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EC NURSING AND HEALTHCARE
Research Article

Effectiveness of Routine Patient Cleansing with Chlorhexidine Gluconate for Infection Prevention in Adult Intensive Care Unit

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Received: July 05, 2021; **Published:** August 30, 2021

Abstract

Health care-associated infections are among the most common types of adverse events [19], reported in acute care settings, which includes Ventilator Associated Pneumonia (VAP) and Central Line Associated Bloodstream Infection (CLABSI). Management of these infections incurs significant health care costs compounded by lengthier hospital stay. Initiated in Adult Intensive Care Unit, applying an evidence-based strategy by bathing patient daily with 2% chlorhexidine cloths to prevent healthcare acquired infection like VAP and CLABSI. All patient admitted in AICU were included but patient with skin allergy, with open wounds and ICU stay is less than 48 hours were excluded in the piloting and implementation phase. There were a total of 462 patient admitted in Adult Intensive Care Unit. Out of these admissions 167 (36%) were included in the intervention. Measurement of effectiveness by monthly HAI rate of VAP and CLABSI monitoring during the entire piloting and implementation phase based on data from infection control monthly report. Data for nine months from January to September 2019 starting from first three months of pilot implementation and six months adoption was compared from data of last year 2018. Results indicate that the intervention of bathing patient with chlorhexidine is effective in reducing level of pathogens in the skin thus preventing the occurrence of Ventilator Associated Pneumonia and Central Line Associated Bloodstream Infection. Given the evidence as chlorhexidine bathing was beneficial to decrease the incidence of VAP and CLABSI. Initiative utilizing evidence based practice for patient safety and improving outcome is a step that every institution must be done.

Keywords: *Chlorhexidine 2%; Bathing; Intensive Care Unit; Infection Control; Ventilator Associated Event; Central Line Associated Blood Stream Infection; Blood Stream Infection; Hospital Acquired Infection*

Introduction

Among the most common types of adverse events reported in acute care settings is Health care-associated infections, it has been reported that approximately 10% of patients hospitalized for acute care in the United States with health care-associated infections died during their stay [8] and the infection rates of difficult-to-treat pathogens, such as methicillin-resistant Staphylococcus aureus (MRSA) have steadily and significantly increased over time all over the world that can lead to considerable morbidity and mortality.

Management of these infections incurs significant health care costs compounded by lengthier hospital stay. Infections are particularly a concern in acute or critical care settings when commonly used medical devices such as ventilator and catheters provide routes for bacteria to enter the bloodstream. Thus, cleaning skin surfaces prior to procedures that would breach the epithelial barrier or on an ongoing basis at venous access sites provides one strategy to reduce the risk of infection and it was based on evidence with a big impact on patient safety it can improve the quality of patient care and decreased mortality rate associated with HAI and patient stay in Adult Intensive Care Unit (AICU). Chlorhexidine gluconate (CHG) is a common and safe antimicrobial agent and has been used widely in hand hygiene and skin disinfection.

During the past decade, a number of studies have examined the use of chlorhexidine bathing as an infection prevention strategy [5]. There is rich evidence that chlorhexidine bathing can prevent colonization and infection with health care-associated pathogens and reduce dissemination to the environment and the hands of personnel.

A multicenter, cluster-randomized, crossover trial is conducted in critically ill children in 10 ICUs. Bathing was performed using 2% chlorhexidine-impregnated cloths [4]. Chlorhexidine bathing resulted in a statistically significant reduction in bacteremia [17].

Background/Significance

Initiative to utilized evidence-based practice for patient safety and improving outcome is a step that every institution must be done [23]. SFHP-Dammam commitment to provide safe practice, our enthusiasm to use evidence based approaches to nursing care delivery and to integrate the best available scientific knowledge with nursing expertise prompted the conceptualization of this Evidence Based Practice Initiative. It aimed to provide patient safety by preventing further harm to patient, improve the quality of patient care based on best available evidences, decrease HAI rate and patient stay in Adult Intensive Care Unit, proving the effect of bathing with chlorhexidine as what the evidence stated and adopting the practice.

