2022

Educating Nurses on the Progression of Chronic Kidney Disease

Andrea Georgia Mignott
Walden University

Walden University

College of Nursing

This is to certify that the doctoral study by

Andrea Mignott

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. Anna Hubbard, Committee Chairperson, Nursing Faculty
Dr. Tracy Andrews, Committee Member, Nursing Faculty
Dr. Diane Whitehead, University Reviewer, Nursing Faculty

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

Walden University
2022

Abstract

Educating Nurses on the Progression of Chronic Kidney Disease

By

Andrea Georgia Mignott

MS, University of the West Indies, 2015

BS, University of the West Indies, 2012

Project Submitted in Partial Fulfilment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2022

Abstract

The increasing prevalence and incidence of chronic kidney disease (CKD) is a major healthcare burden in developed and developing countries. A gap in nursing practice was identified in a teaching and referral hospital located in Jamaica. Nurses in the organization lacked requisite knowledge and current evidence-based practice guidelines on CKD and therefore could not teach patients diagnosed with CKD. The purpose of this project was to educate nurses regarding the progression of CKD, with the aim of slowing the disease process. This Doctor of Nursing Practice project explored whether educating nurses on the progression of CKD would increase their knowledge of this disease. This staff education project involved identifying knowledge gaps and increasing nurses' knowledge with information based on current evidence-based practices. The chronic care model was used to guide this project. Twenty-one nurses voluntarily participated in the project. Findings from analysis and synthesis of evidence revealed that the pre-seminar (M = 46.76%, SD = 16.95%) and post-seminar test (M = 59.38%, SD = 13.29%) among nurses who attended a seminar on progression of CKD, indicates improvements in memory recall, with t (20) = -4.011 and $p < .005$. Project results may impact social change as nurses with increased knowledge regarding CKD can improve the health and wellbeing of their patients.

Educating Nurses on the Progression of Chronic Kidney Disease

by

Andrea Georgia Mignott

MS, University of the West Indies, 2015

BS, University of the West Indies, 2012

Project Submitted in Partial Fulfilment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

August 2022

Dedication

"The heights by great men reached and kept were not attained by sudden flight, but they, while their companions slept, were toiling upward in the night". The work of this project is dedicated to the loving memory of my friend and patient Miss. Sarina Patricia Grossett.

Acknowledgments

I would like to express my sincere appreciation to my committee members: mentor/chair Dr. Anna Hubbard, second committee member Dr. Tracy D. Andrews, and the University Research Reviewer Dr. Diane Whitehead, for their guidance and support throughout this project. My esteemed gratitude to my mother for all her support and encouraging words.

Table of Contents

Section 1: Nature of the Project

Introduction

The increasing prevalence and incidence of chronic kidney disease (CKD) is a major healthcare burden in developing and developed countries. The Global Burden of Disease (GBD) study ranked chronic kidney disease the 12th leading cause of death globally in 2017, an increase from 17th in 1990 (Cockwell & Fisher, 2020). In developing countries such as Jamaica, CKD causes devastating effects on the socio-economic lives of populations that are affected. Contributing factors include late referrals to nephrologists or nephrology clinics and lack of awareness of practice guidelines for treating CKD among primary care providers. CKD mostly affects young and middle-aged persons who comprise the most productive group in society (Adejumo et al., 2018). The National Kidney Foundation (NKF, 2021) said 10.0% of the population worldwide are affected by CKD, and with early diagnosis and treatment, it is possible to slow or stop the progression of this disease.

Early detection of stages of CKD, diagnosis, and effective management of risk factors can potentially slow progression and decrease mortality and morbidity due to cardiovascular disease, and therefore improve patient outcomes and quality of life (Gapira et al., 2020). The NKF (2021) said with early diagnosis and treatment, it is possible to slow or stop the progression of CKD. Medication management, dietary management, exercise, and fluid restriction can improve quality of life and decrease complications related to CKD (Gapira et al., 2020).

