nurse typically conducts oral screenings at baseline. The answer to the questions were coded as 1 (Never), 2 (Sometimes), and 3(All the time). There were a total of three questions; "Do you assess the oral cavity at least once a shift?", Do you do oral care for your patients at least once a shift?", "Do you do a full oral assessment for every admission?". Most nurses answered Sometimes. Most nurses answered "sometimes".

The last aim was to increase the ratio of abnormalities found during this assessment to be sent out for outpatient dental referrals with the outcome of increased percentage of abnormalities noted and sent out for out-patient dental referral by 50%. To measure how well the project met the objective, the amount of completion of oral care and screenings are done were collected by the DNP Project Coordinator. Though oral care was completed daily, there were no lesions or abnormalities found. Due to this, there were no abnormalities or lesions to make a referral to dentistry. See Appendix H & I.

Discussion & Analysis

Oral cancer and recurrent oral cancer accounts for 128,000 deaths annually. (American Cancer Society, 2021). Yet, oral care is often neglected in inpatient settings. Poor oral care can lead to complications and extended hospitals stays such as pneumonia and aspiration risks (Ni Chroinin et. al., 2016). The oral screening protocol program implemented at Kaiser MSPCU

demonstrated mixed results. However, the results also offered helpful insights into the

relationship of oral care in inpatient settings.

Though no lesions were found in the time of this project, the results indicated that there

was an increased baseline knowledge of oral care and health. Results also indicated that there

was improved consistency of oral care completion.

Through the didactic education on oral care and health screening, results showed significant

improvement in participants' rating of their abilities with regards to acute situations and care of

critically ill patients in the post-test, as compared to the pre-test. The survey questions at the end

of the post-test demonstrates that most nurses at baseline often neglect oral screening or care

unless pertinent to the patient's ongoing diagnosis at the time at baseline. The didactic education

session had a p-value of 0.139, therefore didn't demonstrate statistically significant changes

between both the pre-test and post-test. However, the program did increase nursing knowledge

related to oral care and screening.

The monthly comparisons gradually had increased consistency in oral care completion. In

addition, they were to be found statistically significant. These results showed significant

improvement in the completion of oral care, thus improvement in oral screenings implemented to

nurses' head-to-toe assessment over time. This implies that oral care importance was emphasized

and applied daily amongst the MSPCU staff.

Implications - Through this project, there are number of implications. The implication for

practice is to continue to change the culture and put an emphasis on oral health in inpatient

settings. The implications for healthcare policy are to commit to a drive-in oral health and care

and put in a policy in place for a formalized oral screening protocol program. The implications

for executive leadership. The implications for quality/safety are through the emphasis of oral

care and how the quality of oral care is given daily to inpatient settings. This acts on improving

oral health in general and is a safety mechanism from complications such as aspiration risk or

pneumonia.

Limitations - Several limitations were identified. This included patient compliance oral care or

completion, lack of nursing compliance, and actual oral lesions or abnormalities to be found that

may influence the successes of this program.

Since patients often neglect their own oral health, therefore, education for patients on oral

health is essential. By changing the culture of oral health in both the patient and RN forefront,

oral care would be done properly and consistently. By being proactive in oral care, this can lead

to overall optimal health by highlighting the importance of performing oral care and identifying

oral abnormalities in the early stages. The implementation of an oral screening program is low

cost and is effective on many levels as indicated from the studies. Overall, it would be beneficial

for both healthcare settings and patients to have an oral screening and health program instituted.

Plans for Sustainability and Future Scholarship - The plan for sustainability and future

scholarship of this program is to continue to put an emphasis on oral care in inpatient settings.

Change the culture of the unit is imperative to create optimal oral care and health outcomes.

Conclusion

The overarching goal of the Oral Screening Protocol was to improve oral health in the

MSPCU population. The hope was to empower nurses with additional knowledge about oral

health, screening, and care. This would encourage nurses to complete oral screening and care

daily amongst their assignments. The goal was to minimize any increased risk of oral

abnormalities, thus leading to decreased risk of longer hospital stays or other preventative oral or

diagnosis complications. Successful implementation of the program was based on the collected

data. Data suggested that there were increasing rates of oral care and assessments being completed daily by nurses, therefore would lead to increased rates of oral abnormalities found. However, during the time period of this project, though there were more completed daily oral screenings and care, there were no abnormities found.

Despite the limitations, the project implicated that there were increased base knowledge of oral care and screening for abnormalities and lesions as well as increased rates of consistent oral care completion. Due to this, there was improved oral care outcomes simply by putting an emphasis on oral care and completion of it in nurses' daily tasks. The hope is that with continued improved oral health and care, it would drive the status quo on daily oral care hospital wide.