Patients colonized or infected with health care-associated pathogens often carry the organisms on their skin [5]. Chlorhexidine gluconate (CHG) is an antiseptic that can be used on skin and environmental surfaces, and has displayed broad-spectrum activity against several organisms, including multi-drug resistant (MDR) bacteria. Many evidences show the effectiveness of chlorhexidine (CHG) bathing, in adult intensive care patients, to reduce infection.

Materials and Methods

This is a unit pre and post intervention, an evidence based project initiated by Adult Intensive Care Unit applying a new strategies to prevent healthcare acquired infection in cooperation with Infection Control Department. After the appraisal of evidences and proposal approval the project started the three months piloting from January 1, 2019 until March 31, 2019. Before the commencement of pilot implementation, nursing staff was provided an orientation on the implementation process. All patient admitted in AICU were included but patient with skin allergy, with open wounds and less than 48 hours stay were excluded in the piloting and implementation phase. Resources used were Chlorhexidine gluconate 0.2% solution and plain bathing whips which is available in AICU.

Patients were bathed daily with 2% chlorhexidine cloths during the intervention period Implementation compliance monitoring was done by completing a checklist that was included in the night shift report done by charge nurses. The checklist reflected patient that were included and excluded in the care and the reason for exclusion. Effectiveness measurement by monthly HAI rate of VAP and CLABSI monitoring during the entire piloting phase based on data from Infection Control monthly report. To strongly prove the effectiveness, upon initial implementation of practice, data for nine months starting from first three months of pilot implementation and six months adoption that was started April 2019- September 2019 was compared from data of last year 2018. As method of evaluation Infection Control department quarterly report of the incidence density of VAP and, CLABSI for patients undergoing ventilation in adult intensive care unit was utilized by comparing data report.

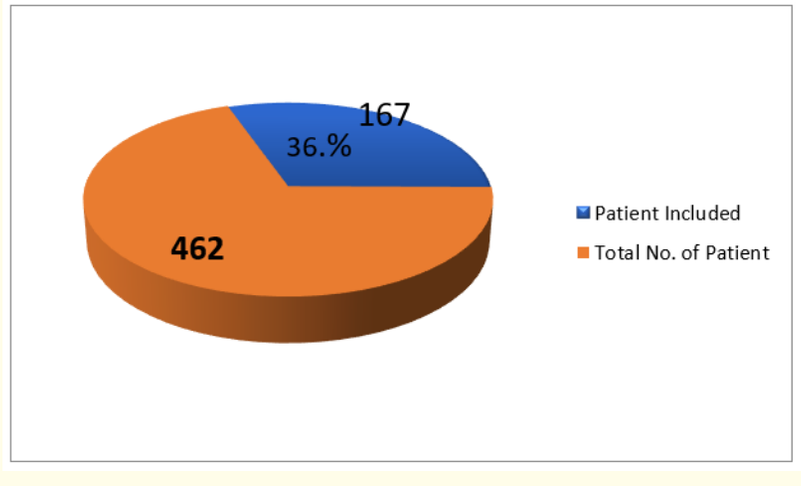

Figure 1: *Adult intensive care unit population during implementation.*

Month	Number of Patient	Missed Days
January	15	1
February	24	4
March	14	3
April	16	2
May	0	0
June	28	3
July	25	9
August	25	3
September	20	2

Table 1: *Patient admitted in adult intensive care unit during pilot/implementation phase.*

Result

During the pilot testing and implementation there were a total of 462 patient admitted in Adult Intensive Care Unit. Out of these admissions 167 (36%) were included in the intervention, some were excluded due to following reasons patient were not on ventilator, with open wound and skin allergy and ICU stay is less than 48 hours. Mostly of the cases included were on ventilator and were patient with ICU stays greater than 48 hours, representing patient eligible for acquisition of healthcare acquired infection. In addition, there is also one complete month wherein the pilot phase is not fully implemented due to unavailability of materials and reflected as missed days. Comparing the data of quarterly incidence of VAP and monthly incidence of CLABSI results indicates that the intervention of bathing patient with chlorhexidine is effective in reducing level of pathogens in the skin thus preventing as well as decreasing the occurrence of Ventilator Associated Pneumonia and Central Line Associated Infection. A multicenter randomized trial done [3] evaluating the effect of daily bathing with chlorhexidine impregnated washcloth supported this result. A significant decreased in quarterly incidence of VAP from 1st – 3rd Quarter for the year 2019 with total rate of 4.27 compared to year 2018 with total rate of 7.15. As for CLABSI there is a no reported incidence from 1st - 3rd Quarter of 2018 and 2019 (Figure 2 to 4).