Educating nurses to identify and manage early stages of CKD and related risk factors is vital to improving patient outcomes. Shilpak et al. (2020) said identifying and treating CKD at the earliest stages is of vital importance. Couser et al. (2011) said early detection and treatment of CKD using readily available and inexpensive therapies can slow or prevent disease progression, and therefore reduce the burden of CKD, improve outcomes, and significantly reduce morbidity and mortality from this disease. Thompson-Martin et al. (2015) said evidence-based and timely referrals to a nephrologist has the potential to slow progression of CKD, decreasing morbidity and mortality and reducing healthcare costs.

There was a gap in nursing practice involving a teaching and referral hospital located in Jamaica. Nurses in the organization lacked requisite knowledge and current evidence-based practice guidelines on CKD, and therefore were not able to teach patients diagnosed with CKD. The prevalence of CKD in Jamaica, defined as serum creatinine > 150 umol/L, was estimated at 327 per million in 1999, and the number continues to rise (Ferguson et al., 2015). In 2006, the Caribbean Renal Registry was established to document the epidemiology of renal disease in the Caribbean; in 2007, the registry included 968 patients with CKD in Jamaica, of which 576 were on renal replacement therapy (Ferguson et al., 2015). Since 2007, the number of persons diagnosed with CKD has increased significantly, although data are not captured in the renal registry, and the teaching and referral hospital has seen a huge number of admissions at various stages of the CKD continuum. It was evident based on the assessment that patients had little or no insights regarding their CKD diagnosis, and nurses were reluctant to educate patients

because of their knowledge deficits in terms of identifying and managing CKD. Additionally, many nurses were unaware of current evidence-based guidelines for management of CKD. Educating nurses on the progression of CKD is essential for them to be effective in terms of educating their patients and society. This staff education project may impact social change by providing nurses with requisite knowledge based on best practices to reduce the disease burden, slowing progression and therefore improving patient outcomes.

Problem Statement

There was a gap in nursing practice in a teaching and referral hospital located in Jamaica. Nurses in the organization lacked requisite knowledge and current evidence-based practice guidelines on CKD, and therefore were unable to teach patients diagnosed with CKD. CKD is common among the Jamaican population, with a prevalence of 327 per million persons (Ferguson et al., 2015). Data from the Caribbean Renal Registry showed Jamaica had more than 2,700 patients at different stages of the CKD continuum living in four out of twelve of the main parishes in the country, with more than 800 receiving treatment and 1,200 expected to need renal replacement therapy (Kramer et al., 2018). Approximately 86% of patients at a specialist clinic in a teaching hospital in Jamaica had CKD and 70% were at high risk for adverse outcomes (Ferguson et al., 2015). Given the current number of persons living with CKD in Jamaica, growing number of patients with CKD attending a specialist clinic at the hospital, and inadequate number of trained personnel, the practice-focused question that is the focus of this

doctoral project was: Will educating nurses on the progression of CKD increase knowledge?

Nurses on medical wards in the organization lacked requisite knowledge and current evidence-based practice guidelines involving CKD. This staff education project was significant to nursing practice in terms of having equipped and empowered nurses with requisite knowledge on CKD. This project has the potential to increase nurses' knowledge using evidence-based practice. Nurses can then educate their patients on progression of CKD, with the overall goal to improve patient outcomes.

Purpose Statement

There was a gap in nursing practice in a teaching and referral hospital located in Jamaica. Nurses in the organization lacked requisite knowledge and current evidence-based practice guidelines on CKD, and therefore were unable to teach patients diagnosed with CKD.

The guiding practice-focused question for this doctoral project was: Will educating nurses on the progression of CKD increase knowledge? This staff education project addressed the gap in practice by educating nurses and increasing their knowledge on the progression of CKD in order to slow the progression of this disease and improve outcomes for patients.

The chronic care model (CCM) was used to plan educational sessions for nurses. The CCM is based on the assumption that improvement in care and management of chronic illnesses requires a team-based approach that incorporates patient, healthcare provider, and system level interventions (Fiandt, 2006). The CCM was an organized

framework which I used to address a gap in practice by educating nurses on the progression of CKD which helped to inform nurses and increase their knowledge using current evidence-based practices to improve patient outcomes.