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Appendices

Appendix A: SWOT Analysis A

(Problem)	(SWOT Analysis to identify a specific problem, list it here)
Strengths: • Describe your organizational setting. • What is your organization's greatest strength? • Do you consider your organization leadership team strong? Why? • What does your organization offer to its employees that make it worthwhile to belong to your organization? What's in it for them? • Are your colleagues active and engaged? • Additional strengths	- This is a 16-bed Progressive Care Unit within a 233-bed hospital in a suburban setting placed in Portland, Oregon. Kaiser Sunnyside Medical Center is a not-for-profit, general care hospital in Clackamas County where it was opened in 1975. - The greatest strength of the unit is its' staff. Kaiser takes pride in making sure each staff member in the hospital is taken care of and spoken for. The staff at PCU are considered part of the Critical Care units being closely aligned with the ICUs. The staff are extremely adaptable, knowledgeable, and accountable. The staff prides with being one of the best nurses in the area involving many accredited nurses and staff members. Kaiser also supports advancing careers and milestones for its members, thus providing a thriving unit with copious opportunities presented to them. - The organization leadership is strong on both a Kaiser and unit stand front. Due to Kaiser being exceptionally supportive in its members, it's allowed staff to thrive. The staff are amongst credited in their specialties and more. The unit has an active unit-based council with various roles and with respected voluntary, representatives for each role. The culture on the unit is one of teamwork and family, going above and beyond to help one another to ensure that the patients receive exceptional care. Due to this healthy environment, the staff are thriving. - Kaiser's core values are deeply in betted in patient centered care. The organization understands that to achieve exceptional care, it must work within. The staff are a major role in accomplishing that task, thus are supported heavily. By doing so, staff are going above and beyond for their patients because they have the time, resources, and compassion to do so. - All the units on the hospitals are active, engaged, and always critically thinking to provide the best care possible for their patients. This particular unit, the

(Problem)	(SWOT Analysis to identify a specific problem, list it here)
	staff nurses are recruited to fill leadership roles, becoming quality representatives known as "champions". Nursing staff are offered a multitude of opportunities, led with various conferences throughout the country and weekly educational sessions. The overall unit culture is recognized as healthy and positive. Since my colleagues are happy, staff stay for years building on their experiences. New graduates that come within this department are welcomed in and are taught at the more exceptional standards to be held accountable. Each nursing leadership team member are enthusiastic and committed to the unit. There is also a healthy relationship between interprofessional departments. - Another benefit is that the unit rooms at PCU are single occupancy and large. There is a plethora of resources and items for both staff and patients.
Weaknesses: • What is your organization's biggest weakness? • What can be improved? • What necessary expertise / manpower do you currently lack? • Does your organization have adequate resources for this project? • Additional weaknesses	- One weakness that the PCU unit has is that there is a lack of a unified protocol for daily shift tasks. For example, oral care and assessments. Oral care is done once per shift and can be delegated to the CNA by the nurse. However, due to a lack of core staff and high nurse turnover rate, there is often discrepancies on this task being done. - Due to a high turnover rate, there is a variance in teaching and precepting in orientation. There are several experienced staff members. There are a couple that have 10+ years, but most of the staff are new grads and less than 3 years of experience. - Another weakness is that there is turnover in management as well. Just recently, the PCU has hired a new manager with the interim manager on standby. Due to this, there may be discrepancies on what day-to-day operations are. - Like any hospitals, nurses are required to float. However, it may not be appropriate to the nurse's experience and skill set. For example, PCU nurses floated to ICU may not have had the additional training to care for a higher acuity patient. - What can be improved is the orientation process for onboarding new grads, new hires, and general float pool staff. There is inconsistency of training and protocols since daily operations fluctuates. For

(Problem)	(SWOT Analysis to identify a specific problem, list it here)
	example, a nurse that floated to the PCU may not know to do daily oral care or q4 swabs compared to their own unit. In addition, Float pool designated for the critical care units are often trained variously amongst staff without one set preceptor. This leads to feelings of inadequacy or impotence with too much variation. - By changing the orientation to something more consistent, it would enhance learning. The orientation process should be revised to adequately reflect the needs of new grads and new hires transitioning to critical care areas. It would also be helpful to have designated preceptors, so that training may be consistent. This would in turn allow unit leadership to be able to assess needs and take measures to make sure new grads and new hires meet the standards and processes. - Kaiser uses some older technology that leads to inefficiency. For example, the clocking system is through a phone call process in comparison to the modern tap system. Another archaic system is having blood sugars be manually put in for documentation other than it being automated. - This organization has adequate resources for this project. There is a plethora of opportunities and resources to advance accreditation, learning opportunities, and general support of enhancing patient care.
Opportunities: • What is your organization's greatest opportunity? • What environmental trends might impact your organization? • What external changes or factors present interesting opportunities? • Additional opportunities	- The greatest opportunity that this unit has is that it's constantly growing and adapting to challenges. The unit is always holding itself to the highest standard of care. The unit staff and culture are thriving, therefore leads to exceptional and safe care. - An environmental trend that impacts the organization is using an older EPIC EHR system. This system is a bit outdated compared to other hospitals, where for example, the blood sugars do not automatically go into the documentation system. - An opportunity for change is the use of updated technology and clocking systems that lead to more

