2021

Improving Nursing Knowledge on Antibiotic Therapy to Prevent Pneumonia Readmissions

Muskuda Deen
Walden University

Walden University

College of Nursing

This is to certify that the doctoral study by

Muskuda Deen

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Mary Verklan, Committee Chairperson, Nursing Faculty
Dr. Lilo Fink, Committee Member, Nursing Faculty
Dr. Patti Urso, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2021

Abstract

Improving Nursing Knowledge on Antibiotic Therapy to Prevent Pneumonia

Readmissions

by

Muskuda Deen

MSN, Walden University, 2014

BSN, Walden University, 2011

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

February 2021

Abstract

Lack of education on the appropriate use of antibiotic therapy can lead to an increase in early readmissions for patients with community-acquired pneumonia (CAP). The purpose of this project was to educate medical-surgical nurses at an inpatient hospital in the southern region of the United States on the appropriate use of antibiotic therapy to decrease early CAP readmissions. The project practice question was whether the infection control clinical practice guidelines would increase the medical-surgical nurses' knowledge on the appropriate use of antibiotic therapy to decrease the 30-day readmission rates for patients diagnosed with CAP. The staff education development was guided by the Iowa model and the self-care theory to achieve the project objectives. The sources of evidence to support the project were through a literature review and data made available from the project site hospital. The project used a pretest and posttest 10-question questionnaire and de-identified retrospective and prospective data for patients with early CAP readmissions. The participants were thirteen registered nurses from three medical-surgical units in the inpatient hospital. Results of the findings using descriptive statistics revealed a 91.5% increase in nurses' knowledge on the appropriate use of antibiotic therapy and a decrease in early CAP readmissions from 20 (52.3%) to 2 (6.67%) in 1 month following implementation. The recommendation was made to continue using the staff educational intervention to increase nurses' knowledge and decrease early CAP readmissions. Implications for positive social change that result from this project are the increase of knowledge among nurses, which can foster patient satisfaction, and reduce the financial burden of preventable early CAP readmissions.

Improving Nursing Knowledge on Antibiotic Therapy to Prevent Pneumonia

Readmissions

by

Muskuda Deen

MSN, Walden University, 2014

BSN, Walden University, 2011

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

February 2021

Dedication

To God Almighty, the Provider, the Giver of Knowledge, Comforter, and Understanding. I am dedicating the project to the entire staff of the inpatient hospital that participated in the project and the Professional Practice research committee for their support and for allowing me to develop the project to improve our patients' care.

Table of Contents

List of Tables

Section 1: Nature of the Project

Introduction

In the inpatient care hospital setting, the 30-day readmission rates for community-acquired pneumonia (CAP) have increased linearly since 2016. The inpatient hospital benchmark for CAP is 0.88% (Dogoda & Rahbani, 2018); however, the inpatient readmission rate for CAP was 5.60% in 2017. The inappropriate use of antibiotic treatment was identified as a factor associated with pneumonia readmission in an inpatient hospital in the southern region of the United States. The lack of appropriate use of antibiotic treatment for patients diagnosed with CAP caused early readmissions and serious complications. Past studies have suggested that antimicrobial stewardship (AMS) activities were not used as they should be, and nurses could improve AMS by promoting antimicrobial principles (Fisher et al., 2018; Lisenby et al., 2015; Skinner et al., 2018). Antibiotic treatment had proven to be an effective therapy when given within the first 4 hours before admission (Agency for Healthcare Research and Quality [AHRQ], 2017). The purpose of this practice project was to increase medical surgical nurses' competency and knowledge on the appropriate use of antibiotic therapy using infection control guidelines to educate the medical surgical nurses. In Section 1, I discuss the problem statement, purpose statement, nature of the project, and the significance of the project.

Problem Statement

According to Viasus et al. (2017), CAP is a significant worldwide issue that can lead to serious complications. In an inpatient hospital setting, the 30-day readmission rates for CAP have increased linearly since 2016. The inpatient hospital benchmark for

CAP is 0.88% (Dogoda & Rahbani, 2018); however, the inpatient readmission rate for CAP was 5.60% in 2017. A retrospective medical record review was conducted from June 1, 2017 to November 30, 2017 for patients diagnosed with CAP who were readmitted within 30 days. Based on the medical records from the patients diagnosed with CAP, it was determined that the highest risk factor for CAP readmission rates was the inappropriate use of antibiotic therapy.

Although the use of antibiotic therapy has shown to be an effective method in decreasing the pneumonia readmissions, the antibiotic treatment could be ineffective if not used appropriately (Garde et al., 2015; Mansouri et al., 2011). Choudhury et al., (2011) noted that the prolonged duration of antimicrobial therapy and the ineffective transition from intravenous to oral antibiotic has proven to cause a delay in CAP treatment. An antibiotic stewardship program was developed in 2007 by the Infectious Diseases Society of America and the Society of Healthcare Epidemiology of America as a set of guidelines for the implementation and measurement of the success of the antibiotic therapy (Kalil et al., 2016). Also, past researchers have suggested that AMS activities are not used as they should be to control and prevent the infection (Fisher et al., 2018; Lisenby et al., 2015; Skinner et al., 2018).

Reducing the 30-day readmission rates has become a priority for many healthcare organizations and policymakers to improve patients care and reduce costs (Lisenby et al., 2015; Skinner et al., 2018). As a result, it is imperative that nurses understand the importance of appropriate use of antibiotic treatment to prevent CAP readmission (Goering, 2018). The implementation of an infection control educational intervention

with its patient-centric focus was significant to nursing practice because it would improve

the consumer health event in the disease prevention approach, decrease healthcare cost

and decrease the readmission rates for patients diagnosed with CAP.

Purpose Statement

The purpose of this project was to determine if the infection control clinical

practice guidelines would increase medical-surgical nurses' competencies and knowledge

of the appropriate use of antibiotic therapy to decrease 30-day readmission rates for

patients diagnosed with CAP. In the inpatient hospital setting, there was a gap in practice

on the use of antimicrobial treatment associated with the readmission rates for patient

diagnosed with CAP. The need to decrease the 30-day readmission rates for patients with

CAP was identified by administration leaders and nurse managers in an inpatient hospital

in the southern region of the United States. The project outcome was to identify the

infection control clinical practice guidelines as an effective educational intervention to

increase nurses' knowledge on the appropriate use of antibiotic therapy when caring for

patients diagnosed with CAP.

Nurses must be knowledgeable of antibiotic principles in caring for patients

diagnosed with CAP. With an increase in medical-surgical nurses' knowledge and

competencies, the nurses would be better equipped in identifying the antibiotic principles

and responding to patients diagnosed with CAP in a timely manner. In addition, the

project addressed the practice gap by helping nurses identify the significance of antibiotic

treatment to decrease readmissions for patients diagnosed with CAP, decrease healthcare

spending, and improve patients' outcomes.

Nature of the Doctoral Project

A staff education program was implemented to address the inappropriate use of antibiotic therapy associated with CAP readmissions in an inpatient hospital in the southern region of the United States. Nurses' in the three medical-surgical units in the inpatient hospital participated in the project as most of the patients admitted for pneumonia were placed in the medical-surgical units. The purpose of the project was to increase the medical-surgical nurses' knowledge on the appropriate use of antibiotic treatment to decrease CAP readmissions.

The project was developed using a before (pretest) and after (posttest) design. A retrospective review of the electronic medical records (EMRs) of patients admitted for CAP was conducted before the educational intervention to determine the number of early readmissions for patients diagnosed with CAP. The director of quality improvement obtained the data from the EMRs of the patients who had early readmission for CAP for the month prior to the educational event and provided me with deidentified data regarding the early readmissions. The data were encrypted and entered into my personal password-protected computer and kept in a private, locked office.

Nurses in the three medical-surgical units were given a pretest from an infection control clinical practice guidelines 10-question questionnaire obtained from the Centers for Disease Control and Prevention (CDC) to assess their knowledge on antibiotic treatment. The infection control questionnaire contained 10 multiple-choice questions related to antibiotic principles such as de-escalation treatment, duration, drug resistance in pneumonia (DRIP) score, procalcitonin level, empiric antibiotic treatment and

conversion from intravenous (IV) to oral antibiotic. Answering all the questions correctly on the questionnaire provided a total score of 20 points. The nurses were given 30-minutes to complete the 10-qestion questionnaire in the conference room on the unit. I was the project leader, and I gave out and retrieved the 10-question questionnaire from nurses. Using a pencil, the nurses completed the 10-question questionnaire. The pre-tests 10-question questionnaires were placed by the nurses in an envelope marked "*pre-test*". I then placed the pre-test envelope in a secure, locked file cabinet located in a private, locked office. Participants were advised not to write their names on any questionnaires as all data were confidential. The data were uploaded onto an Excel spreadsheet and encrypted on my password-protected personal computer locked in a private office.

An infection control educational intervention using a poster and lecture on antibiotic therapy was used to educate the nurses after completion of the pretest. The educational session was conducted in the inpatient hospital over a 2-weeks period using 30-minute luncheon learning session to ensure that all nurses received the education. The conference room on the unit was used for the learning, and I developed the poster and presented the lecture on antibiotic therapy. The poster content contained information antibiotic principles such as de-escalation treatment, DRIP score, procalcitonin level, empiric antibiotic treatment, and conversion from IV to oral antibiotic. Before the lecture, nurses were given a sheet to sign their names to make sure all nurses receive the information. The nurses had 15-minutes to ask questions on the antibiotic principles after the educational intervention.

A posttest was given with the infection control clinical practice guidelines questionnaire after the educational intervention to assess the nurses' knowledge for comparison with pretest scores. The infection control questionnaire contained 10 multiple-choice questions related to antibiotic principles such as de-escalation treatment, duration, DRIP score, procalcitonin level, empiric antibiotic treatment and conversion from IV to an antibiotic. Answering all the questions correctly provided a total score of 20 points. The nurses were given 30-minutes to complete the 10-question questionnaire in the conference room on the unit. I was the project leader, and I gave out and retrieved the 10-question questionnaires from the nurses. Using a pencil, the nurse completed the 10-question questionnaires. The completed posttests were placed by the nurses in an envelope marked "*posttest*". I placed the posttest envelope in a secure, locked file cabinet located in a private, locked office. Participants were advised not to write their names on any questionnaires as all data remained confidential. The data were uploaded onto an Excel spreadsheet and encrypted on my password-protected personal computer locked in a private office.

A prospective chart review was conducted a month after the educational intervention to determine the number of early readmissions for patients diagnosed with CAP. The director of quality improvement reviewed the EMRs of the patients who had early readmission for CAP for the month after to the educational event and provided me with deidentified data regarding the early readmissions. The data were encrypted and entered into my password-protected personal computer kept in a private, locked office.

Data were analyzed by using descriptive statistic to compare the pretest and posttest scores. Grove et al. (2013) noted that the descriptive statistics are used to analyze data and allows the investigator to describe and interpret the data in a meaningful way. A spreadsheet was used to compare the number of patients with early readmissions for CAP before the educational intervention, and the number of early readmissions for CAP after the educational intervention.

The sources of evidence were obtained from a literature review and from project-generated data from the inpatient hospital that was the project site. A literature search was conducted using PubMed, Medline, CINAHL, EBSCO, Ovid and the Cochrane Library to identify articles related to medical-surgical nurses' use of antibiotic therapy and CAP readmission rates published between 2010- and 2019. The keywords used to conduct the search were *antibiotic therapy, community-acquired pneumonia, 30-day readmission, nursing education on antibiotic treatment, antibiotic stewardship program, CAP risk factors and adherence to antibiotic therapy*.