Nature of the Doctoral Project

The purpose of this staff education project was to provide nurses with basic information necessary to assess, diagnose, and manage patients with CKD. Early diagnosis, treatment, and management of CKD slows disease progression, generates substantial cost savings for the healthcare system, and therefore improves patient outcomes (Wouters et al., 2015; Dobber, 2021).

In this study, I used the following keywords: *staff education, nurses' knowledge, nurses' education, progression of chronic kidney disease, chronic kidney disease, clinical practice guidelines, and chronic care model.* All sources were published between 2012 and 2022. I used the following databases: Walden Library, CINAHL, Ovid Plus, EBSCOHost, Medline, National Library of Medicine, West Indian Medical Journal, Kidney International Supplements, International Society of Nephrology, Nephrology Nursing Journal, Saudi Journal of Kidney Diseases and Transplantation, British Medical Journal, and PubMed. Selection criteria were based on studies that addressed nurses' knowledge, staff education, and the CCM as they related to the progression of CKD. Only English articles were included.

Approval was obtained from the hospital where the project was conducted. I obtained approval from Walden University's Institutional Review Board (IRB, #10-29-21-1045845). I used the analysis, design, development, implementation, and evaluation

(ADDIE) model for curriculum development with input from experts. The ADDIE model is a structured system framework for building effective education and training programs and performance support tools. Educational sessions on the progression of CKD were conducted during a seminar using a PowerPoint presentation as the method of delivery in person for 1 hour. Knowledge on progression of CKD was assessed using a pretest close-ended and structured self-administered questionnaire as well as a post-test self-administered questionnaire after the session. Proposed participants were 21 registered nurses working on medical wards in the hospital.

Prospective participants were informed about the aim of the project and its benefits in order to obtain their cooperation and acceptance to participate. They were informed that participation was voluntary and they had the right to withdraw at any time without giving a reason, and their responses would be confidential. Informed consent was obtained from all participants meeting inclusion criteria. The CCM is an integrated framework for organizing and providing care for persons with chronic diseases, incorporating the patient, healthcare provider, and system interventions necessary to accomplish the overall goal of improving care for chronic diseases (Agency for Healthcare Research and Quality [AHRQ], 2017).

Significance

Stakeholders for this project were patients diagnosed with CKD who will benefit from awareness and education involving CKD as evidenced by delayed disease progression. Other stakeholders were nurses working in medical wards of the hospital who benefitted from attending educational sessions on the progression of CKD,

evidenced by nurses who are equipped, educated, and empowered to educate patients regarding progression of CKD, with the overall goal to improve patient outcomes.

Educated nurses have the potential to make a difference in the lives of the CKD population, create efficiencies in education delivery, and improve outcomes of patients (Narva et al., 2015). Additionally, an education program has the potential to reduce unplanned urgent replacement therapy, hospital admissions, hospital costs, and cardiovascular events (Narva et al., 2015).

The project has the potential to contribute to the nursing profession by having equipped, educated, and empowered nurses ready to teach patients about CKD to slow progression and improve health and wellbeing of patients. The project will also contribute to nursing practice by adding to the body of nursing knowledge and improvement of healthcare policies and delivery based on best practices. Additionally, the project may contribute to transformative changes that are occurring in the CKD population based on best practices.

There is potential transferability of this project to clinical, socioeconomic, and public health issues. Nurses could contribute significantly by educating patients about disease conditions to slow disease progression. The devastating effect of CKD on the socioeconomic lives of affected persons could be improved by promoting early referral to nephrologists or nephrology clinics. Gapira et al. (2020) said early detection of stages of CKD, diagnosis, and effective management of risk factors can potentially slow progression. With early intervention and referral to a nephrologist or nephrology clinic, young and middle-aged persons affected with CKD could contribute significantly to

society. Increasing prevalence and incidence of CKD in developing countries such as Jamaica could be reduced significantly with an educated population, thereby reducing the public health burden of the disease.

This study will lead to social change through empowerment of nurses to communicate with their patients effectively and efficiently about CKD to slow progression. The organization would benefit from a well-structured and coordinated healthcare system, supporting health promotion and illness prevention.