(Problem)	(SWOT Analysis to identify a specific problem, list it here)
	efficient and effective care. By updating the systems, it would improve care provided to patients and engage with tech-savvy staff.
Threats: • What is your organization's biggest threat? • What obstacles do you face? • What are other organizations doing that yours is not? • What challenges can be turned into opportunities? • Are external economic forces affecting your organization? • Additional threats	- The PCU's biggest threat is the possibility of staffing turnover due to high rates of patient turnover and acuity. Nurses can leave for other educational opportunities and career advancement and/or explore other specialties. Staffing turnover will prevent the unit from developing into a group of more experienced, knowledgeable PCU nurse. High nurse turnover is an expensive process as it takes several months and investment for new hires. Precepting new hires and new nurses adds as an additional strain to core staff and preceptors. This may also lead to contribution of nurse burnout. - Due to PCU being a critical care unit, there is requirements for higher level critical thinking and quality improvements as standards of care for this population. This may add as an additional stressor to core staff and a steep learning curve for new hires and new grads. This may pose an obstacle. - In comparison to other organizations, Kaiser PCU is considered critical care meaning that there is a higher standard level of care for patients. IN addition, other organizations have better staff retainment, therefore leading to less nurse turnover. For example, there are travel nurses that fill in the gaps for teaching and scheduling. - Some of these challenges can be changed by hiring more staff and gaining knowledge on what keeps staff happy. In addition, hiring experienced staff would help. This can mean through higher wages and better benefits. Consistent core staff for preceptors with incentives to mitigate burn out can lead to opportunities for continued growth and shaping of culture amongst new hires and new grads.

(Problem)	(SWOT Analysis to identify a specific problem, list it here)
What needs to happen to ensure your organization's health and success?	The PCU already has a good culture in an institution that listens and supports all core staff. By doing so, the patient care is at exceptional levels. However, the Kaiser and PCU unit will need to continuously grow into modern systems to enhance patient care. In addition, Kaiser and PCU would need to continue a unified protocol for orientation that allows for consistency in teaching new grads and hires. This can be done by following IHI's triple aims; improve patient experience of care, improve health of populations, and reduce the per capita cost of healthcare. Through these guides, Kaiser can continuously improve their already exceptional care. Kaiser as an institution and the PCU unit can contribute to reducing healthcare waste and costs by retaining core staff and having consistent orientation guidelines. This can mean eliminating ineffective and/or inefficient training during the orientation process.

Appendix B: SWOT Analysis B

	Helpful To achieving the objective	Harmful To achieving the objective
Internal Origin {Attributes of the organization}	**Strengths** • Staff are engaged, committed, adaptable, and held accountable. • Various opportunities for engagement and certification advancement. • Compassionate, tight-knit team and good culture • Plethora of resources for both patients and staff to maintain exceptional care • Patient-Nurse ratios are exceptional and safe.	**Weaknesses** • High acuity patients and high turnover rate may contribute as a stressor that may lead to nurse burnout. • Higher level care meaning additional accreditation and classes that may contribute as a stressor that may lead to nurse burnout • High nurse turnover rate leads to inefficiency and resource waste and costs. • High turnover rates lead to inconsistency in orientation, leading to missed daily care such as oral care. • Archaic documentation systems that lead to inefficiency.
External Origin {Attributes of the organization}	**Opportunities** • New unit opportunities for growth and development throughout the hospital setting and unit processes. • Possibility for interprofessional collaboration within the hospital and out-patient settings • Hold a higher standard of care of oral care. • Update technology systems for efficient and effective care. • Unified orientation system for both new grads and new hires.	**Threats** • Staffing turnover due to staff members pursuing further educational opportunities and/or better scheduling. • Possible changing hospital priorities with new executive leadership team and unit management • Lengthy nursing staff training period required to ensure competent provider