Significance

Despite the treatments and nursing care, CAP readmission rates continue to rise and are a leading cause of death in the United States (Lisenby et al., 2015). Alba and Amin (2014) noted that more than one million people are admitted with CAP every year, of which 50,000 die from the disease and 140,000 are readmitted for CAP. The inappropriate use of antibiotic treatment has been associated with CAP readmission rates in the project site inpatient hospital. Such a problem has caused an increase in the inpatient hospital financial budget and negatively affect patients' quality of care. As a

result, it was significant to educate nurses on the appropriate use of antibiotic treatment to decrease CAP readmissions. Nurses play an important role in reducing the readmission rates, and an educational intervention would empower nurses to educate patients on CAP and to comply with the antibiotic therapy.

CAP readmission rates continue to rise posing financial burden on healthcare spending. Alba and Amin (2014) noted that healthcare organizations spend more than 10 billion dollars every year for CAP readmissions. Also, health care organizations are not being reimbursed for care provided to patients readmitted for CAP within 30-day of discharge. Mather et al. (2014) found that a reduction in CAP readmission had been identified as one of the markers for quality patient care. This doctoral project has the potential to improve patient care, and patient satisfaction and decrease CAP readmission rates.

The project may be transferable to other units in the inpatient hospital and similar inpatient hospital settings to educate nurses and patients diagnosed with CAP on the appropriate use of antibiotic treatment. Also, the project may be transferable to public health departments to educate individuals, families, and communities on the appropriate use of antibiotic treatment. Identifying antibiotic therapy's association with CAP readmission rates was significant and relevant to nursing practice; in past studies, researchers have suggested that antimicrobial therapy is not properly used (Fisher et al., 2018; Lisenby et al., 2015; Skinner et al., 2018).

The positive implications for social change that would result from this study include increased nurses' efforts to collaborate with other healthcare disciplines on the

appropriate use of antibiotic treatment for patients diagnosed with CAP. The project

provided an opportunity for social change as nurses, and patients could gain a deeper

understanding of the disease process and assist patients with ownership of their care. The

outcome of the project would be an improvement in the nurses' skills in caring for

patients with CAP and increased knowledge of the proper use of antibiotic therapy. The

nursing profession is continuously striving for new knowledge and best practice. Nurses

must engage in life-long learning to improve their knowledge and clinical skills, and the

educational intervention related to the appropriate use of antibiotic therapy could change

the nursing culture to enhance improvement in performance and patient satisfaction.

Finally, the finding from this project could be used by policymakers and hospital leaders

to design future pneumonia readmission prevention programs.

Summary

CAP is a significant problem that can lead to severe complications and death.

Despite nursing care and antibiotic treatment, CAP readmission rates continue to rise and

cause substantial financial burden on healthcare spending. In addition, healthcare

organizations are not receiving reimbursement for patients readmitted with CAP within

30-days of discharge. In an inpatient care hospital in the Southern region of the United

States, CAP readmission rates had increased linearly since 2016. The inappropriate use of

antibiotic treatment was associated with early readmissions for CAP in the project site

inpatient hospital. The practice problem for this project was to determine if the infection

control clinical practice guidelines would increase the medical-surgical nurses'

knowledge and competencies on the appropriate use of antibiotic therapy to decrease the

30-day readmission rates for patients diagnosed with CAP. An educational intervention was developed and provided information on antibiotic principles, such as de-escalation treatment, duration, DRIP score, procalcitonin level, empiric antibiotic treatment and conversion from IV to oral antibiotic; this intervention was used to educate medical-surgical nurses in the inpatient hospital. A before (pretest) and after (posttest) design was used in the project to assess the nurses' knowledge on the appropriate use of antibiotic therapy. A retrospective review of the EMRs of patients admitted for CAP was conducted before the educational intervention to determine the number of early readmissions for patients diagnosed with CAP. The infection control 10-items questionnaire on antibiotic therapy was used for the pretest and posttest. Also, a prospective chart review was conducted a month after the educational intervention to determine the number of early readmissions for patients diagnosed with CAP. The data were analyzed using descriptive statistic to compare the pretest and posttest scores to identify any change, and a spreadsheet was used to compare the number of patients with early readmissions for CAP before the educational intervention, and the number of early readmissions for CAP after the educational intervention.

Section 1 included details on the problem with CAP readmission rates associated with antibiotic therapy, the practice-focused question and the approach used to decrease the readmission rates. Section 2, I discuss the introduction, concepts, models, and theories; relevance to nursing practice; local background and context; the role of the DNP student; and role of the project team.

Section 2: Background and Context

Introduction

CAP is the most common reason for readmissions and a significant cause of death in the United States (Jain et al., 2018). Moreover, it accounts for more than one million hospitalizations in the United States annually leading to costs of more than 9.7 billion dollars every year (Adamuz et al., 2015). In an inpatient hospital in the southern region of the United States, the 30-day readmission rates for CAP has increased linearly since 2016. The inpatient hospital benchmark for CAP is 0.88% (Dogoda & Rahbani, 2018); however, the inpatient readmission rate for CAP was 5.60% in 2017. The inappropriate use of antibiotic treatment has been identified as a factor associated with readmission for patients with CAP. As a result, the practice problem of this doctoral project was to determine if the infection control clinical practice guidelines would increase the medical-surgical nurses' competencies and knowledge on the appropriate use of antibiotic therapy to decrease the 30-day readmission rates for patients diagnosed with CAP. In Section 2, I present the concepts, models, and theories applicable to the study; the relevance of the project to nursing practice; the local background and context; the role of the DNP student; and the role of the project team.

Concepts, Models, and Theories

When considering a practice protocol to decrease the readmission rates for patients diagnosed with CAP, it was significant to use the best evidence-based model to guide the clinical practice problem. With the implementation of the new CAP readmission program, the Iowa model was the best evidence-based model to direct the

staff educational intervention. The Iowa model focuses on change implementation using evidence-based practice (White & Spruce, 2015).

The Iowa model was used to direct the program for CAP readmissions to elicit a change and help nurses transfer project findings to clinical practice to improve patient care. The Iowa model was developed in the early 1990s by a group of nurses from University of Iowa hospitals, clinics, and the College of Nursing to promote quality patient care (Titler et al., 2001). The model described the essential aspects used to guide a change: (a) identifying the problem, (b) defining a plan, (c) forming a team, (d) gathering evidence, (e) analyzing and critiquing evidence, (f) determining the appropriateness of the collected information, (g) evaluating what change was appropriate for the practice (h) implementing the change, and (i) disseminating the results (White & Spruce, 2015).

The Iowa model highlights the significance of nurses using an evidence-based approach to implement a change through strategies that identify the problem, determine the purpose, use evidence to guide the intervention and apply findings to improve patient care. In identifying the problem of the increase in CAP readmission rates, the Iowa model provided support for an intervention to decrease readmission rates. The Iowa model provided support for the project by establishing the expectations of the project and supporting the project question to ensure the appropriateness of data collection and literature reviews. In addition, the model guided the project in analyzing and critiquing data through assessing for strengths and weaknesses, and engaging the medical-surgical nurses in the learning environment using a strategy such as lunch and learning. Finally, the Iowa model guided the project with the implementation process, evaluation and

dissemination of the findings by increasing staff understanding of the problem, creating awareness, assisting staff in adopting the change and integrating the evidence-based findings in practice.

Self-Care Theory

Orem's self-care framework served as the theoretical framework for this project (Orem & Vardiman, 1995). Simmons (2009) defined Orem's theory as a self-care deficit in which the individual could not care for self, and nurses could focus on providing strategies to help the individual gain control of their self-care abilities. Researchers and practitioners used the theory to understand and reduce disease complications and associated costs (Afrasiabifar et al., 2016). The theory suggested that nurses could involve the patients in their care; patient-centered care requires the patients' involvement and compliance with discharge instructions. Adamuz et al. (2015) noted that a staff educational intervention for patients admitted with CAP could decrease the potential for readmissions after discharge. The self-care theory could assist patients in taking responsibility for their care.

Dorothea Orem developed the theory, which is framed around the partnership of the individuals who experience the deficits in self-care and the healthcare professionals who can intervene and meet their care demands (Williams, 2015). Self-care is theorized as behavior and action learned through interpersonal exchanges and interactions that enable an individual to achieve a clear need (Baskin, 2017). Orem defined self-care needs in three types: universal, developmental, and health deviations (Çapik et al., 2015). Comprehensive, or universal, requirements are focused on the self-care needs associated

with maintaining the integrity of one's structure and function (Baskin, 2017).

Developmental self-care is focused on care needs that arise from a patient's life cycle or

events, and health deviation self-care is observed in the event of illness (Çapik et al.,

2015). Orem identified self-care as a central concept to healthcare provision and

described the factors that could guide healthcare practice such as research, and education

to create a positive patient outcome (Eyegue-Sandy, 2017).

 In this doctoral project, the Orem theory was used to highlight the importance of

the patients taking part in their care and complying with antibiotic treatment to decrease

CAP readmissions. Patient self-care plays a crucial role in the postdischarge care of

patients diagnosed with CAP. With an increase in staff knowledge regarding antibiotic

therapy, the patients could receive the appropriate education to care for themselves after

discharge to prevent readmissions. Also, nurses can use strategies to involve patients in

their care to avoid the likelihood of readmission after discharge. Implementing a staff

educational intervention would play a critical role in preparing the medical-surgical

nurses in educating their patients on self-care activities to comply with the antibiotic

treatment after discharge.

 The Orem self-care model universal component applied as self-care requirements

needed for an individual's life development such as sufficient intake of food, water, and

air; balancing of exercise and rest; elimination; and involvement in wellness activities to

prevent illness. Orem's self-care model developmental component also applied as

developmental life situations may prevent patients from caring for themselves. Finally,

the model is used to address that health deviation component that arises from a patient

being unable to care for themselves due to illness. For the patient to perform self-care, the environment must be supportive. The nurse must involve the patient in self-care activities, especially when there is a deviation in the patient's condition or developmental situations. Also, the nurse must guide the patient regarding health-related activities to improve optimal well-being.

Relevance to Nursing Practice

Hospitalized patients admitted with CAP are at risk for readmissions due to the inappropriate use of antibiotic therapy (Micek et al., 2014). In an inpatient hospital in the Southern region of the United States that was the project site, the inappropriate use of antibiotic treatment was associated with CAP readmission rates. As a result, exploring the inappropriate use of antibiotic therapy associated with CAP readmission was relevant to nursing practice to decrease the readmission rates. More than one million people are admitted with CAP every year, of which 50,000 people died from the disease, and 140,000 people are readmitted for CAP (Alba & Amin 2014). In addition, pneumonia is one of the leading causes of death in the United States, accounting for 57,000 deaths in 2013 (Kurtzhalts et al., 2016). Weinreich et al. (2016) identified some of the factors associated with CAP readmissions that have resulted from the lack of standardized protocols and pathways, lack of staff education on the appropriate use of antimicrobial treatment, and lack of care collaboration among healthcare professionals.

The current problems with CAP readmission rates have been associated with increasing healthcare costs and decreasing quality of patient care, and the inpatient hospital is not receiving reimbursement for patients admitted within 30-day of discharge.

Sexton (2013) identified that the Center for Medicare and Medicaid Services (CMS) uses pay-performance for quality care, and healthcare institutions are not receiving reimbursed for patients readmitted with CAP 30-day after discharge. Thus, it is relevant to provide an educational intervention to help nurses understand the importance and appropriate use of antibiotic therapy to decrease CAP readmissions. The antibiotic stewardship program was developed in 2007 by the Infectious Disease Society of America, and the Society of Healthcare Epidemiology of America as a set of guidelines aimed to implement and measure the success of the antibiotic therapy (Kurtzhalts et al., 2016). The AMS recommended that a decrease in the prolonged use of antimicrobial treatment and timely switching from IV antibiotic to oral antibiotics can help to decrease CAP readmission rates (Foolad et al., 2018). Past researchers have suggested that AMS activities are not used as they should be, and nurses can improve their knowledge of antimicrobial treatment to decrease CAP readmission rates (Fisher et al., 2018; Lisenby et al., 2015; Skinner et al., 2018).