Summary

Section 1 of this staff education project includes the problem statement, purpose statement, nature of the doctoral project, significance, and a summary.

In developing countries such as Jamaica, CKD continues to be a major healthcare burden. Nurses can play a significant role in terms of reducing the burden and slowing disease progression. Early detection of CKD stages, diagnosis, and effective management of risk factors can potentially slow progression and decrease morbidity and mortality, and therefore improve patient outcomes and quality of life (Gapira et al., 2020). Educational programs aimed at specific knowledge gaps in CKD should be addressed because they have the potential to increase nurses' knowledge and improve patient outcomes (Adejumo et al., 2018).

Section 2 includes an explanation of the CCM, relevance to nursing practice, background and context, the role of the DNP student, and a summary.

Section 2: Background and Context

Introduction

CKD is a major public health burden because of its increasing prevalence and incidence in developing and developed countries. CKD is characterized by kidney damage or glomerular filtration rate (GFR) that is < 60 ml/min/1.73 m^2 for 3 or more months, with the presence of albuminuria (Levey et al., 2005). Devastating effects of CKD on socioeconomic lives of affected populations are more pronounced in developing countries such as Jamaica because most patients present late to a nephrologist or nephrology clinic, and CKD mostly affects young and middle-aged individuals who constitute the most productive groups in society (Adejumo et al., 2018). In Jamaica, the reported prevalence of chronic renal failure defined as serum creatinine > 150 umol/L was estimated at 327 per million population in 1999 (Ferguson et al., 2015). In 2007, the Caribbean Renal Registry included 968 patients with CKD in Jamaica, of which 576 were on renal replacement therapy, and since then the numbers have increased significantly (Ferguson et al., 2015).

Given the huge burden of CKD in Jamaica and lack of awareness about the disease among the Jamaican population, educating nurses to identify and manage the early stages of CKD and related risk factors among patients is of critical importance, because it has the potential to slow or reduce the disease burden. Adequate knowledge of CKD among nurses and other healthcare professionals is essential for them to be effective in terms of educating their patients and society about CKD (Adejumo et al., 2018).

There was a gap in nursing practice in a teaching and referral hospital located in Jamaica. Nurses in the organization lacked requisite knowledge and current evidence-based practice guidelines on CKD and therefore were unable to teach patients diagnosed with CKD. Hence, the practice problem and the practice-focused question for this doctoral project was: Will educating nurses on the progression of CKD increase knowledge?

The purpose of this doctoral project was to educate nurses on the progression of CKD, slow the disease progression, and improve health outcomes of patients.

Concepts, Models, and Theories

The CCM was used to guide the staff education project. The public health burden of CKD in developed and developing countries is high and continues to grow, requiring stronger systems of care. The CCM was developed as an organized framework that encourages high-quality chronic disease management and improved care at both individual and population levels (Fiandt, 2006). Improvements in care and management of chronic illnesses require interventions at the healthcare provider, patient, and system levels (Fiandt, 2006). Elements of the CCM include self-management support, delivery system design, decision support, clinical information systems, organization of healthcare, and community resources; these elements are designed to support productive interactions and strengthen the provider-patient relationship and improve health outcomes (Institute for Healthcare Improvement [IHI], 2021). Nurses play an integral role in implementing successful interventions through the CCM. Hence, educating nurses on the progression of

CKD using the CCM will benefit nursing practice because it facilitates an organized framework that improves healthcare of individuals, populations, and society.

The CCM is a standard for improving care for people with chronic diseases such as CKD (Bodenheimer et al., 2005). Educating nurses will place them in a better position to champion transformation of CKD. Interactions between informed and activated patients and prepared and proactive practice teams is the aim of the CCM (Bodenheimer et al., 2005).

Nurses play an integral role in implementing components of the CCM, most importantly through education. Components of the CCM were used to guide the study. An understanding of teaching strategies to support patients in terms of self-care management can improve compliance and reduce complications of the disease (Ikpasaja, 2021).