Appendix C: Evidence Table

Artic le #	Author & Date	Evidence Type	Intervention	Sample, Sample Size, Setting	Study findings that help answer the EBP Question	Observable Measures	Limitations	Evidence Level & Quality
1	Schuler, Bock, Heinric h-Weltzie n, Bekes, Rudovk y, Filz, & Ligges, 2017	Randomi zed controlle d trial	Oral health screening amongst CAP (intervention group) and DC (Control Group)	A randomized sample of 81 children and adolescents (CAP) (6017) in all new inpatients admitted. N= 341. Intervention group CAP (n=81patient admissions), control group DC (n=260)	Implementatio n of an oral health screening amongst the participants by 2 dentists and were given a health oral health status. It was found that CAP had higher caries prevalence with the incidence that highest caries experience was observed in patients with acute, stressful life events.	Correlation of OHRQoL and measureme nt of dental caries diagnosed by dentists.	Limitations include small sample size of interventio n group.	Level II, B
2	Daniel & Gaunt, 2022	Retrospe ctive observati onal study and QI study	Overall inpatient screened versus no screening previously in inpatient settings.	Inpatients admitted to an elderly-care ward comprising of 34 patients	Over a 4-month period, there was significant improvement rates in oral-health assessment by 86%, completion of routine mouthcare by 32%, and overall health by 66%. Interventions are low-cost and simple and could potentially implement across all wards. Wider adoption would improve mouthcare, thus potential benefit for both patient experience and morbidity.	Nurse led driver for change lead to assessment and documentat ion of oral care given. Two month following evaluation of preceding changes impact. Data gathered included FY1 on patient oral health, rate of proforma completion, and patient-reported completion of routing mouthcare.	Limitations include small sample size, participatio n, and time sensitive timeframe.	Level V, A/B
3	Thanka ppan, Subram anian,	Systemat ic Review	Economic, cost-effective studies that was assessed for oral health	27 studies were selected of 205 identified through a search	A strong predictive value found that oral	Impact of model discriminat ion	Limitations include heterogenei ty in	Level III, A/B

	Balasub ramania n, Kuriako se, Sankara narayan an, & Iyer, 2021		screenings and effectiveness/cost effectiveness compared to traditional no screening.	of MEDLINE, CINAHL, Econlit, through EBSCOhost, EMBASE, and Cochrane Library. Fully economic evaluations, studies based on visual oral screening were included and studies only comparing costs and non-research articles were excluded.	cancer screening to be cost effective and effective parameters in finding abnormal, malignant lesions and early cancer lesions. This is compared to no screening or preventative screening in community/ho spital settings.	CHEERS – Consolidat ed Health Economic Evaluation Reporting Standards checklist and reviewed by three independen t reviewers.	included economic evaluations . Difference in dimensions of heterogenei ty include geographic al differences, costs, preferences , treatment effects, and other countries.	
4	Ni Chroini n, Montalt o, Jahromi , Ingham, Beverid ge, Foltyn, 2016	Cross-sectional study	All inpatient geriatric patients screening compared to no screening previously	All individuals 70 and over admitted to a geriatric service over 3 months.	Poorer oral health was more common in dementia and renal impairment. Overall, oral health screening should be considered for vulnerable populations.	In person assessment using the Oral Health Assessment Tool (range0-2, 2=poorest) for lips, tongue, gums, and soft tissue, saliva, teeth, dentures, oral cleanliness, and dental pain. In additions, comorbiditi es, and medication s ere also recorded.	Limited to comorbiditi es being the first line of treatment prior to screening.	Level III, B
5	Haresak u, Uchida, Aoki, Akinaga , Yoshida , 2020	Cross-sectional survey	All recruited 919 nurses recruited and performed oral health assessments compared to no assessments previously	919 nurses across 5 hospitals in Japan were recruited as responders with data collected pertaining to dental assessment and referral to dental services from the	757 (84.2%) nurses responded to the oral health questionnaire regarding an oral health assessment and dental referral. 41.2% performed oral assessments	Structured questionari es regarding to knowledge of oral assessment, performanc e, and referral were done.	Limited to heterogenei ty of population, gender differences, and hospital differences.	Level III, A/B

				timeframe August 2018 to September 2018.	for more than 50% of their inpatients with 29.9% encouraged more than one inpatient to see a dentist within the previous 3 months. There is a significant difference in wards and hospitals that oral assessments for performance of oral assessments in inpatient settings.	Oral Health Assessment Tool (OHAT) was utilized.		
6	Hayashi, Izumi, Mastuda, Isobe, & Akifusa, 2019	Cross sectional study	Inpatients in 2 wards assessed for the following tools in terms of oral health assessments and comorbidities compared to the rest of the hospital wards.	Inpatients of convalescent wards (age 34-100) and their respective oral health was assessed by nurses.	GOHAI and OHAT were significantly worse than those in non-cases cohort. Multiple regression analysis revealed that GOHAIR was statistically significant predictor of HADS score (p=0.012), and that HADS and OHAT scores were predictors of GOHAIR (<0.001 respectively). Oral health related quality of life, affected by oral hygiene stratus, was strongly associated with emotional	Hospital Anxiety and Depression Scale (HADS) used to assess emotional distress, Geriatric Oral Health Assessment Index (GOHAI), Oral Health Assessment Tool (OHAT) were all assessed and sought for correlation for causal connections of these factors.	Limitations include educational level of participants, no evaluation of oral diseases prior, and limited to only 2 wards of hospitals, thus small population size.	Level III, B