Despite the development of the AMS guidelines, there is no current standard of practice for antibiotic therapy in decreasing CAP readmissions (Lisenby et al., 2015). Improving antibiotic therapy in the inpatient hospital can not only reduce the CAP readmission rates; but can also improve patient outcomes, and decrease healthcare costs and hospital stay. Addressing the inappropriate use of antibiotic therapy is relevant to the nursing practice as it can promote a social change on communities' approach for disease prevention and help nurses to understand the appropriate use of antimicrobial treatment to improve patients care. In addition, implementing the infection control educational

intervention can help patients comply with the antimicrobial therapy and decrease CAP readmissions. Finally, the increase in the nurses' knowledge on antibiotic therapy can help patients gain deeper understanding of the appropriate use of antimicrobial treatment and assist them in taking control of their care.

Local Background and Context

In this inpatient care hospital setting, the 30 days' readmission rates for CAP has increased linearly since 2016. The inpatient hospital benchmark for CAP is 0.88% (Dogoda & Rahbani, 2018), however, the inpatient readmission rate for CAP was 5.60% in 2017. The inappropriate use of the antibiotic treatment was associated with the increase in readmission rates for patients diagnosed with CAP. The inpatient hospital is not receiving reimbursement for 30-day readmissions after discharge (Dogoda & Rahbani, 2018). The hospital quality care and patient safety rules are regulated by two agencies, the CMS and the Joint Commission (JC). More than 70% of the patients treated in the inpatient hospital are immigrant from a different cultural background with no medical insurance. As a result, the hospital leadership team was in support of implementing an educational intervention to improve nurses' knowledge and patient care.

The scholarly project targeted nursing staff in three medical-surgical units in an inpatient community hospital with 180 beds in the southern region of the United States. More than 90% of the patients admitted with CAP were placed in the medical-surgical units. The nurses who work in these units were Registered Nurses with 2-4 years of nursing education, and 1-15years of clinical experience. The lack of continuing education on antimicrobial therapy in the inpatient hospital resulted in nurses having decrease

knowledge on the appropriate use of antimicrobial treatment. It is significant to implement an educational intervention on antimicrobial guidelines to increase nurses' knowledge on the appropriate use of antibiotic therapy to decrease CAP readmissions. There is no antibiotic guideline in the project site to decrease CAP readmission rates, and the absence of the antibiotic guideline has led to an increase in CAP readmissions.

Role of the DNP Student

I am a nurse working in an acute inpatient hospital with patients who are readmitted for CAP within 30-day of discharge. The project goal is to develop an educational intervention on antibiotic therapy to decrease CAP readmission rates. I was the leader of the doctoral project and created an environment that was open for team communication. Also, I used my leadership skills and applied evidence-based knowledge learned in classes at Walden University and the practicum setting to improve patient care. Dunbar-Jacob et al. (2013) noted that the DNP prepared nurse must focus on using leadership skills to transform healthcare and applied evidence-based knowledge into clinical practice to improve patient care.

My role in the doctoral project was to collaborate with the director of quality improvement and obtained deidentified data from the medical records of the patients diagnosed with CAP who had early CAP readmission rates prior and post educational intervention. I entered the deidentified data obtained from the patients' medical records into a spread sheet on my personal computer that was password protected and kept in a private, locked office to compare the number of patients with early readmissions for CAP

before and after the educational intervention. I scheduled meetings every Monday with the project team to provide clear project goals and timeline to achieve project objectives.

Next, I developed the poster educational intervention on antibiotic therapy to decrease CAP readmission rates, and I presented a 30-minute presentation on the appropriate use of antibiotic therapy to the medical-surgical nurses. I created a multiple-choice format infection control questionnaire obtained from CDC and conducted the pretest and posttest on antibiotic therapy to evaluate the medical-surgical nurses' knowledge. I collaborated with my preceptor to identify available office space, a locked cabinet to secure deidentified data obtained from patients' medical records and test scores, and I analyzed the pretest and posttest scores. The pretest and posttest scores were entered into a spreadsheet on my personal computer that was password protected and kept in a private, locked office to determine the mean differences between both scores. I coordinated a meeting to debrief the hospital leaders and unit managers on the project results on staff education and CAP readmission rates.

Role of the Project Team

The project team was composed of the DNP student's preceptor, and the director of quality improvement. The DNP student's preceptor and the director of quality improvement had a significant amount of experience related in working with project development and staff education. The role of the project team members involved contributing to the project objectives, completing individual activities, providing strategies and decision making for the project, attending project meetings, working

together as a team, and communicating with team members to ensure the project responsibilities and outcomes are met.

The DNP student's preceptor role was to identify and provide office space for project leader and lock cabinet to secure patients' data. The preceptor organized and scheduled meetings with unit managers, nurses working in the medical-surgical units and the hospital research team. The student's preceptor scheduled the meetings to discuss the project implementation, obtained project approval and encourage nurses to participate in the project. The director of quality improvement role was to manage the data needed for the project and organized access for pre-and post-intervention data collection on CAP readmissions. The director obtained the data for the month prior and after the educational event. The director of quality improvement worked with the leader to secure data. The project team members worked with me to create strategies to guide the project, and engaged in the planning, implementation, and evaluation of the project. Finally, the project team supported the project leader in integrating change management into the project plan as supported by DNP Essential Number 4 (American Association of Colleges of Nursing [AACN], 2006). The project team met every Monday for 30- minutes to discuss and give feedback on the project.

Summary

Community-acquired pneumonia is a significant health problem, and the most common reason for 30-day readmission after discharge. The project implementation site had no educational guidelines on antibiotic therapy to decrease CAP readmission rates, which led to a practice gap in the patients' care. To implement a practice change, the

doctoral project must be supported and guided by evidence-based literature. The Iowa model and Orem's self-care theory served as the theoretical frameworks to guide the project. The Iowa model provided a structural practice change for the project, and the Orem's self-care theory identified the self-care activities to decrease CAP readmission rates. As a DNP student, I had a significant role in increasing nurses' knowledge of the appropriate use of antibiotic therapy to reduce CAP readmission rates. My role included leading the project, directing the project team, and identifying resources and services needed to support the project objectives. The project team worked with the leader to plan the staff educational intervention, implement the project, and evaluate the project outcome. Section 3, I discuss the introduction, practice-focused questions, sources of evidence, analysis, and synthesis.

Section 3: Collection and Analysis of Evidence

Introduction

Hospitalized patients diagnosed with CAP are often readmitted within 30-days of discharge due to inappropriate use of antibiotic therapy. In the project site, an inpatient care hospital in the southern region of the United States, the 30-day readmission rates for CAP have increased linearly since 2016. The inpatient hospital benchmark for CAP is 0.88% (Dogoda & Rahbani, 2018), but the inpatient readmission rate for CAP was 5.60% in 2017. The inappropriate use of antibiotic treatment was identified as a factor associated with CAP readmissions rates in the inpatient care hospital. As a result, it was imperative to implement an antibiotic therapy guideline program to decrease CAP readmission rates and promote quality patient outcomes. This doctoral project was developed to determine whether the infection control clinical practice guidelines would increase the medical-surgical nurses' competencies and knowledge on the appropriate use of antibiotic therapy to decrease the 30-day readmission rates for patients diagnosed with CAP. In Section 3, I discuss the practice-focused question, sources of evidence, and analysis and synthesis.

Practice-Focused Question

In an inpatient care hospital in the southern region of the United States, the 30-day readmission rates for CAP have increased linearly since 2016. The inpatient hospital benchmark for CAP is 0.88% (Dogoda & Rahbani, 2018), but the inpatient readmission rate for CAP was 5.60% in 2017. The inappropriate use of antibiotic treatment was identified as a factor associated with CAP readmissions rates in the inpatient care hospital. The project site did not have educational guidelines on antibiotic therapy to

decrease CAP readmission rates. The lack of knowledge of antibiotic therapy to decrease

CAP readmission rates created a practice gap in the care for patients diagnosed with

CAP. The practice-focused question was: Will the infection control clinical practice

guidelines increase the medical-surgical nurses' competency and knowledge of the

identification of the appropriate use of antibiotic treatment to decrease the readmission

rate for patients diagnosed with CAP?

Sources of Evidence

A literature search was conducted using the databases PubMed, Medline, EBSCO,

Ovid and the Cochrane Library to identify articles related to medical-surgical nurses use

of antibiotic therapy and CAP readmission rates published between 2010 and 2019. The

keywords for the search engine included *antibiotic therapy, CAP, 30-day readmission,*

nursing education on antibiotic treatment, antibiotic stewardship program, CAP risk

factors and adherence to antibiotic therapy. The search generated 150 articles on CAP,

antibiotic therapy, 30-day readmission with CAP, antibiotic stewardship program, CAP

risk factors, adherence to antibiotic therapy, and nursing education on CAP. Ten peer-

reviewed articles were used for the project. The inclusion criteria were CAP, antibiotic

therapy, CAP 30-day readmission rate, and antibiotic stewardship program. The choice of

the articles was made based on the topic of the project, the significance to the study, the

outcome, the target population, methodology, and the strengths and limitations of the

study.

The primary objective with the key terms was to review literature that would

support the project effectively. These key terms assisted in identifying the inappropriate

use of antibiotic therapy and CAP readmission rates. The Iowa model guided the doctoral

project by directing staff education plan and its focus on change implementation using

evidence-based practice. Also, the Orem's self-care framework served as the theoretical

framework for the doctoral project to reduce disease complications associated with CAP.

Because nurses can help shape the healthcare environment, it is significant to educate

them on the appropriate use of antibiotic treatment to decrease CAP readmissions.

Collecting and analyzing key evidence on the inappropriate use of antibiotic therapy and

CAP readmission rates would increase patients' understanding on the appropriate use of

antibiotic therapy, identify early preventive care for patients with CAP, increase nurses'

knowledge of the appropriate use of antibiotic treatment, and reduce the 30-day

readmission rates.

Review of the Findings

Engel et al. (2014) noted that 40% of patients admitted in the hospital for CAP are

not switched from an IV antibiotic to an oral antibiotic in a timely manner, which has

caused an increase in 30-day readmissions, longer hospital stays, and increased

healthcare costs. Changing from an IV to an oral route for the administration of

antibiotics within 3 days of admission could help decrease early readmission, hospital

stay, and healthcare costs (Engel et al., 2014). Engel et al. used a pretest and posttest

design to evaluate if the educational intervention on early switching from IV to an oral

antibiotic within 3 days of admission for patients diagnosed with CAP would reduce

length of hospital stays and 30-day readmission rates. It was found that 60% of the

patients were switched in a timely manner from IV to an oral antibiotic in the 3 days

following admission, thereby decreasing their risk for longer hospital stay and early readmissions. The inappropriate use of antibiotic treatment for patients diagnosed with CAP necessitated an urgent need to develop education that could increase nurses' knowledge and decrease early readmissions. This study supported the project outcome, which was to increase nurses' knowledge on the appropriate use of antibiotic treatment to decrease CAP readmission rates.

Micek et al. (2014) performed a retrospective study using 259 patients to determine if administering an antibiotic treatment within the first 4 hours of arrival in the emergency room (ER) would reduce hospital stays, mortality rates, and 30-days readmissions. 72 patients, who received antibiotic treatment 4 hours of arrival in the ER had shorter hospital stays and decreased early readmissions. Nurses must adhere to proper antibiotic treatment to improve patient care and promote positive outcomes (Micek et al., 2014). These findings support the need for educating nurses on the appropriate use of antibiotic therapy to improve patient outcomes. This project creates an awareness in the inpatient hospital on increasing care providers' understanding of the appropriate use of antibiotic therapy to reduce CAP readmission rates.