Pintz et al. (2021) said 334 nurse practitioner students participated in an educational program designed to prepare students with skills to care for patients with chronic illnesses within an interprofessional practice setting. Interprofessional Care of Individuals with Multiple Chronic Conditions is an open-access eLearning course designed to prepare students with the requisite skills; the course features video case studies and interactive exercises. Nurses, nurse practitioners, and other healthcare professionals must be prepared to care for the growing population of patients with multiple chronic illnesses in order to promote patient engagement, self-management, and interprofessional collaboration (Pintz et al., 2021).

Llewellyn (2019) said the most successful interventions for primary care screening and management for CKD involved redesigning roles and bringing in adjunct team members with specialized knowledge or integrating interventions into existing workflows. Nurses with CKD knowledge were integral parts of successful interventions.

Anderson and Malone (2015) said preparing Australian nursing graduates for a changing health system was important to recognize global issues and prepare them to work within well-recognized models. Tertiary education providers should consider evidence-based models as key components of a curriculum (Anderson & Malone, 2015).

Thangkratok et al. (2019) study aimed to assess the role of nurses during the implementation of the CCM in Thailand and analyze related factors. Participants were 200 registered nurses who responded to self-administered questionnaires. The study found that the role of nurses during the implementation of CCM was at a reasonable level. Healthcare organization, clinical information systems, self-management support, decision support systems, and delivery system design were at high levels, while community resources and policy were at the lowest level. Encouragement and motivation to work and organizational support for chronic disease care should be provided (Thangkratok et al., 2019).

The following is a list of terms used in the doctoral project:

Chronic Care Model (CCM): An organizing framework for improving care and managing chronic illness at the individual and population levels (Fiandt, 2006). The model involves practical, supportive, and evidence-based interactions between informed and activated patients and prepared and proactive practice teams (Fiandt, 2006).

Chronic Kidney Disease (CKD): An abnormality of kidney structure or renal function as defined by markers of kidney disease or a decrease in GFR below 60 ml/min/1.73m^2 for more than 3 months (Gapira et al., 2020).

Knowledge: The extent to which a person has theoretical and practical information necessary to perform a task, including the ability to apply it again in work (Gapira et al., 2020). In this study, level of knowledge refers to the extent to which nurses are knowledgeable about CKD including, its definition, causes, risk factors, and complications.

Nurse: Healthcare professionals who are focused on serving individuals, families, and communities, ensuring that they achieve, maintain, and recover optimal health and functioning (Gapira et al., 2020). In this study, nurses are registered members of the healthcare team and registered with the nursing council of Jamaica. Nurses who participated in the project worked on the medical wards of the hospital with the expectation of identifying and treating patients with CKD according to established protocol.

Socioeconomic status: Social factors or class of an individual or group. Factors include education, income, and occupation (American Psychological Association, 2021).

Relevance to Nursing Practice

Nurses play an important role in terms of slowing the progression of CKD by educating patients, and their families on the importance of lifestyle modifications, medication adherence, glucose monitoring, and blood pressure control. According to Chicca (2020), the three main nursing care goals are preventing or slowing disease

progression, promoting physical and psychosocial well-being, and monitoring disease and related risk factors. Implementing components of the CCM is relevant to improving staff education on the progression of CKD. The CCM is accepted as a standard for improving care for people with chronic conditions worldwide (Bodenheimer et al., 2005). Studies showed that nurses play a central role in implementing components of the CCM and the positive outcomes seen may be due to better communication between nurse and patient (Bodenheimer et al., 2005).

Evidence has shown large deficiencies in CKD awareness and its progression in developed and developing countries, drawing attention to the need for improvement in CKD education (Narva et al., 2016). Data from the National Health and Nutrition Examination Survey (NHANES) posited that the awareness of CKD status among people with CKD was 6.4%, which is below the Healthy People 2020/30 goal of 11.7% (Narva et al., 2016). Narva et al. (2016) study highlighted that almost one-third of patients who followed nephrology practices had no understanding of their diagnosis of CKD and no awareness regarding their treatment options. Educating nurses on the progression of CKD, would increase knowledge, and place nurses in a better position to champion the transformation of chronic care.