					distress in inpatients.			
7	Mun, Jeon, Choi, Lee, Kim, & Han, 2017	Combined prospective-retrospective observational study and QI study.	61 inpatient rehab patients were assessed for oral health and performance versus the traditional no screening in other wards.	40 men, 21 women rehabilitation inpatients with a mean average of 56.6 years were included in the study.	50.8% patients could brush their teeth versus 49.2% needed assistance. Those receiving nasogastric tube feeding was higher in the group that could not provide oral self-care, thus needing additional assistance. Scores indicated for swelling, tongue, and total domains of bedside oral exam were poorer for patients who could not provide oral care for themselves.	The bedside oral exam (BOE), which can be used to visually examine the oral health status of patients, was developed by Prendergast et al by modifying the Oral Assessment Guide developed by Eilers et al[13] to assess the oral health status of intensive care patients.	Limitations include small sample size, limited health literacy, and patient physical requirements.	Level V, B
8	Walsh, Warnakulasuriya, Lingen, Kerr, Ogden, Glenny, & Macey, 2021	Systematic review	Oral cancer screening program versus no cancer screening program	18 studies were selected under the Cochrane Library through April 2013. Non-systematic reviews, opinions, and case series were excluded. Hand search of reference lists was also completed using the same criteria.	Early detection of oral cavity squamous cell carcinoma (OSCC) and oral potentially malignant disorders (OPMD), followed by appropriate treatment, may improve survival, and reduce the risk for malignant transformation respectively	The researchers utilized methodological quality using the Quality Assessment of Diagnostic Accuracy Studies 2 (QUADAS-2) to assess the studies as well as oral health assessment	Limited to research done specifically on oral health programs instituted to support oral cavity cancer outside of frontline workers such as dentists and hygienists.	Level III, A/B

						tool (OHAT).		
9	Macey, 2015	Cross-sectional study	Implementation of an automated, outpatient-based screening program successfully identify premalignant or early-stage cancerous lesions in high-risk patients compared to traditional no screening program	8037 patients (86% male, age 33 to 109 years) attending an outpatient facility at the Far Eastern Memorial Hospital, Taipei, Taiwan, were recruited to the study. all were deemed to be at high risk for oral cancer due to their consumption of tobacco or betel quid.	Implementation of a screening program has been seen beneficial to improve recruitment screening programs for premalignant or early-stage cancerous lesions. It is correlated that recruitment rate is improved, which may reduce oral cancer–related morbidity and mortality.	Normal mucosa, benign lesions, or positive lesions were recorded in high-risk patients. 127 out of 8037 patients were diagnosed with precancerous or cancerous lesions.	Limited to a small population size	Level II, B
10	Shah, Bhushan, Akhtar, Singh, Garg, and Gupta, 2020	Cross-sectional study	Mouth self-examination (MSE) versus no MSE knowledge	539 people enrolled in the study derived from the Buksa tribe.	Mouth self-examination to improve oral cancer awareness and early detection in a high-risk population. It was found that 220 (40.8%) practiced MSE and 319 (59.2%) have never practiced MSE, where in totality, the prevalence of oral lesions identified by	Mouth Self-Examination, Questionnaires, and Screening tools done by health worker	Limited to small population size, health literacy, compliance, and geographical factors that contribute to compliance difficulties.	Level III, A/B

					health worker was 213 (39.5%), whereas MSE showed only prevalence rate of 69 (12.8%). MSE can improve oral health awareness, thought frequent efforts to educate and encourage is needed for success.			

Appendix D: Oral Screening Tool

Permanent Teeth PCOAT
(Primary Care Oral Assessment Tool – for patients age ≥ 6 years)

Permanent PCOAT Rev. 3-8-2016

Date: _____ Patient Name: _____ Date of Birth: _____

Management Guidelines: Applied Fluoride Varnish ☐

Referral to Dental Care:
☐ Not Indicated   ☐ Routine   ☐ Expedited

Patient Questions:

Question		
Do you have a dentist where you go to get your teeth cleaned and taken care of? If yes, who/where:_____	☐ Yes– seen within the last six months	☐ No ☐ Yes- seen more than six months ago
Have you had any cavities or fillings in the last 12 months?	☐ No	☐ Yes
Have you ever been told you have gum disease?	☐ No	☐ Yes
Have you had any teeth removed in past 36 months?	☐ No	☐ Yes
When do you eat sugary or starchy foods outside of meal time? (candy, pretzels, chips, bread, tortillas)	☐ Mostly at meal - times	☐ Outside of meal - times
When do you drink sugary beverages outside of meal time? (sweet coffee/tea, juice, soda pop, energy/sport drinks, cocktails, wine, beer)	☐ Mostly at meal - times	☐ Outside of meal - times
How often do you brush your teeth?	☐ Twice or more a day	☐ Once daily or less

Low Risk
☐ Reinforce routine dental care
☐ Set diet and oral hygiene management goals
☐ Use OTC fluoride toothpaste twice daily
☐ Recommend gum with xylitol as first ingredient

High Risk
☐ Set diet and oral hygiene management goals
☐ Instruct on OTC or prescription fluoride tooth - paste
  ☐ Prescribe high fluoride toothpaste for decay
☐ Gum with xylitol as the first ingredient
☐ Prescribe antibacterial mouth rinse to decrease oral bacteria