A study was conducted in five hospitals in the United Kingdom to determine the impact of nurses' involvement in an antibiotic stewardship program with an aim to reduce hospital stays, 30-days readmission and healthcare costs for patients diagnosed with CAP (Edwards et al., 2011). The researchers used staff education, group discussions, and chart reviews to educate nurses on antibiotic management, and assessed the number of patients readmitted with CAP after the educational intervention. Nurses

were not using the antimicrobial management program as they should have, which could have led to negative patients' outcomes (Edwards et al., 2011). The findings revealed nurses' willingness to learn the antimicrobial principles and use the appropriate antimicrobial management for patients diagnosed with CAP, which led to a decrease in length of stays, healthcare costs and 30-day readmissions. The findings support this DNP project implementing staff education to increase nurses' knowledge on the appropriate use of antibiotic therapy to reduce CAP readmission rates

Viasus et al. (2017) performed a retrospective study using 166 patients to determine the safety of antibiotic de-escalation in reducing mortality rates, length of hospital stay, and 30-day readmission rates. The researchers used data from patients diagnosed with CAP who had two or more antibiotic treatments and were switched to a narrower spectrum within 72 hours of admission (Viasus et al., 2017). There was no significant impact in antibiotic de-escalation and hospital stays, mortality rates and early readmissions, as several different factors contributed to patient readmissions (Viasus et al., 2017). However, the researchers identified factors that could be used to improve hospital stays and readmission rates (Viasus et al., 2017). Viasus et al.'s results support the aim of this project because the educational intervention identifies ways to reduce the excessive use of antibiotic therapy to improve patients care.

Marti et al. (2017) performed a randomized control trial study using 371 patients to determine if administering the antibiotic therapy within 4 hours of arrival in the ER would prevent adverse symptoms and stabilize patients within 24 hours of admission. The researchers used data from patients diagnosed with CAP. The randomly selected

patients received antibiotic therapy within 4 hours of arrival in the ER, while the control

group received routine antibiotic therapy. The secondary data used length of stays, ICU

admissions, and early readmissions. There was no significant difference in administering

antibiotic treatment within 4 hours of arrival in the ER to prevent adverse symptoms, and

stabilize patients within 24 hours of admission (Marti et al., 2017). Several different

factors had contributed to the patient's admissions (Marti et al., 2017). The researchers

identified factors that could be used to reduce early CAP readmissions and ICU

admissions. The findings support this doctoral project on the inappropriate use of

antibiotic therapy, which is supported with staff education.

Mansouri et al. (2011) conducted a retrospective cohort study using 130 patients

admitted for CAP to determine if an antibiotic restriction program (ARP) would reduce

antibiotic duration, length of stay, and 30-day readmission rates. The antibiotic restriction

program was implemented one month before, and one month after the study. The

secondary data used blood cultures and comorbidities. The findings revealed that 132

antibiotics were ordered before implementing the ARP, which was reduced to 28 after

implementing the ARP (Mansouri et al., 2011). Also, there was a decrease in hospital

stays, early readmissions, and healthcare costs. This study supports the purpose of the

doctoral project, which is to implement a program and increase nurses' knowledge on the

appropriate use of antibiotic therapy to decrease CAP readmissions.

Participants

The chosen participants for the doctoral project were registered nurses in three

medical-surgical units in the inpatient hospital. The registered nurses had 2-4 years of

nursing education and 1-15years of clinical experience. The thirteen selected participants

included ten bedside nurses and three resource nurses. The roles of the ten nurses

included caring for patients and educating patients on their care. The roles of the resource

nurses include promoting quality patients care, managing the unit operations, and

educating staff on policies, procedures. The participants were chosen because patients

admitted with CAP are placed in the medical-surgical units, and the nurses currently lack

education on the appropriate use of antibiotic therapy. The goal of the project is to

educate the medical-surgical nurses on the appropriate use of antibiotic therapy, to

increase their knowledge on antibiotic treatment, and decrease CAP readmissions.

Procedure

After receiving approval from the Walden University Institutional Review Board

(IRB), I obtained a deidentified data of the number of early readmissions for CAP from

the director of quality improvement for the timeframe of 30-day before the

implementation of the educational intervention. The data were downloaded in an Excel

spreadsheet. All collected data were kept on my personal computer that was password

protected, and kept in a private, locked office. The participants that had access to the data

were the director of quality improvement and the project leader's preceptor.

Once the data were collected, the educational flyers and handouts (Appendix A)

on antibiotic therapy obtained from the CDC was developed and presented to the

inpatient care facility leaders for feedback and approval. After approval of the

educational materials, the nurses from the three medical-surgical units were informed

about the project, and flyers were placed with dates and times in the medical-surgical

units to remind nurses of the learning sessions. A 10-question multiple-choice format

infection control questionnaire obtained from CDC Continuing Education for Antibiotic

Stewardship (Appendix B) was used to assess the nurses' knowledge before the

educational intervention (CDC, 2018). The pretest questionnaire and pencils were

distributed to the participants in the medical-surgical unit conference room. The

participants were given 15 minutes to complete the pretest. The pretest was placed by the

nurses in the return envelope marked "*pre-test*". The envelope was placed in a secure,

locked file cabinet located in a private, locked office.

The poster educational intervention (Appendix C) was developed using the

CDC's infection control clinical practice guidelines to educate medical-surgical nurses on

the appropriate use of antibiotic therapy for patients diagnosed with CAP. The poster

education was presented to the hospital leaders for approval. The education interventional

guideline contained principles and use of the antibiotic therapy such as the de-escalation

treatment, duration, DRIP score, procalcitonin level, empiric antibiotic treatment and

conversion from IV to oral antibiotic. Once the education was approved, it was presented

to the participants who were given 30-minute luncheon learning sessions over a 2-week

period. The staff educational guideline was presented in the medical-surgical unit

conference room in the presence of the participants. The participant's questions were

addressed during the presentation, and feedback was obtained.

After the educational sections, the same questionnaire was used for the posttest to

assess if there was an increase in the nurses' knowledge. The posttest questionnaire was

distributed to the participants in the medical-surgical unit conference room in a sealed

envelope that contained the instructions, the allotted timeframe, and a return envelope

mark posttest questionnaire. The participants were given 15 minutes to complete the

posttest. The posttest was placed by the nurses in the return envelope marked "*posttes*t". I

placed the posttest envelope in a secure, locked file cabinet located in a private, locked

office. The pretest and posttest scores were analyzed using descriptive statistics to

determine whether there were mean differences between the two scores.

Thirty-days after the educational intervention, data were obtained for the number

of patients who had early readmissions for CAP. The deidentified data were obtained

from the director of quality improvement. The data were encrypted and entered into an

Excel spreadsheet on my personal computer that was password protected and kept in a

private, locked office. The number of patients with early readmissions for CAP before the

educational intervention was compared to the number of early readmissions for CAP after

the educational intervention.

Instruments

The 10-question questionnaire chosen for this project was retrieved from the CDC

Continuing Education for Antibiotic Stewardship (Appendix B). The 10-question

questionnaire had 10 multiple choice questions and answers, which was used for the

pretest and posttest. The questions addressed the principles and use of antibiotic therapy

such as the de-escalation treatment, duration, DRIP personal computer that was password

protected score, procalcitonin level, empiric antibiotic treatment and conversion from

intravenous (IV) to an oral antibiotic. Participants took 15-minutes to answer the

questions and each question had a scoring scale of 2 points for each correct answer and 0

points for each incorrect answer (CDC, 2018). The tool is open to healthcare

organizations and clinicians to improve their knowledge on the appropriate use of

antibiotic treatment (CDC, 2018).

Analysis and Synthesis

The first objective of the doctoral project was to identify the number of patients

readmitted with CAP within 30-day of discharge. The data for the analysis and synthesis

information was obtained from the inpatient hospital in the southern region of the United

States. Retrospective data were obtained on the number of patients with early CAP

readmissions a month prior to intervention. Prospective data were obtained on the

number of patients with early CAP readmissions a month post-intervention. The

retrospective and prospective data were uploaded to a Microsoft Excel spreadsheet.

Descriptive statistics was used to compare the number of early readmissions of CAP

before and after the educational intervention.

The second objective of the project was to create staff education to increase

nurses' knowledge of the appropriate use of antibiotic therapy. The report included the

number of scores of the questions from the pretest and posttest. The pretest and posttest

scores were uploaded to an Excel spreadsheet and descriptive statistics was generated to

compare the number of scores of the questions from the pretest and posttest. Also,

descriptive statistics was generated to compare the overall mean scores percentages of the

nurses' knowledge for the pretest and posttest.

Summary

Hospitalized patients diagnosed with CAP are often readmitted due to the inappropriate antibiotic treatment. As a result, it was significant that nurses are knowledgeable of the appropriate use of antibiotic treatment to decrease CAP readmission rates. The staff education on antibiotic therapy prepared nurses on the appropriate use of antibiotic treatment, which could improve the patients understanding and promote treatment compliance. The aim of the project was to increase the medical-surgical nurses' knowledge of the appropriate use of antibiotic therapy to decrease 30-day readmissions for patient diagnosed with CAP. The literature search was conducted using the databases PubMed, Medline, EBSCO, Ovid and the Cochrane Library to identify articles related to medical-surgical nurses use of antibiotic therapy and CAP readmission rates published between 2010-2019. The keywords for the search engine included antibiotic therapy, CAP, 30-day readmission, nursing education on antibiotic treatment, antibiotic stewardship program, CAP risk factors and adherence to antibiotic therapy. The key terms assisted in identifying the inappropriate use of antibiotic therapy and CAP readmissions, and educational intervention used to decrease the 30-day readmission rates.

A before-after approach was used to evaluate the nurses' knowledge on the appropriate use of antibiotic therapy and determine if there was a decrease in the CAP readmission rates. A pre-and post-test was given using the CDC Continuing Education for Antibiotic Stewardship. The same guidelines were used to develop the educational program. Retrospective and Prospective deidentified data from the patients' medical records was obtained from the director of quality improvement 30-day before and after

the educational intervention. The data were compared to determine whether there was a decrease in CAP early readmissions. In Section 4, I discuss the introduction, implications and findings, recommendations, and the strengths and limitations of the project.

Section 4: Findings and Recommendations

Introduction

An increase in early readmissions for CAP has become a significant problem for an inpatient care hospital in the southern region of the United States. CAP 30-day readmissions were identified as a problem and healthcare systems were not receiving reimbursement for services provided to patients admitted with CAP within 30-day of discharge. The inpatient hospital identified that 22.22% of patients were readmitted with CAP within 30-day of discharge (director of quality improvement, personal communication 2020). The inappropriate use of antibiotics was recognized as a factor in the increase of early CAP readmissions. A staff educational intervention was developed to educate nurses on appropriate use of antibiotic therapy to prevent CAP readmissions. Before the staff education program on the appropriate use of antibiotic therapy, nurses lacked the knowledge on the appropriate use of antibiotic therapy to prevent early CAP readmissions. Thus, it was important to address the gap in nursing practice related to the use of the appropriate antimicrobial treatment to decrease early CAP readmissions. The practice-focused question was, Will the infection control clinical practice guidelines increase the medical-surgical nurses' knowledge of the identification of the appropriate use of antibiotic treatment to decrease the readmission rate for patients diagnosed with CAP?