The current state of nursing practice showed that nurses lacked the requisite knowledge on the progression of CKD, and therefore were not able to educate their patients in the selected teaching and referred hospital in Jamaica. With an increased risk of CKD progression, patients are faced with decreased quality of life, increased health care costs, multi-morbidity, and mortality. Several pieces of evidence supported the need

for awareness, early identification, intervention, and management of CKD to slow the disease progression. Shlipak's (2020) study supported the view that early identification and intervention of CKD offers the potential to substantially reduce the morbidity and mortality from CKD and its related complications, such as cardiovascular disease. The role of the nurses is critical in the awareness, identification, intervention, and management on the progression of CKD. Studies have shown that nurses have positively impacted patient outcomes and improved quality of life, after educating both patients and relatives on CKD (Llewellyn, 2019). Therefore, educating nurses on the progression of CKD has the potential to increase knowledge, and position nurses to be better able to educate their patients regarding CKD, to slow the disease progression, improve outcomes, and improve nursing practice.

In-service training and educational programs targeting specific knowledge gaps in CKD are strategies identified that have been used to address the gap in practice caused by the lack of knowledge and current evidence-based practice guidelines on CKD from nurses (Adejumo et al., 2018; Gapira et al., 2020). The authors further suggested that nurses should be given adequate evidence-based knowledge at the university level to enable them to appropriately manage patients with CKD; and educational programs should be incorporated regularly into continuing medical education hours for nurses and the nursing curriculum (Adejumo et al., 2018; Gapira et al., 2020).

The present doctoral project was intended to produce nurses knowledgeable about the progression of CKD and would be able to educate their patients regarding CKD, to slow the disease progression. This has the potential to improve nursing practice and

patient outcomes. Using elements of the CCM provides a holistic organizational approach to identifying facilitators of better outcomes for patients with chronic illnesses (Llewellyn, 2019).

Local Background and Context

Nurses in a selected teaching and referral hospital located in Jamaica lacked the requisite knowledge and current evidenced-based practice guidelines on CKD, and therefore, were unable to teach patients diagnosed with CKD. In 1999, the prevalence of CKD in Jamaica was estimated at 327 per million (Ferguson et al., 2015). The Caribbean Renal Registry included more than 2,700 patients at different CKD stages living in four main parishes of Jamaica, with more than 800 receiving a form of renal replacement therapy, and approximately 1, 200 anticipated to need some form of replacement therapy in the future (Kramer et al., 2018). This is likely an underestimation of the total number of patients needing renal replacement therapy, as the registry of patients is not mandatory. A study done at a teaching and referral hospital in Jamaica found that 10% of patients attending a diabetes clinic had chronic kidney disease (Ferguson et al., 2015). Given the rapid increase in the incidence and prevalence of CKD in Jamaica, and CKD being the fifth leading cause of mortality, there is a need for awareness, education, early identification, and management of CKD to slow the disease progression. Nurses equipped with the requisite knowledge and current evidence-based guidelines have an opportunity to positively impact the outcomes of the population affected through appropriate interventions and management. Hence, the practice-focused question that is the focus of

this doctoral project was: Will educating nurses on the progression of CKD increase knowledge?

As the incidence and prevalence of CKD continue to rise in Jamaica, the health care system is at risk of being overwhelmed by an explosion of CKD. The intended setting for the study was a teaching and referral hospital located in Jamaica, which serves a population of approximately 2.9 million. The institution offers a wide range of medical services including outpatient care through over 30 specialized outpatient clinics and support services such as radiology, cardiology, physiotherapy, laboratory, and addiction treatment. The hospital was considered for this project because of the population it serves, and the many referrals received daily. Patients from rural areas and surrounding hospitals are usually referred for further management of CKD. The devastating effect of the disease on the socio-economic lives of the people affected leads to significant challenges for the community. The 2015 study done at the hospital revealed that 86% of patients who attended a specialized clinic had CKD and were at high or very high risk of adverse outcomes (Ferguson et al., 2015). There was an increased need for public awareness among high-risk groups as part of the effort to slow the disease progression. Educating nurses on the progression of CKD is essential for them to be effective in educating their patients. Currently, policies, programs, and intervention strategies for early identification, diagnosis, and management of CKD and related risk factors are being implemented. It is the vision that health-conscious Jamaicans with improved health status will limit the impact of the disease on the population (Ministry of Health, 2018).