Health Care Provider History and Oral Exam:

Item			
Exposure to fluoride (toothpaste, rinse, Rx)	☐ Yes	☐ No	
Physical, behavioral or cognitive factors interfering with oral care (special needs, drug/alcohol overuse, tobacco use)	☐ No	☐ Yes	
Frequent vomiting/acid reflux (daily)	☐ No		☐ Yes
EXAM: Dry mouth/Xerostomia (reported or observed OR risk from Rx/radiation treatments)	☐ No		☐ Yes
Visible, heavy plaque on teeth	☐ No	☐ Yes	
Visible cavities (including white spot lesions)	☐ No	☐ Yes	
Gingivitis	☐ No	☐ Yes	
Fillings, crowns, retainers, braces, removable appliances	☐ No	☐ Yes	
Suspicious lesion on buccal mucosa, gingiva, tongue	☐ No		☐ Yes
	☐ Low	☐ High	☐ Extreme

Extreme Risk
☐ Set diet and oral hygiene self-management goals
☐ Recommend (see guidelines)
  ☐ Oral moisturizer for dry mouth
  ☐ pH neutralizing rinse for vomiting
  ☐ Fluoridated mouth rinse for decay
Prescribe (see guidelines)
  ☐ Anti-bacterial rinse to decrease oral bacteria
  ☐ High fluoride toothpaste for decay
☐ Gum with xylitol as first ingredient
☐ Topical fluoride every 3 months
☐ Evaluate medications to modify xerostomia

Self Management Goals
☐ Regular dental visits	☐ Water between meals
☐ Brush twice daily	☐ Quit plan for tobacco
☐ Use Rx Fl- toothpaste	☐ Less junk food/candy
☐ Fluoride mouth rinse	☐ No soda
☐ Less/no sweet drinks/alcohol	☐ Healthy snacks
☐ Drink water with fluoride	☐ Floss daily

Appendix E: Oral Screening Risk Tool

Permanent Teeth PCOAT
(Primary Care Oral Assessment Tool – for patients age > 6 years)
Patient Questions

Date: _____ Patient Name: _____ Date of Birth: _____

Do you have a dentist where you go to get your teeth cleaned and taken care of? If yes, who/where:	❑ Yes, within the last six months ❑ Yes, seen more than six months ago ❑ No	
Have you had any cavities or fillings in the last 12 months?	❑ No	❑ Yes
Have you ever been told you have gum disease?	❑ No	❑ Yes
Have you had any teeth removed in the past 36 months?	❑ No	❑ Yes
When do you eat sugary or starchy foods outside of meal time (candy, pretzels, chips, bread, tortillas)?	❑ Mostly at meal times	❑ Outside of meal Times
When do you drink sugary beverages outside of meal time (sweet coffee/tea, juice, soda pop, energy/sport drinks, cocktails, wine, beer)?	❑ Mostly at meal times	❑ Outside of meal Times
How often do you brush your teeth?	❑ Twice or more a day	❑ Once daily or less
Do you have vomiting or acid indigestion often?	❑ No	❑ Yes

Appendix F: Outcome Measures

Outcome Measures:

Outcome 1: The aim is to induce increased optimal oral health and identification of abnormalities such as lesions and abscesses in this PCU patient population.

Measure	Measure Type	Data Source	Sampling Method	Timing/Frequency
% of documented oral abnormalities in inpatient PCU patients	Process	EHR	All patients during the reporting period	Daily for 1 month

Standard Measure?**	No
Numerator	# of documented oral abnormalities in inpatient PCU patients
Denominator or Population	All patients during the reporting period.
Exclusions	None
Calculation/Statistic(s)	Percent/proportion
Goal/Benchmark	**25%**

Data Element	Variable Name	Definition	Data Type	Data Values & Coding	Restrictions/ Validation
Nurse/ Provider Identifier	Employee ID	System generated identifier	Continuous	N/A	Required
Patient Identifier	pat#	System generated unique identifier	Continuous	N/A	Required
Race	Race	Patient race	Categorical	1, White; 2, Hispanic or Latino; 3, Black or African American; 4, Native American or American Indian; 5, Asian/Pacific Islander; 6, Other.	
Date of Birth	Dob	Patient date of birth	Continuous	01-01-1900 to 12-31-2018	Date (M-D-Y)
Admit Date	admitDate	Date patient was admitted	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)
Discharge Date	disDate	Date patient was discharged	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)

Primary Diagnosis Code	dxCode	Primary diagnosis code (ICD-10)		ICD-10	
Oral screening	Teaching	Was the oral screening completed?	Dichotomous	1, Yes; 0, No	Required
Abnormalities	Abnormality	Was the oral abnormality reported and sent off for referral?	Dichotomous	1, Yes; 0, No	Required

Outcome 2: An aim is to increase the rate at which a nurse is doing oral screenings amongst their patients.