The project goal was to implement infection control clinical practice guidelines to increase the medical-surgical nurses' knowledge on the appropriate use of antibiotic therapy to decrease the 30-day readmission rates for patients diagnosed with CAP. The

infection control clinical practice guidelines were designed to improve nurses' knowledge

on the appropriate use of antibiotic treatment (CDC, 2018). Sources of evidence for the

project included an in-depth literature review initiated using Walden University databases

as the primary evidence to support the evidence-based practice project. The search

generated articles on CAP, antibiotic therapy, 30-day readmission with CAP, antibiotic

stewardship program, CAP risk factors, adherence to antibiotic therapy, and nursing

education on CAP. The CDC website provided the latest infection control clinical

practice guidelines on the appropriate use of antibiotic therapy. The educational program

included an infection control questionnaire, antibiotic therapy handouts, poster education

and a pretest and posttest to evaluate the improvement of the nurses' knowledge on

antimicrobial treatment to decrease early CAP readmissions. The evidence obtained to

prevent the early CAP readmissions was communicated through the hand-outs on

antibiotic therapy (Appendix A), the 10-question questionnaire (Appendix B), and staff

education on antibiotic therapy (Appendix C). The 10-question questionnaire included 10

multiple choice questions with two points allocated for each correct answer and zero

points for each incorrect answer. The analytical strategies used included a comparison of

deidentified retrospective data for patients with early CAP readmission and prospective

data for patients with early CAP readmissions, pretest and posttest scores to assess

nurses' knowledge of the appropriate use of antibiotic using descriptive statistics and a

Microsoft Excel spreadsheet. Section 4, I discuss the study findings and implications, the

contribution of the doctoral project team, and the strengths and limitations of the study.

Summary of Findings

The aim of this project was to implement clinical practice guidelines on antibiotic therapy to increase medical surgical nurses' knowledge of the appropriate use of antibiotic therapy to prevent early CAP readmissions in an inpatient hospital in the southern region of the United States. Past study results have suggested that AMS activities are not used as they should be, and nurses can improve their knowledge of antimicrobial treatment to decrease CAP readmission rates (Fisher et al., 2018; Lisenby et al., 2015; Skinner et al., 2018). The practice-focused question was: Will the infection control clinical practice guidelines increase the medical-surgical nurses' knowledge on the identification of the appropriate use of antibiotic treatment to decrease the readmission rates for patients diagnosed with CAP? The first objective of the project was to increase nurses' knowledge and introduce clinical practice guidelines on the appropriate use of antibiotic treatment through assessment, educational intervention, and evaluation of nurses' knowledge. The second objective of the project was to assess the rate of early CAP readmissions in the inpatient hospital by obtaining the retrospective and prospective data. The third objective of the project was to determine nurses' knowledge on the appropriate use of antibiotic therapy through participants' job position, nursing education and years of experience.

Objective 1

Object 1 focused on increasing nurses' knowledge and introducing the clinical practice guidelines on the appropriate use of antibiotic therapy through assessment, educational intervention and evaluation of nurses' knowledge. To accomplish the

objective, I developed an educational poster presentation using information obtained from the CDC. Before the educational session, I assessed whether the inpatient hospital setting had clinical practice guidelines on the appropriate use of antibiotic therapy to prevent early CAP readmissions. However, the inpatient hospital did not have clinical practice guidelines on the appropriate use of antibiotic therapy. I obtained an authorization from the director of quality improvement to develop the clinical practice guidelines on the appropriate use of antibiotic therapy for medical surgical nurses' in the inpatient hospital. I collected baseline knowledge data on the appropriate use of antibiotic therapy using a 10-question pretest questionnaire (Appendix B). The purpose was to determine the knowledge gain after the nurses were provided with the educational information. The 10-question pretest questionnaire was given prior to each educational presentation; the questionnaire took no more than 5 minutes to complete. The participants were instructed to complete the pretest and place it in the envelope marked "*pretest,*" which I collected at the end of the session. The pretest questionnaires were then secured in a locked file cabinet in a team member's office to be compared to the posttests completed at the end of the presentation. The cabinet was locked and was made accessible to team members only.

The education sessions were held during various shifts over 2 weeks in the unit conference room to provide adequate opportunity for all staff members to attend. To ensure nurses attended the staff education, a roster was presented at every educational presentation and staff were asked to sign-in. The information was provided in a poster presentation (Appendix C) lasting 30 minutes with a visual and verbal presentation on the

appropriate use of antibiotic therapy. Handouts were given during the presentation (Appendix A) on the appropriate use of antibiotic therapy. After the presentation, 15 minutes were used to address questions and feedback was received.

Upon conclusion of each presentation, I administered the 10-question posttest questionnaire to the nurses, which took no more than 5 minutes to complete. The participants placed the completed posttest in the envelope marked "*posttest,*" which I collected at the end of the session. The anonymous pre-tests and posttests were counted at the completion of each administration to ensure all tests were returned and placed in a sealed envelope with the appropriate label. The envelopes were placed in a secured file cabinet located in a private office until time of analysis

I analyzed the data collected from the 10-question pretest and posttest questionnaires. The 10-question questionnaire used for the pretest and posttest was developed from the CDC's (2018) Continuing Education for Antibiotic Stewardship. The data were entered in an Excel spreadsheet to show the variance in 2 points for correct answers compared to 0 for incorrect answers with a goal of 20 points after the educational presentation. Thirteen medical surgical nurses attended the staff educational intervention on the appropriate use of antibiotic therapy. I calculated the nurses' knowledge base on the correct answers in the pretest and posttest questionnaire. The results from the questionnaires showed low scores on pretests and high scores on posttests on the appropriate use of antibiotic therapy (Table 1). There were high pretest and posttest scores (100%) for the item on nurses' support for the appropriate use of antibiotic therapy, and low scores for pretest (30.8%) and posttest (69.2%) questions

related to antibiotic resistance. Also, nurses had low scores for pretest (23.1%) and

posttest (69.2%) for the question related to the cause of inappropriate use of antibiotic

therapy. The data generated from the pretest questionnaire validated a need for a staff

educational intervention.

Table 1
Percent Correct on Individual Knowledge Questions From Before and After Intervention

	Pre % correct	Post % correct
1. Community-acquired pneumonia is a serious health problem and causes more than ?? deaths per year	15.4	100.0
2. What percentage of antibiotic therapy are prescribed inappropriately and unnecessarily in inpatient and outpatient settings?	7.7	92.3
3. Nurses can do the following to support appropriate antibiotic use in their facility	100.0	100.0
4. Which question should the provider ask hours after antibiotic therapy is initiated?	15.4	100.0
5. What is antibiotic resistance?	30.8	69.2
6. Inappropriate antibiotic treatment can cause …	23.1	69.2
7. Inappropriate antibiotic therapy is defined as antibiotic prescribing that is not in agreement with established clinical practice guidelines. (T or F)	76.9	100.0
8. Appropriate antibiotic therapy is defined as….	30.8	92.3
9. Nurses can help prevent antibiotic resistance by…	84.6	100.0
10. The process of an antibiotic time out is ….	7.7	92.3

The objective of increasing nurses' knowledge on the appropriate use of antibiotic

therapy was met. The analytical strategies compared the pretest and posttest scores

uploaded to an Excel spreadsheet using descriptive statistics. The findings of the

comparison for the pretest and posttest analysis of the 10-question questionnaire showed

a significant increase in the nurses' knowledge on the appropriate use of antibiotic

therapy. The percentage of the nurses' knowledge increased to 91.5% post educational

intervention as compared to 39.2% preeducational intervention (Table 2).

Table 2

Percentage of Knowledge Gain From Pretest to Posttest Questionnaires

	Knowledge Gained
Pretest	39.2
Posttest	91.5

Objective 2

The second objective was to determine the rate of early CAP readmissions in the

inpatient hospital through by obtaining and analyzing the retrospective and prospective

data. To achieve this objective, a 4-month deidentified retrospective data were obtained

from the director of quality improvement before the implementation of the staff

educational intervention to determine the variance in percentage of early CAP

readmissions. A 1-month deidentified prospective day was obtained from the director of

quality improvement after the implementation of the staff educational intervention to

determine the variance in percentage of early CAP readmissions (Table 3). The number

of patients readmitted with early CAP in the 4-month pre-intervention was 20 (52.3%) as

compared to the number of patients readmitted with early CAP in the 1-month post-

intervention was two (6.67%).

Table 3

Percentage of Patients With Early CAP Readmissions

	Percentage of patients with early CAP readmissions
4-month retrospective study	52.3
1-month prospective study	6.67

Objective 3

The third objective was to determine the nurses' knowledge on the appropriate use of antibiotic therapy based on the participants' job position, nursing education and years of experience (Table 4). Thirteen medical surgical nurses attended the staff educational intervention, in which 10 nurses were bedside nurses and 3 nurses were unit supervisors who occasionally took patient care responsibilities. Nearly all the nurses had 4 years of nursing education except for one nurse with 2 years of nursing education. Five nurses had less than 2 years of nursing experience and one nurse had 15 years of nursing experience.

Table 4

Participant Characteristics

	n	*%*
Position		
Bedside nurse	10	76.9
Supervisor with occasional patient care responsibilities	3	23.1
Nursing education		
2 years	1	7.7
4 years	12	92.3
Years' experience		
2 years or less	5	38.5
3-5 years	3	23.1
6-10 years	4	30.8
More than 10 years	1	7.7

The objective of increasing nurses' knowledge on the appropriate use of antibiotic therapy was met. The analytical strategies compared the pretest and posttest scores of the bedside nurses and unit supervisors uploaded to an Excel spreadsheet using descriptive statistics (Table 5). The percentage of questions correct for the pretest for the beside nurses was 44% as compared to 23.3% for the unit supervisors. The posttest scores increase dramatically in both groups as the bedside nurses had 92% correct responses and the unit supervisors had 90% correct responses.

Table 5

Percentage Correct for Bedside Nurses and Unit Supervisors

	Pretest	Posttest
Bedside nurses	44	92
Unit supervisors	23.3	90

Findings and Implications

The proposed project educated the nursing staff on the appropriate use of antibiotic therapy to prevent early CAP readmissions in an inpatient hospital in the southern region of the United States. The data collected from the pretests and posttests validated an increase in nurses' knowledge after the staff educational intervention. The nurses' knowledge on the appropriate use of antibiotic therapy increased after the educational intervention, which implied that the nurses lack the knowledge of the appropriate use of antibiotic therapy. Analysis of the pre-and posttest scores in the 10-question questionnaire demonstrated that the education was effective in increasing

nurses' knowledge on the appropriate use of antibiotic therapy. Also, the project outcome validated that the staff educational intervention was effective in increasing nurses' knowledge on the appropriate use of antibiotic therapy. The successful implementation of this practice change gave the nursing staff a greater confidence in providing a higher quality patient care using the clinical practice guidelines for antibiotic therapy to prevent early CAP readmissions.

The retrospective and prospective data obtained from the director of quality improvement showed a decrease in early CAP readmissions after the staff educational intervention, which implied that the inpatient hospital lack a standard guideline on the appropriate use of antibiotic therapy. Comparison of the pre- and posttest data on early CAP readmissions indicated that the lack of a standard antibiotic therapy guideline, and a gap in the inpatient hospital efforts in educating nurses contributed to an increase in early CAP readmissions. The project outcome validated that the staff education intervention was effective intervention in decreasing early CAP readmissions.

The pretest results for the bedside nurses and the unit supervisors showed low scores for unit supervisors and high scores for bedside nurses, which implied that the nurses did not have the necessary knowledge on the appropriate use of antibiotic therapy to prevent early CAP readmissions. The general performance of the nurses' pretest scores was below the expectation concerning knowledge on the appropriate use of antibiotic therapy. After the educational intervention, the nurses' posttest scores increase significantly on knowledge of antibiotic therapy. The project outcome validated that the staff education was effective in increasing nurses' knowledge on the appropriate use of

antibiotic therapy. The project outcome is a positive social change that could be enforced by future DNP graduates, to encourage hospitals administrative leaders to support policies that provide funding to maintain EBP programs on appropriate use of antibiotic therapy.