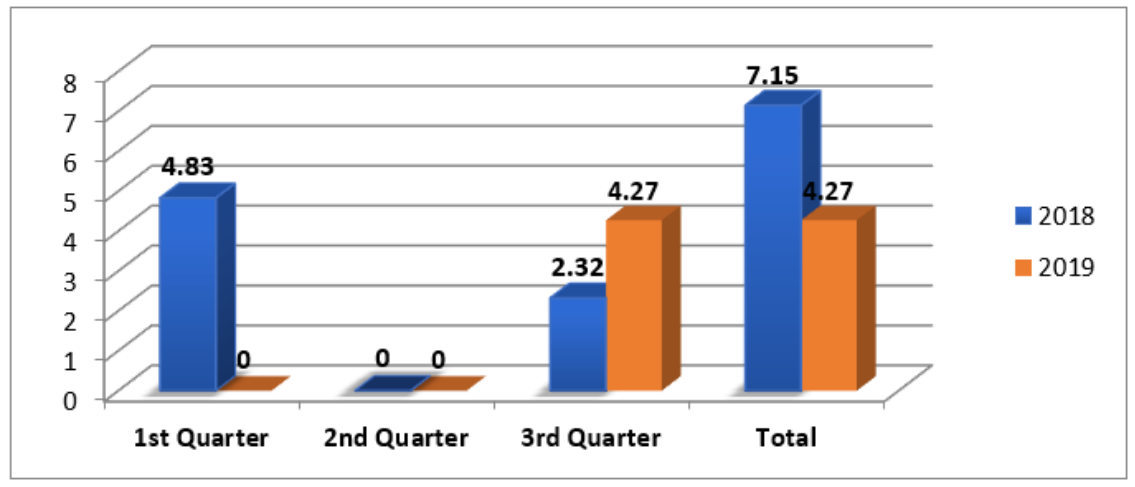

Figure 2: *Quarterly VAP rate (Comparison 1st – 3rd Quarter 2018, 2019).*

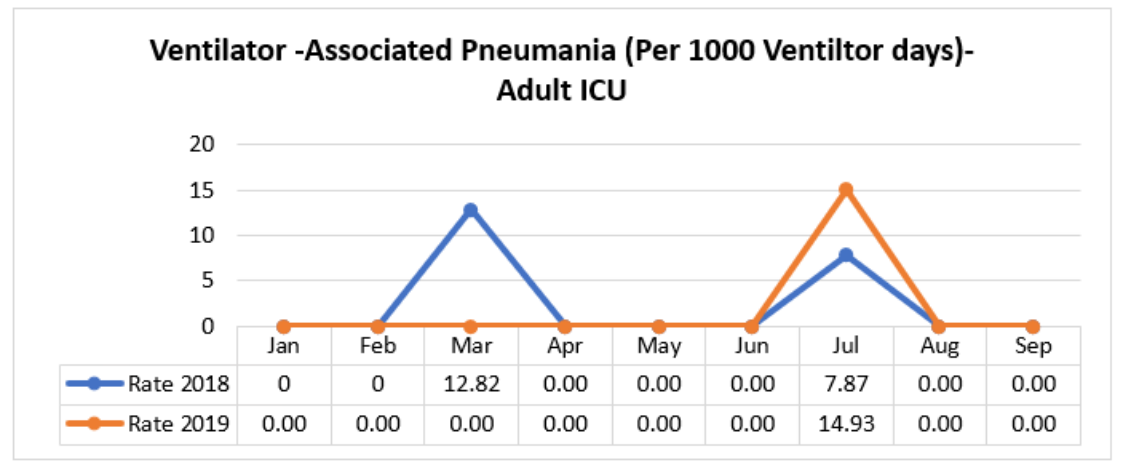

Figure 3: *VAP monthly rate/1000 ventilator days (Comparison 1st – 3rd Quarter 2018, 2019).*