Measure	Measure Type*	Data Source	Sampling Method	Timing/Frequency
% of nurses conducting oral screenings in their head-to-toe assessment	Process	EHR	All patients during the reporting period	Daily for 1 month

Standard Measure?**	No
Numerator	# of documented oral screenings done by nurses in inpatient PCU patients
Denominator or Population**	All patients during the reporting period.
Exclusions	None
Calculation/Statistic(s)	Percent/proportion
Goal/Benchmark	**25%**

Data Element	Variable Name	Definition	Data Type	Data Values & Coding	Restrictions/ Validation
Nurse/ Provider Identifier	Employee ID	System generated identifier	Continuous	N/A	Required
Patient Identifier	pat#	System generated unique identifier	Continuous	N/A	Required
Date of Birth	Dob	Patient date of birth	Continuous	01-01-1900 to 12-31-2018	Date (M-D-Y)
Admit Date	admitDate	Date patient was admitted	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)
Discharge Date	disDate	Date patient was discharged	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)

| Primary Diagnosis Code | dxCode | Primary diagnosis code (ICD-10) | | ICD-10 | |
| Oral screening | Teaching | Was the oral screening completed? | Dichotomous | 1, Yes; 0, No | Required |

Outcome 3: An aim is to educate nurses and general providers about oral health and assessment, thus being able to teach oral health management to their patient population by discharge**.**

Measure	Measure Type*	Data Source	Sampling Method	Timing/Frequency
% of nurses conducting oral education at discharge	Process	EHR	All patients during the reporting period	Daily for 1 month

Standard Measure?**	No
Numerator	# of nurses conducting oral education to inpatient PCU patients at discharge
Denominator or Population**	All patients during the reporting period.
Exclusions	None
Calculation/Statistic(s)	Percent/proportion
Goal/Benchmark	**50%**

Data Element	Variable Name	Definition	Data Type	Data Values & Coding	Restrictions/ Validation
Nurse/ Provider Identifier	Employee ID	System generated identifier	Continuous	N/A	Required
Patient Identifier	pat#	System generated unique identifier	Continuous	N/A	Required
Date of Birth	Dob	Patient date of birth	Continuous	01-01-1900 to 12-31-2018	Date (M-D-Y)
Admit Date	admitDate	Date patient was admitted	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)
Discharge Date	disDate	Date patient was discharged	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)
Primary Diagnosis Code	dxCode	Primary diagnosis code (ICD-10)		ICD-10	
Oral screening	Teaching	Was the oral screening completed?	Dichotomous	1, Yes; 0, No	Required

Discharge Oral Education	Teaching	Was the oral screening education completed at Discharge?	Dichotomous	1, Yes; 0, No	Required

Outcome 4: An aim is to increase the ratio of abnormalities found during this assessment to be sent out for outpatient dental referrals.

Measure	Measure Type*	Data Source	Sampling Method	Timing/Frequency
% of abnormalities noted and sent out for out-patient dental referral	Process	EHR	All patients during the reporting period	Daily for 1 month

Standard Measure?**	No
Numerator	# of abnormalities noted and sent out for out-patient dental referral
Denominator or Population**	All patients during the reporting period.
Exclusions	None
Calculation/Statistic(s)	Percent/proportion
Goal/Benchmark	50%

