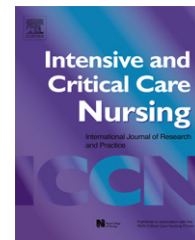




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ORIGINAL ARTICLE

One evidence based protocol doesn't fit all: Brushing away ventilator associated pneumonia in trauma patients

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KEYWORDS

Ventilator associated pneumonia;
Oral hygiene;
Evidence based protocol;
Trauma;
Nurses' attitudes and beliefs;
Mechanical ventilation;
Critical care

Summary

Objectives: Evaluate change in ventilator associated pneumonia (VAP) and nurse's attitudes, beliefs post implementation of an evidence based practice (EBP) oral hygiene protocol.

Methodology/design/setting: Descriptive pre and post test design in two critical care units in a Level One Trauma Community Hospital. Oral hygiene protocol data was reanalysed to examine effects in medical surgical and trauma subgroups.

Outcome measures: Oral care practices, attitudes and beliefs among nurses, and VAP rates according to Centers for Disease Control and Prevention guidelines.

Results: Trauma rates increased from 6.4% to 10.0% ($p=0.346$), and medical/surgical rates decreased from 3.3% to 1.0% ($p=0.042$). Results revealed changes in nurses' beliefs regarding pre-admission colonisation ($p=0.027$) and having adequate training. Nurses' perception of facility support improved, by having suitable equipment and readily available supplies. Foam swabs with moisture agents at 4 hours or less was 88.6% and toothbrush use at 12 hours or less was 71%, with significant changes in frequency of oral care post intervention.

Conclusions: Trauma patients present with unique characteristics which compromise oral care. Understanding risk and prognostic factors, mechanisms of transmission and systemic inflammatory response are important when implementing EBP protocols. Nurses' attitudes, beliefs are important, and staff adherence considered when initiating EBP changes.

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Introduction (literature review)

Ventilator associated pneumonia (VAP) is the second most common nosocomial infection in the United States (U.S.) and the most frequently occurring among mechanically ventilated (MV) patients (Genuit and Napolitano, 2007; Tablan et al., 2004). Centers for Medicare and Medicaid Services (CMS) listed VAP as a "reasonably preventable" disease that

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leads to increased morbidity, mortality and hospital costs, and stopped coverage in October 2009. Mortality rates from VAP are as high as 50%, with a 5–7 day increased length of stay, leading to an average additional cost of \$40,000 (Murray and Goodyear-Bruch, 2007; Safdar et al., 2005b; Weireter et al., 2009). VAP has become such a quality problem that it was added to the outcome indicators in the National Database of Nursing Quality Indicators (Montalvo, 2007).

The National Healthcare Safety Network (NHSN) reported that trauma intensive care units (ICUs) were only second to burn ICUs in the incidence of VAP (Edwards et al., 2009) and represented 83% of all nosocomial pneumonias (Vincent et al., 2001). Three types of trauma related pneumonias include early onset, late onset and immune compromised (Craven, 2000; Hedrick et al., 2008; Kashuk et al., 2010; Magret et al., 2010).

Prevention is the most effective method to reduce VAP. Colonisation of the oropharynx is a critical risk factor for developing VAP (Bergmans et al., 2001; Crnich et al., 2005; Fourrier et al., 2005; Garcia, 2005; Grap et al., 2003; Houston et al., 2002; Koeman et al., 2006; Kollef, 2004; Munro et al., 2006; O'Keefe-McCarthy, 2006; Rello et al., 2003; Safdar et al., 2005a; Tantipong et al., 2008). Growth of pathogenic bacteria in dental plaque provides a microhabitat for organisms and an opportunity for adherence on tooth surfaces. Within two days of no plaque agitation, bacteria attaches to tooth surfaces where micro colonies of gram positive and gram negative cocci and rods develop and bio films begin. These bio films extend to subgingival regions where gram-negative cocci and rods cause inflammation. Micro colonies protected by extracellular slime layers are typically resistant to systemically administered antibiotics and locally applied antimicrobials. Physical removal of plaque bio films occurs with direct agitation of gum and tooth surfaces.

Aim

The aim of this study is to evaluate the effectiveness of an EBP oral hygiene intervention to reduce VAP rates in trauma patients and measure relationships among nurse's attitudes, beliefs, training, education and frequency of delivery of oral hygiene in trauma patients.

Methods

Setting

A descriptive pre and post test design was conducted in two critical care units in a Level One Trauma Community Hospital. Data from a previous study involving an EBP oral hygiene protocol was reanalysed to examine the effects in medical surgical and trauma subgroups (Zimmerman et al., 2011).

Participants

Staff

A total of 107 nurses, 57 Trauma registered nurses (RNs) and 50 Cardiovascular RNs employed or contracted by the

hospital who provided direct patient care in both units were asked to participate in the study. Registry nurses who worked as contract staff in both units was not included in staff surveys as these nurses do not provide care for ventilated patients.

Patients

Inclusion criteria were all adult male and female patients, admitted as inpatients to the cardiovascular intensive care and trauma intensive care unit that required endotracheal intubation and were MV. Patients were followed for 48 hours after removal of the ventilator or discharged from the critical care unit for development of VAP. Patients who were intubated and ventilated at the time of or within 48 hours before the onset of pneumonia were included. Exclusion criteria were all adult male and female patients with pneumonia present or incubating on admission to the critical care unit.

Instruments and measures (reviewer #2: used instrument must be fully clarified and taken out of results)

Patients

VAP was diagnosed according to Centers for Disease Control and Prevention (CDC) guidelines, which state that patients must be MV for greater than 48 hours and exhibit at least three out of five of the following symptoms: fever, leukocytosis, change in sputum (colour and/or amount), radiographic evidence of new or progressive infiltrates and worsening oxygen requirements (Tablan et al., 2004).

Staff

Nurse attitudes, beliefs, adequacy of training, availability of supplies and education were measured with a 27-item survey designed to gather information related to current oral care practices, training and attitudes among nurses in ICUs across the U.S. (Furr et al., 2004). The 27-item survey measured nurses' attitudes and beliefs towards oral care. Indicators regarding attitudes were measured on a 5 point Likert scale (1 = strongly agree, 2 = somewhat agree, 3 = neither agree nor disagree, 4 = somewhat disagree or 5 = strongly disagree). Beliefs were measured on a 10 point Likert scale (1 = least likely and 10 = most likely).

Demographic information included age, total years experience in ICUs, work shift, type of ICUs worked and original nursing education degree. Surveys were distributed to nurses in trauma and cardiovascular ICUs.

Procedure

Surveys with a letter describing the study were distributed and nurses were given one month to complete, once baseline data collection was completed, education for the oral care protocol began. Upon completion of staff education, observation of treatment fidelity was initiated.

Intervention was implementation of an EBP oral care protocol for all MV patients. Critical care educators provided

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