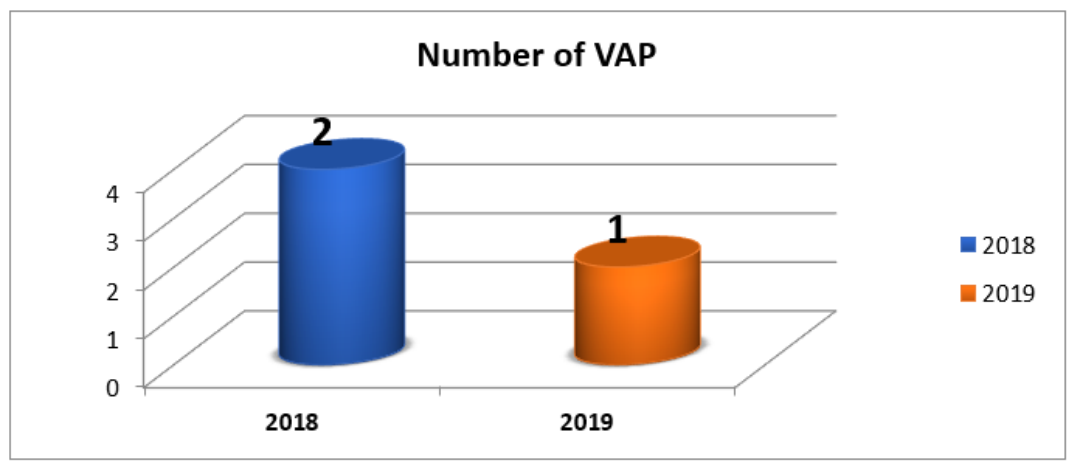

Figure 4: *Total number of VAP (Comparison 1st - 3rd Quarter 2018, 2019).*

Sustainability

Creation of culture where EBP is valued and expected continuous monitoring measurement and review of every practice adopted for enhancement. Dissemination of result for motivating staff. Support of senior leadership to maintained share governance giving attention to staff inquiry and concerns for every practice that they found out to have gap and possibly to innovate new practice. Staff participation contributes to an organizational culture that emphasizes collaboration in working toward program sustainability [11].

Discussion

Infections acquired during a hospital stay have been shown to be preventable. In particular this infection includes Ventilator Associated Pneumonia (VAP) and Central Line Associated Bloodstream Infection (CLABSI) due to more invasive procedures, mechanical ventila-

tion, and critical illness of patients being cared for in the adult intensive care unit (AICU) are at greater risk of HAI and associated poor outcomes. What triggers to conceptualize the project were safety and risk management and the introduction of best practice with high level of evidence for its effectiveness. Scope of the problem is unit-based extending to department and institutional. Observed compliance of the AICU nurses during the pilot implementation is commendable, showing their commitment to patient safety through updated practice. Though, some missed days during the implementation period due to unavailability of materials. The hospital annual data of VAP shows clear improvement over the last year 2018 with decreased incidents for 2019. These data were based on SFHD VAP rate to NDNQI benchmarking which indicates clear improvement.

Conclusion and Implication to Practice

Given the evidence as chlorhexidine bathing may be beneficial to decrease the incidence of VAP and CLABSI, one of the guiding principles of infection prevention is that effective implementation of interventions requires monitoring of compliance of staff with regular feedback on performance. There is a need to develop effective strategies to monitor compliance with bathing protocols and provide feedback to personnel. Enough supply of material to sustain the practice is necessary.

Acknowledgement

We would like to thank the following people for making this evidence based-project becomes a reality. First, Ms. Amal Al Mutairy former Evidence Based Practice Champion of Adult Intensive Care Unit (AICU), Charge Nurses of AICU Mr. Bahaa Wisha, Ms. Ranit Thomas and all the unit staff nurses who have made a significant contribution to properly implement this practice from the pilot implementation until the final adoption of the practice. Your dedication and commitment in improving the care delivery to your patient surpass everyone`s expectation.

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Volume 3 Issue 9 December 2021