Institution

The project was a significant change as the institution supported the staff educational intervention on antibiotic therapy. Prior to the implementation of the staff educational intervention, there was no formal education on the appropriate use of antibiotic treatment. Since the implementation of the project, the nursing staff has become empowered in using the knowledge gained on antibiotic therapy to improve patient safety and outcomes related to appropriate use of antibiotic therapy for the patient admitted with CAP. Also, the institution now has the clinical practice guidelines for antibiotic therapy to provide a higher level of patient care. Reducing the 30-day readmission rates have become a priority for many healthcare organizations and policymakers to improve patients care and reduce cost (Lisenby et al., 2015; Skinner et al., 2018). As a clinical nurse for the organization at the project site, I am confident that the implementation of the project will be used in other inpatient care areas in the hospital.

Systems

Since the implementation of the project, myself and the hospital administrative leaders have identified other units within the hospital that the education on antibiotic therapy would be beneficial. It is the plan to introduce the staff education on the appropriate use of antibiotic therapy in the critical care unit and the emergency

department. Prior to the implementation of the staff education, the nurses lacked the

knowledge on the appropriate use of antibiotic therapy. By introducing the staff

education on antibiotic therapy, the nurses will be able to identify the patients at risk for

early CAP readmissions. The project outcomes were an increase in the nurses'

knowledge on the appropriate use of antibiotic therapy and decreased early CAP

readmissions. Community-acquired pneumonia is the most common reason for

readmissions and a significant cause of death in the United States (Jain et al., 2018).

Weinreich et al. (2016) discussed that some of the factors associated with CAP

readmissions have resulted from the lack of standardized protocols, lack of staff

education on antimicrobial treatment and lack of care collaboration amongst healthcare

professionals. The nursing leaders verbalized their commitment to ongoing education in

other areas of the hospital by incorporating the educational intervention as a mandatory

staff education. The evidence after the educational intervention indicates that the

organization will be successful in increasing nurses' knowledge on the appropriate use of

antibiotic therapy to prevent early CAP readmissions.

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

The purpose of this project was to investigate whether implementation of the

clinical practice guidelines on the appropriate use of antibiotic therapy in the inpatient

hospital setting would increase the nurses' knowledge and decrease early CAP

readmissions. A recommendation was provided to the project team members, and the

director of quality improvement to continue with the 10-question pretest questionnaire as

the initial assessment tool to determine nurses' knowledge on the appropriate use of

antibiotic therapy. Also, recommendation was provided to assess nurses' knowledge on other inpatient unit for the use of appropriate antibiotic therapy as nurses play a crucial role in preventing early CAP readmissions (Alba & Amin, 2014). The nurses' comprehensive assessment of antibiotic therapy can help them identify correct treatments for antibiotic-resistant bacteria and implement appropriate infection control treatment (Jayaweerasingham et al., 2019).

The project team members and the director of quality improvement agreed to commit to an ongoing education to include all nurses on the appropriate use of antibiotic therapy. Also, the project members agreed to use the clinical practice guideline on antibiotic therapy as a mandatory education for nurses and new orienteers. Identifying a continuing education on antibiotic therapy associated with CAP readmission rates was significant and relevant to the nursing practice as past studies have suggested that the antimicrobial therapy is not properly utilized as it should be (Fisher et al., 2018; Lisenby et al., 2015; Skinner et al., 2018).

Contribution of the Doctoral Project Team

The project team consisted of the director of quality improvement, my preceptor, research committee members, unit managers, and nurse educators. The project team played an essential role in successfully planning, implementation, and evaluating the staff education on antibiotic therapy. The team maintained continuous communication via email and Virtual Zoom meetings every Wednesday for the six-weeks of the project intervention to discuss the progress and clarify some of their concerns. The director of quality improvement and my preceptor oversaw that the resources needed to accomplish

the project objectives were met and encouraged the nurses to attend the staff education. The research committee members authorized the final approval of the staff education. I was inspired by the team's transformational leadership skills in planning, implementing, and to evaluate the project. Transformation leadership has provided team opportunity engagement to maintain the quality outcome of interventions (White et al., 2016).

As the team leader, I was responsible for providing refreshments and educational materials. My preceptor designated the scheduled date, time, and location for the staff education and the director of quality improvement was responsible for obtaining and securing the deidentified data for patients with early CAP readmissions. Prior to the project implementation, the team members reviewed the data collection process and educational materials. The support of team engagement in the outcome objectives has provided a better understanding of the project purpose, significance, and measurable results (Kettner et al., 2017). The project outcomes were discussed with the team, and they were delighted with the results. The project outcomes made a positive impact on the team and, a recommendation was made to implement the staff education on antibiotic therapy in other areas in the hospital. The essential role played by the project team ensured successful planning, implementation, and evaluation of the staff education on antibiotic therapy.

Strengths and Limitations of the Project

Strengths

One strength of the project was the director of quality improvement eagerness and commitment to implement the staff education on the appropriate use of antibiotic therapy

to decrease early CAP readmissions. The director of quality improvement understood the urgency of implementing a clinical practice guideline on antibiotic therapy to decrease early CAP readmissions. The inpatient hospital is not receiving reimbursement for care provided to patients with early CAP readmissions (director of quality improvement, personal communication 2020). Sexton (2013) discussed that the Centers for Medicare and Medicaid Services (CMS) uses pay-performance for quality care, and healthcare institutions are not getting reimbursed for patients readmitted with CAP 30-day after discharge. Also, the hospital did not have any standardized clinical practice guidelines on antibiotic therapy. Despite the development of the AMS guidelines, there is no current standard of practice for antibiotic treatment in decreasing CAP readmissions (Lisenby et al., 2015).

The nurses' willingness to attend the staff educational intervention on antibiotic therapy was another strength of the project. The staff education on antibiotic therapy increased the nurse knowledge on the appropriate use of antibiotic therapy and decreased early CAP readmissions. The education gave the nurses confidence to use the clinical practice guideline to identify patients at risk for early CAP readmissions. The nurses acknowledged their understanding of the clinical practice guideline on antibiotic therapy and were eager to use it as a standardized tool for patients admitted with CAP. The staff's eagerness and willingness made the implementation of the project more manageable and with less resistance.

Limitations

One limitation of the project was the restriction and barriers placed by the organization members to implement the project. The Research Committee Members of the inpatient hospital delayed the project approval and postponed educational sessions for various reasons. Therefore, there were lots of time wasted doing nothing with the project. The delay centered around the organization requirements needed for the project approval, the lockdown with the recent COVID-19 pandemic, and the delay in scheduling the staff education. For change to occur in an organization, it is important to assess the staff's readiness and ability to make change and the organization's readiness and ability to accept the change (Marvin, et.al, 2018).

The limited-time used to evaluate the educational intervention's effectiveness on early CAP readmissions was another limitation of the project. The director of quality improvement stated that the inpatient hospital had difficulty collecting data for patients admitted with CAP due to increased admissions with COVID-19. Therefore, the one-month time interval to evaluate the project effectiveness on early CAP readmissions was not enough. However, the inpatient hospital will continue to collect data and evaluate the staff education to decrease early CAP readmissions. One of the steps in evaluating a program is to gather credible evidence that strengthens the evaluation results (Afrizal, et.al, 2019).

<div align="center">

Summary

</div>

The DNP project site needed a staff educational intervention on antibiotic therapy to increase the medical-surgical nurses' knowledge of the appropriate use of antibiotic

therapy to decrease early CAP readmissions. I developed the staff educational intervention and educated the nurses on the appropriate use of antibiotic therapy. The analysis findings of the pretest and posttest 10- question questionnaire showed a significant increase in the nurses' knowledge of the appropriate use of antibiotic therapy. Also, the staff education was effective in increasing nurses' knowledge of the appropriate use of antibiotic therapy. The nurses were able to implement the skills and knowledge gained from the educational sessions to identify the patients at risk for early CAP. The findings obtained from the retrospective and prospective data validated that the staff educational intervention effectively decreased early CAP readmissions. After implementing the staff education, the nursing leaders verbalized their commitment to ongoing education in other areas of the hospital by incorporating the educational intervention as a mandatory staff education. In section five, I discussed the dissemination plan, analysis of self, and summary.

Section 5: Dissemination Plan

Introduction

Dissemination of the findings from the project involves translating findings to different audiences to instill knowledge, create awareness of the evidence-based findings, and improve practices (Curtis & DeMaio, 2017). Dissemination of the project will include the project team in implementing the findings in other areas within the inpatient hospital. The discussion will focus on sharing ideas on the project findings, increasing the teams' awareness of nurse knowledge of the appropriate use of antibiotic therapy, and implementing the findings. The dissemination will encourage the team to adopt the clinical practice guideline on antibiotic therapy to decrease early CAP readmissions. It is significant for the team to understand the appropriate use of antibiotic therapy to decrease early CAP readmissions.

I plan to disseminate the staff educational intervention results in the inpatient hospital conference room using a verbal and visual approach with a PowerPoint presentation. The PowerPoint presentation slides will include results of the pre- education and post-education questionnaires, poster education, handouts, and tables to provide support for the project findings. I will use the tables to discuss the rate of nurses' knowledge and early CAP readmissions before and after the education intervention to demonstrate the staff education's effectiveness. I will focus on maintaining an open relationship with the project team members while taking responsibility to resolve difficult challenges from the project. Disseminating the project will help the audience to identify the outcome and accept the changes. Also, disseminating the outcome can provide an

opportunity for the nurses to use the project findings to improve patient care and bring closure to the clinical practice gap (Curtis & DeMaio, 2017).

Analysis of Self

Practitioner

As a practitioner, I understand the importance of having the proper skills to implement a practice change. Currently, I am a clinical nurse in the inpatient hospital where the project was implemented. My role in the organization will focus on quality and safe patient care. As a DNP graduate, I will further my role as a clinical practitioner in collaborating and adopting evidence-based practices to identify patients at risk for health issues. I will implement a practice change and disseminate findings to address the problem. My role will also focus on educating nurses on the appropriate use of antibiotic therapy to decrease early CAP readmissions. It is imperative to implement a clinical practice change to improve patient care and promote quality patient's outcomes (AACN, 2006).

Scholar

The knowledge and experiences gained from this project allowed me to assess for clinical practice gap and implement a change to promote positive outcomes. As a DNP scholar, I used my practicum experiences to implement a staff educational intervention on the appropriate use of antibiotic therapy to decrease early CAP readmissions. I was able to increase the team's awareness in using the staff education on antibiotic therapy to increase nurses' knowledge and decrease early CAP readmissions. The DNP program's goal is to produce nurses who are well prepared to bridge the gap with new knowledge,

translate the knowledge, and integrate it into practice (AACN, 2006). I will apply the

knowledge I have gained from the DNP program at Walden University in my career to

implement, evaluate outcomes, and disseminate findings into nursing practice (AACN,

2006).

Project Manager

The DNP Program at Walden University has prepared me to be an effective and

efficient project manager. The knowledge gained from the practicum experience has

given me the skills to assess, implement, and evaluate the complex DNP project. As a

project manager, it was significant to implement a staff education on antibiotic therapy to

increase nurses' knowledge and decrease early CAP readmissions. My responsibilities as

the project manager included identifying the practice gap, evidence-based literature

review, education of participants, applying practice change, and evaluating the

effectiveness of the practice change. Project managers are a significant component in

planning, implementing and evaluating the practice change (Mélanie et al., 2017).

As a project manager, I used my leadership skills to identify the practice gap and

assess staff readiness for the change. Amarneh (2019) noted that before the change can

take place, the nursing staff's readiness must be assessed to promote a better outcome. I

utilized the project team members for various activities. I created clear goals to achieve

the desire outcomes, maintained an open communication with the project team members

and utilized their effort in planning, implementing, and evaluating the project.