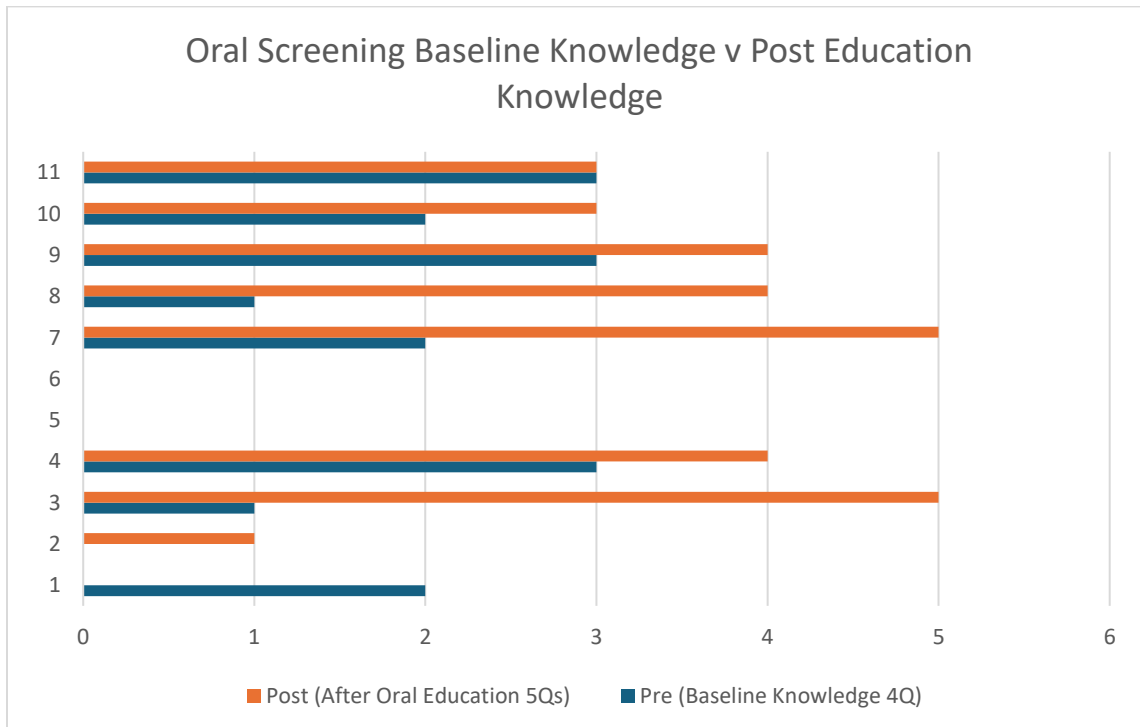| Data Element	Variable Name	Definition	Data Type	Data Values & Coding	Restrictions/ Validation
Nurse/ Provider Identifier	Employee ID	System generated identifier	Continuous	N/A	Required
Patient Identifier	pat#	System generated unique identifier	Continuous	N/A	Required
Date of Birth	Dob	Patient date of birth	Continuous	01-01-1900 to 12-31-2018	Date (M-D-Y)
Admit Date	admitDate	Date patient was admitted	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)
Discharge Date	disDate	Date patient was discharged	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)
Primary Diagnosis Code	dxCode	Primary diagnosis code (ICD-10)		ICD-10	
Oral screening	Teaching	Was the oral screening completed?	Dichotomous	1, Yes; 0, No	Required
Abnormalities	Abnormality	Was the oral abnormality reported and sent off for referral?	Dichotomous	1, Yes; 0, No	Required

Appendix G: Data Dictionary

Data Dictionary:

Data Element	Variable Name/Data Label	Definition/Purpose	Data Type	Data Values & Coding	Restrictions/ Validation
Nurse/ Provider Identifier	Employee ID	System generated identifier	Continuous	N/A	Required
Patient Identifier	pat#	System generated unique identifier	Continuous	N/A	Required
Race	Race	Patient race	Categorical	1, White; 2, Hispanic or Latino; 3, Black or African American; 4, Native American or American Indian; 5, Asian/Pacific Islander; 6, Other.	
Date of Birth	Dob	Patient date of birth	Continuous	01-01-1900 to 12-31-2018	Date (M-D-Y)
Admit Date	admitDate	Date patient was admitted	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)
Discharge Date	disDate	Date patient was discharged	Continuous	01-01-2018 to 12-31-2019	Date (M-D-Y)
Primary Diagnosis Code	dxCode	Primary diagnosis code (ICD-10)		ICD-10	
Oral screening	Teaching	Was the oral screening completed?	Dichotomous	1, Yes; 0, No	Required
Abnormalities	Abnormality	Was the oral abnormality reported and sent off for referral?	Dichotomous	1, Yes; 0, No	Required
Discharge Oral Education	Teaching	Was the oral screening education completed at Discharge?	Dichotomous	1, Yes; 0, No	Required
Abnormalities	Abnormality	Was the oral abnormality reported and sent off for referral?	Dichotomous	1, Yes; 0, No	Required

Appendix H: Pre-Test v Post Test (n=11)

Participant	Pre (Baseline Knowledge 4Q)	Post (After Oral Education 5Qs)	Pre Test Avg	Post Test Avg	Difference between baseline knowledge and post knowledge
1	2	0	50%	0%	-50%
2	0	1	0%	20%	20%
3	1	5	25%	100%	75%
4	3	4	75%	80%	5%
5	0	0	0%	0%	0%
6	0	0	0%	0%	0%
7	2	5	50%	100%	50%
8	1	4	25%	80%	55%
9	3	4	75%	80%	5%
10	2	3	50%	60%	10%
11	3	3	75%	60%	10%

Oral Screening Baseline Knowledge v Post Education Knowledge

■ Post (After Oral Education 5Qs)   ■ Pre (Baseline Knowledge 4Q)

P value and statistical significance:

The two-tailed P value equals 0.139
By conventional criteria, this difference is not statistically significant.
Confidence interval:
The mean of Group One minus Group Two equals -14.09
95% confidence interval of this difference: From -37.60 to 9.41
Intermediate values used in calculations:
t = 1.3358
df = 10
standard error of difference = 10.549
Review your data:

Group	Group One	Group Two
Mean	38.64	52.73
SD	30.34	40.27

Appendix I: Data Periods Statistical Analysis

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	45.084[a]	20	.001
Likelihood Ratio	46.715	20	<.001
Linear-by-Linear Association	.383	1	.536
N of Valid Cases	55		

a. 27 cells (90.0%) have expected count less than 5. The minimum expected count is .04.