Completion of Project

One essential role of the DNP prepared nurse is to integrate evidence-based findings into clinical practice to promote positive patient outcomes. As the health system continues to evolve rapidly, it imperative that nurses plan, implement, evaluate and disseminate evidence-based findings to improve patient care. Curtis and DeMaio, (2017) discussed that disseminating the outcome of the project will help the participants to accept the proposed change and provide an opportunity to utilize the research findings to improve patient care.

Some of the project obstacles included IRB approval and scheduling of staff education. The IRB approval was the first obstacle as the project needed IRB approval before data collection. According to Lapid et al. (2019), the IRB approval must be completed before data collection as its purpose is to protect participants' rights. For the project to be approved, the research committee met once a month to address concerns and ask questions. Due to the increasing concerns and problems with the project, there was a massive delay in approving the project. Finally, my Chair Dr. Verklan had to help address some of the project concerns, which led to IRB approval. Throughout the obstacles, I relied upon guidance and direction from my Chair.

The next obstacle was the scheduling of staff education. After the project was approved, my goal was to start the staff educational intervention via Virtual learning. The reason that surrounded the Virtual learning was due to the COVID-19 lockdown restrictions. However, the research committee members did not allow a swift start of staff education because nurses did not have enough time to participate in Virtual learning. The

DNP project's completion has given me the leadership skills to continue seeking out problems, developing educational programs and utilizing evidence-based research knowledge to improve clinical practice and patient outcomes. The obstacles in completing the project were part of my professional growth in using strategies to overcome challenges.

Summary

The purpose of the evidence-based project (EBP) was to determine if the staff educational intervention on the appropriate use of antibiotic therapy would increase the medical-surgical nurses' knowledge and decrease the 30-day readmission rates for patients diagnosed with CAP. The objective of the EBP was to develop staff educational intervention to increase nurses' knowledge on the appropriate use of antibiotic therapy and decrease early CAP readmissions. The educational intervention used provided the medical-surgical nurses with knowledge to identify patients at risk for early CAP readmissions. The goal of increasing the nurses' knowledge on the appropriate use of antibiotic therapy and decreasing early CAP readmissions was met. Evaluation of the findings showed a trend of increasing nurses 'knowledge of the appropriate use of antibiotic therapy (Table 2) and decreasing early CAP readmissions (Table 3). The dissemination of the project outcomes will take place in the inpatient hospital conference room using verbal and visual approach with PowerPoint. There was collaboration among team members in the planning and implementation of the project. I am very confident that the inpatient hospital will adopt my developed clinical practice guideline on antibiotic therapy to increase nurses' knowledge and decrease early CAP readmissions.

References

Adamuz, J., Viasus, D., Simonetti, A., Jaminez-Martinez, E., Molero, L., Gonzalez-
Samatino, M., Castillo, E., Juve-Udina, M.-E., Alcocer, M.-J., Hernandez, M.-P.,
Roel, A., Abad, E., Zabalegui, A., Ricart, P., Gonzalez, A., Isla, P., Dorca, J.,
Garcia-Vidal, C., & Carrtala, J. (2015). Impact of an educational program to
reduce healthcare resources in community-acquired pneumonia: The EDUCAP
randomized controlled trial. *PLoS ONE, 10*(10), 1- 12.
https://doi.org/10.137/journal.pone.0140202

Afrasiabifar, A., Mehri, Z., Sadat, S. J., & Shirazi, H. R. (2016). The effect of Orem's
self-care model on fatigue in patients with multiple sclerosis: a single blind
randomized clinical trial study. *Iranian Red Crescent Medical Journal*, *18*(8),
e59188. https://doi.org/10.5812/ircmj.31955

Afrizal, S. H., Hidayanto, A. N., Handayani, P. W., Budiharsana, M., & Eryando, T.
(2019). Narrative review for exploring barriers to readiness of electronic health
record implementation in primary health care. *Healthcare Informatics Research,
25*(3), 141–152. https://doi.org/10.4258/hir.2019.25.3.141

Agency for Healthcare Research and Quality. (2017). National older adults benchmark
details: Establishing benchmark for hospitals.
https://nhqrnet.ahrq.gov/inhqrdr/National/benchmark/table/Priority_Populations/
Older_Adults

Alba, I., & Amin, A. (2014). Pneumonia readmissions: Risk factors and implications.
Journal of Clinical Nursing, *14*(4), 649-654.

Amarneh, B. H. (2017). Nurses' perspectives on readiness of organizations for change: A

    comparative study. *Nursing: Research & Reviews, 7,* 37–44.

    https://doi.org/10.2147/nrr.s126703

American Association of Colleges of Nursing. (2006). *The essential of doctoral*

    education for advanced nursing practice.

    https://www.aacnnursing.org/DNP/DNP-Essentials

Barlam, T. F., Cosgrove, S. E., Abbo, L. M., MacDougall, C., Schuetz, A. N., Septimus,

    E. J., Srinivasan, A., Dellit H. T., Falck-Ytter T. Y., Fishman, O. N., Hamilton,

    W. C., Jenkins, C. T., Lipsett, A. P., Malani, N. P., May, S. L., Moran, J. G.,

    Neuhauser, M. M., Newland, G. J., Ohl, A. C., … Trivedi, K. K. (2016).

    Implementing an antibiotic stewardship program: guidelines by the Infectious

    Disease Society of America. *Journal of Clinical Infectious Disease*, 62(10), e51-

    e77. https://doi.org/10.1093/cid/ciw18

Baskin, L. (2017). Health literacy, social support and self-care behaviors as predictive

    factors in the use of the emergency department for patients with chronic care

    management in patients with HTN and/or diabetes mellitus ages 30-64 [Doctoral

    dissertation, The University of Southern Mississippi]. *Dissertations.* 1458.

    https://aquila.usm.edu/dissertations/1458

Capik, A., Nazik, E., & Ozdemir, F. (2015). The effect of the care given using Orem's

    self-care model on the postpartum self-evaluation. *International Journal of*

    Caring Sciences, *8*(2), 393-403.

Centers for Disease Control and Prevention (2018). Continuing educational materials and

resources for antibiotic stewardship. https://www.train.org/cdctrain/training-plan/3697

Choudhury, G., Mandel, D., Singanayagam, A., Akram, A. R., Chalmers, J. D., & Hill, A. T. (2011). Seven-day antibiotic courses have similar efficacy to prolonged courses in severe community-acquired pneumonia: A propensity-adjusted analysis. Clinical Microbiology and Infection *17(12)*, 1852-1858. https://doi.org/10.1111/j.1469-0691.2011.03542.x

Curtis, J., & DeMaio, D. (2017). Dissemination of translational research. *Radiologic Technology*, *89*(1), 103–106.

Dogoda, K., & Rahbani, P. (2018). Identifying risk factors associated with thirty-day pneumonia readmissions. *Quality Improvement*.

Dunbar-Jacob, J., Nativio, D. G., & Khalil, H. (2013). Impact of doctor of nursing practice education in shaping health care systems for the future. *Journal of Nursing Education*, *52*(8), 423-427. https://doi.org/10.3928/01484834-20130719-03

Edwards, R., Drumright, L. N., Kieman, M., & Holmes, A. (2011). Covering more territory to fight resistance: Considering nurses' role in antimicrobial stewardship. *Journal of Infection Prevention*, *12*(1), 6-10.

Engel, M. F., Burns, A. H. W., Hulscher, M. E., Gaillard, C. A., Sankatsing, S. U., Van-Berkhout, F. T., Emmelot-Vonk, M. H., Kuck, E. M., Steeghs, M. H., Breeijen, J. H., Stellato, R. K., Hoepelman, A. I., & Oosterheert, J. J. (2014). A tailored implementation strategy to reduce the duration of intravenous antibiotic treatment

in community acquired pneumonia: A controlled before and after study. *Journal of Clinical Microbial Infectious Disease*, *33*(1), 1897-1908. https://doi.org/10.1007/s10096-014-2158-z

Eyegue-Sandy, K. (2017). Decreasing thirty-days hospital readmission rates of adult heart failure patients [Doctoral dissertation, Walden University]. Walden University ScholarWorks. https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=4870&context=dissertations

Fisher, C. C., Cox, V. C., Gorman, S. K., Lesko, N., Holdsworth, K., Delaney, N., & Mckenna, C. (2018). A theory-informed assessment of the barriers and facilitators to nurse-driven antimicrobial stewardship. *American Journal of Infection Control*, *46*(12), 1365-1369. https://doi.org/10.1016/j.ajci.2018.05.020

Foolad, F., Huang, A. M., Nguyen, C. T., Colyer, L., Lim, M., Grieger, J., Li, J., Revolinski, S., Mack, M., Gandhi, T., Wainaina, J. N., Eschenauer, G., Patel, S. T., Marshall, D. V., & Nagel, J. (2018). A multicentre stewardship initiative to decrease excessive duration of antibiotic therapy for treatment of community-acquired pneumonia. *Journal of Antimicrobial Chemotherapy*, *73*(5) 1402-1407, https://doi.org/10.1093/jac/dky021

Garde, E. M., Natsch, S., Prins, J. M., & Linden, P. D. (2015). Antibiotic prescribing on admission to patient with pneumonia and prior outpatient antibiotic treatment: A cohort study on clinical outcome. *BMJ Open*, 5(2), e006892. https://doi.org/10.1136/bmjopen-2014-006892

Goering, L. (2018). Pneumonia recovery: A plan can help. *Journal of Quality Improvement*, *27*(5), 305-309.

Grove, S. K., Burns, N., & Gray, J. R. (2013). *The practice of nursing research: Appraisal, synthesis and generation of evidence* (7th ed.): Saunders.

Jain, S., Khera, R., Mortensen, E. M., & Weissler, J. C. (2018). Readmissions of adults within three age groups following hospitalization for pneumonia: Analysis from the Nationwide Readmission Database. *PLoS One*, *13*(9), e0203375. https://doi.org/10.137/journal.pone.0203375

Jayaweerasingham, M., Angulmaduwa, S., & Liyanapathirana, V. (2019). Knowledge, beliefs and practices on antibiotic use and resistance among a group of nurses in Sri Lanka. *Journal of Clinical Nursing*, 12(6), 2-6. https://doi.org/10.1186/s13104-019-4640-2

Kalil, A. C., Metersky, M. L., Klompas, M., Muscedere, J., Sweeney, D. A., Palmer, L. B., Napolitano, L. M., O'Grady, N. P., Bartlett, J. G., Carratala, J., El Solh., A. A., Ewig, S., Fey, P. D., File Jr., T. M., Restrepo, M. I., Roberts, J. A., Waterer, G. W., Cruse, P., Knight, S. L., & Brozek, J. L. (2016). Management of adults with hospital-acquired and ventilator associated pneumonia: 2016 clinical practice guidelines by the Infectious Diseases Society of America and the American Thoracic Society. *Journal of Infectious Diseases*, *63*(5), e61-e111. https://doi.org/10.1093/cid/ciw353

Kettner, P. M., Moroney, R. M., & Martin, L. L. (2017). *Designing and managing programs: An effectiveness-based approach* (5th ed.). Sage

Kurtzhalts, K. E., Sellick, J. A., Ruh, C. A., Carbo, J. F., Ott, M. C., & Mergenhagen, K.
A. (2016). Impact of antimicrobial stewardship on outcomes in hospitalized
veterans with pneumonia. *Journal of Clinical Therapeutics*, *38*(7), 1750-1758.
https://doi.org/10.1016/j.clinthera.2016.06.004

Lapid, M. I., Clarke, B. L., & Wright, R. S. (2019). Institutional review boards: What
clinician researchers need to know. *Mayo Clinic Proceedings, 94*(3), 515–525.
https://doi.org/10.1016/j.mayocp.2019.01.020

Lisenby, K. M., Carroll, D. N., & Pinner, N. A. (2015). Evaluation of pharmacist-specific
intervention on 30-days' readmission rates for high risk patients with pneumonia.
Journal of Clinical Nursing, *50*(8), 700-709. https://doi.org/10.1310/hpj5008-700

Mansouri, M. D., Cadle, R. M., Agbahiwe, S. O., & Musher, D. M. (2011). Impact of an
antibiotic restriction program on antibiotic utilization in treatment of community
acquired pneumonia in a veteran's affairs medical center. *Journal of Infectious
Disease*, *39*(1), 53-58. https://doi.org/10.1007/s15010-010-0078-0

Marti, C., John, G., Genn, D., Prendki, V., Rutschmann, O. T., Stirnemann, J., & Garin,
N. (2017). Time to antibiotics administration and outcomes in community-
acquired pneumonia: Secondary analysis of a randomized controlled trial. *Journal
of Clinical Nursing*, *43*, 58-61. https://.doi.org/10.1016/j.ejim.2017.06.012

Mather, J. F., Fortunato, G. J., Ash, J. L., Davis, M. J., & Kumar, A. (2014). Prediction of
pneumonia 30-day readmission: a single center attempt to increase model
performance. *Respiratory Care*, *59*(2), 199-208.

Marvin, A. F., & Volino Robinson, R. (2018). Implementing trauma-informed care at a

    non-profit human service agency in Alaska: Assessing knowledge, attitudes, and

    readiness for change. *Journal of Evidence-Informed Social Work, 15*(5), 550–563.

    https://doi.org/10.1080/23761407.2018.1489324

Mélanie, L., Monique, A., Guylaine, C., Marie, C. R., Jean, F. F., Claude, F., & Caroline,

    M. (2017). Innovation in health service management: Adoption of project

    management offices to support major health care transformation. *Journal of*

    Nursing Management, 8, 657. https://doi.org/10.1111/jonm.12505

Micek, S. T., Lang, A., Fuller, B. M., Hampton, N. B., & Kollef, M. H. (2014). Clinical

    implications for patients treated inappropriately for community-acquired

    pneumonia in the emergency department. *Journal of Infectious Diseases*, *10*(3),

    14-61. https://doi.org/10.1186/1471-2334-14-61

Orem, D. E., & Vardiman, E. M. (1995). Orem's nursing theory and positive mental

    health: practical considerations. *Nursing Science Quarterly, 8*(4), 165-173.

    https://doi.org/10.1177/089431849500800407

Sexton, D. J. (2013). Excess readmissions for pneumonia: A dilemma with a penalty.

    Journal of Quality Improvement, *57*, 368-370.

Simmons, L. (2009). Dorthea Orem's Self-Care Theory as related to nursing practice in

    hemodialysis. *Nephrology Nursing Journal*, *36*(4), 419-422.

Skinner, E. H., Lloyd, M., Janus, E., Ong, M. L., Karahalios, A., Haines, T. P., Kelly, A.,

    Shackell, M., & Karunajeewa, H. (2018). The improve-gap trial aiming to

    improve evidence-based management of community-acquired pneumonia: Study

protocol for a stepped wedge randomized controlled trial. *Journal of Clinical Nursing*, *12(*3), 6-16. https://doi.org/10.1186/s13063-017-2407

Titler, G. M., Kleiber, C., Steelman, J. V., Rakel, A. B., Budreau, G., Everett, Q. L., Buckwalter, C. K., Tripp-Reimer, C., & Goode, J. C. (2001). The Iowa model of evidence-based practice to promote quality care. *Journal of Nursing Education*, *13*(4), 497-509. https://doi.org/10.1016/50899-5885(18)30017-0

Viasus, D., Simonetti, A. F., Garcia-Vidal, C., Niubo, J., Dorca, J., & Carratala, J. (2017). Impact of antibiotic de-escalation on clinical outcomes in community acquired pneumococcal pneumonia. *Journal of Antimicrobial Chemotherapy*, *72*, 547-553. https://doi.org/10.1093/jac/dkw441

Weinreich, M., Nguyen, O. K., Wang, D., Mayo, H., Mortensen, E. M., Helm, E. A., & Makam, A. N. (2016). Predicting the risk of readmission in pneumonia: A systemic review of model performance. *Journal of Infectious Disease*, *12(*4) 1607-1614. https://doi.org/0000-001-7072-9946

White, K. M., Dudley-Brown, S., & Terharr, M. F. (2016). *Translation of evidence into nursing and health care practice (2nd ed.).* Springer.

White, S., & Spruce, L. (2015). Preoperative nursing leaders implement clinical practice using the Iowa model of evidence-based practice. *Journal of Clinical Nursing*, *1*(102), 50-58. https://doi.org/10.1016/j.aorn2015.04.001

Williams, N. (2015). The impact of self-care education on heart failure patients with a high risk for readmission [Nursing Thesis, Hunt School of Nursing]. *Nursing Theses and Capstone Projects*. 226. https://digitalcommons.gardner-

webb.edu/nursing_etd/226

Appendix A: Handouts on Antibiotic Therapy

IMPROVING ANTIBIOTIC USE

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

Do I really need antibiotics?

SAY YES TO ANTIBIOTICS
when needed for certain infections caused by **bacteria**.

SAY NO TO ANTIBIOTICS
for **viruses**, such as colds and flu, or runny noses, even if the mucus is thick, yellow or green. Antibiotics also won't help for some common bacterial infections including most cases of bronchitis, many sinus infections, and some ear infections.

Antibiotics are only needed for treating certain infections caused by bacteria.

Antibiotics do NOT work on viruses.

Do antibiotics have side effects?

Anytime antibiotics are used, they can cause side effects. When antibiotics aren't needed, they won't help you, and the side effects could still hurt you. Common side effects of antibiotics can include:

Rash   Dizziness   Nausea   Yeast Infections   Diarrhea

More serious side effects include *Clostridium difficile* infection (also called *C. difficile* or *C. diff*), which causes diarrhea that can lead to severe colon damage and death. People can also have severe and life-threatening allergic reactions.

Antibiotics save lives. When a patient needs antibiotics, the benefits outweigh the risks of side effects.

1 out of 5 medication-related visits to the ED are from reactions to antibiotics.

A Commitment to Our Patients About Antibiotics

Antibiotics only fight infections caused by bacteria. Like all drugs, they can be harmful and should only be used when necessary. Taking antibiotics when you have a virus can do more harm than good: you will still feel sick and the antibiotic could give you a skin rash, diarrhea, a yeast infection, or worse.

Antibiotics also give bacteria a chance to become more resistant to them.
This can make future infections harder to treat. It means that antibiotics might not work when you really do need them. Because of this, it is important that you only use an antibiotic when it is necessary to treat your illness.

How can you help? When you have a cough, sore throat, or other illness, tell your doctor you only want an antibiotic if it is really necessary. If you are not prescribed an antibiotic, ask what you can do to feel better and get relief from your symptoms.

Your health is important to us. As your healthcare providers, we promise to provide the best possible treatment for your condition. If an antibiotic is not needed, we will explain this to you and will offer a treatment plan that will help. We are **dedicated** to prescribing antibiotics **only** when they are needed, and we will avoid giving you antibiotics when they might do more harm than good.

If you have any questions, please feel free to ask us.

Sincerely,

To learn more about antibiotic prescribing and use, visit www.cdc.gov/antibiotic-use.

BE ANTIBIOTICS AWARE
SMART USE, BEST CARE

CDC

Appendix B: 10-points Questionnaire

1. Community-acquired pneumonia is a serious health problem and causes more than
    A. 35,00 deaths per year
    B.   600,00 deaths per year
    C. 25.000 deaths per year
    D. 50,000 deaths per year

2. What percentage of antibiotic therapy are prescribed inappropriately and unnecessarily in inpatient and outpatient settings?
    A. 30%
    B. 65%
    C. 76%
    D. 80%

3. Nurses can do the following to support appropriate antibiotic use in their facility
    A. Be aware of antibiotic resistance patterns
    B. Evaluate for antibiotic de-escalation
    C. Communicate with patients and families about antibiotics and possible harms with inappropriate use
    D. All the above

4. Which question should the provider ask hours after antibiotic therapy is initiated?
    A. How long would the patient receive the antibiotic therapy?
    B. Is the patient tolerating fluids?
    C. Is antibiotic resistance infection present?
    D. Is the antibiotic therapy
        Unnecessary?

5. What is antibiotic resistance?
    A. One of the most urgent threats to public health
    B. Bacteria once easily treated and now become untreatable
    C. Difficult to kill and more expensive to treat
    D. All the above

6. Inappropriate antibiotic treatment can cause
    A. Longer hospital stays
    B. early readmissions
    C. Increase healthcare costs
    D. All the above

7. Inappropriate antibiotic therapy is defined as antibiotic prescribing that is not in agreement with established clinical practice guidelines
    A. True
    B. False

8. Appropriate antibiotic therapy is defined as
    A. Antibiotic given within 4 hours of arrival in the ER
    B. Antibiotic given within 6 hours of admission
    C. Transition from IV to an oral antibiotic when the patient is clinically stable
    D. Both A and C are correct

9. Nurses can help prevent antibiotic resistance by:
    A. Encouraging patients to use the antibiotic as instructed
    B. Collaborating with providers to promote appropriate antibiotic use
    C. Evaluate for unnecessary antibiotic therapy, and collaborate with providers for early transition from IV to an oral antibiotic treatment
    D. All the above

10. The process of an antibiotic time-out is
    A. Taking the patients off the medications 2-3 days' prior administration
    B. Reassessing treatment 2-3 days after starting antibiotic therapy taking lab results and clinical response into accounts.
    C. Cease antibiotic administration after 2-3 days and provide the patients with extra vitamins
    D. None of the above

Appendix C: Staff Education on Antibiotic Therapy

Antibiotic Principles and Guidelines

Introduction

Inappropriate antibiotic therapy- is not aligned with clinical practice guidelines, can be identified
- Longer antibiotic duration
- Ineffective de-escalation (unnecessary antibiotics)
- Antibiotic Resistant Infection
- Increase level of bacteria infection(procalcitonin)
- Poor selection of antibiotic treatment (empiric)
- Failure to change IV to an oral antibiotic.

- Inpatient and outpatient- 30%of all antibiotics prescribed are inappropriate and unnecessary
- Long-term care settings- 40-75% of antibiotics prescribed are inappropriate.

Inappropriate Antibiotic Therapy
- Longer hospital stays
- Increase mortality rates
- Increase 30-days readmissions
- Increase healthcare costs

- Community-acquired pneumonia (CAP) has been identified with early readmissions due to inappropriate use of antibiotic therapy

Antibiotic Guidelines

CAP is a serious health problem, accounts for
- More than 50.000 deaths per year
- 140,000 hospital readmissions per year
- More than 10 billion in healthcare costs
- Nurses must follow the guidelines to help prevent inappropriate use of antibiotic therapy
- Antibiotic therapy depends on proper selection of antimicrobial agents
- Collection of blood cultures and sputum gram smear before antibiotic administration
- Administering antibiotic 4 hours of arrival in the hospital
- Discuss with physician for narrow-spectrum when cultures are available to minimize resistant
- Check antibiotic duration for not more than 5-antibiotics for uncomplicated pneumonia
- Evaluate for antibiotic de-escalation to prevent antibiotic resistant infection
- Discuss with physician to switch from IV to an oral antibiotic when patient is clinically stable or 4 days for uncomplicated pneumonia
- Adhere to the right timing and right antibiotic dosage,
- Discuss antibiotic d/c when patient is stable