The Caribbean Renal Registry was established in 2006 to document the epidemiology of renal disease in Jamaica and the Caribbean (Ferguson et al., 2015).

Role of the DNP Student

The role of the DNP student in this staff education project included identifying the project, engaging and recruiting nurses, setting measurable objectives for the project, defining the problem, participating in the education program for the nurses, collecting data needed for evaluating the project performance and producing a written report on the findings.

As a DNP student, my role in the doctoral project was to participate in current evidence-based education sessions for the nurses selected to participate in the project, and as such, I was better able to evaluate if educating nurses on the progression of CKD increased knowledge. I was responsible for the analysis of the data provided by the nurses as an assessment of pre/post interventions monitoring.

Motivations for this doctoral project came when I observed the uncontrolled increase in CKD at an outreach screening clinic, late referral to nephrology clinic, frequent admission of patients with CKD, especially those contributing to the workforce of society, and the obvious gap in nursing practice. Nurses lacked the requisite knowledge and current evidence-based practice guidelines on the progression of CKD and therefore were unable to educate patients on CKD. The effort to educate and create awareness programs among high-risk groups was part of the goal to slow the disease progression. Nurses equipped with the requisite knowledge and current evidence-based

practice guidelines are essential in educating their patients and counseling high-risk groups.

Potential biases may occur at any phase during the project and especially if the investigator has an interest in the area. As a practicing nephrology nurse, I aimed to evaluate if educating nurses on the progression of CKD would increase knowledge, and allow nurses to be better positioned to educate their patients about CKD, to slow the disease progression. Participants were selected based on inclusion and exclusion criteria set for the project, only participants working on the medical ward of the hospital were allowed to participate in the project. Steps to be taken to address potential biases included transparency and accuracy in data collection and analysis within the time frame of the study.

Summary

Educating nurses on the progression of CKD has the potential to increase knowledge and was essential for nurses to be effective in educating their patients, relatives, and the community, as well as counseling the high-risk groups. The staff education session was based on the CCM and was supported by several pieces of evidence (Fiandt, 2006; Llewellyn, 2019). This staff education project has the potential to serve as an integrated framework into practice by using current evidence-based practice guidelines in the early identification and management of patients with CKD, which will lead to improved patient outcomes and better quality of life. The role of the DNP student in the project includes identifying the project, selecting the participants, evaluating the outcomes of the educational sessions, and producing report findings.

Section 3 of the project will address the practice-focused question, sources of evidence, data analysis and synthesis, and a summary.

Section 3: Collection and Analysis of Evidence

Introduction

In a teaching and referral hospital located in Jamaica, there was a gap in nursing practice. Nurses in the organization lacked requisite knowledge and current evidence-based practice guidelines on CKD and therefore were unable to teach patients diagnosed with CKD. The purpose of this staff education project was to evaluate the impact of education sessions for nurses regarding the progression of CKD, in order to slow the progression of this disease and improve outcomes for patients. Education sessions for nurses involved understanding the disease process, monitoring and management of blood pressure and diabetes mellitus, dietary management, medication adherence, and other lifestyle changes such as physical activity, smoking cessation, and limitation of alcohol consumption. Educating nurses on the progression of CKD has the potential to increase knowledge and is essential for nurses to be effective in terms of educating their patients, relatives, and communities, as well as counseling high-risk groups. The CCM was used to guide the staff education sessions.

Section 3 includes the practice-focused question, a review of sources of evidence, and data analysis and synthesis.

Practice-Focused Question

Given the rapid increase in incidence and prevalence of CKD in Jamaica, newly diagnosed CKD patients at the teaching and referral hospital, and frequent admissions of patients at different stages of CKD, there was a need for awareness and education to slow

the progression of CKD. Hence, the practice-focused question was: Will educating nurses on the progression of CKD increase knowledge?

Chronic Care Model (CCM): An organizing framework for improving care and managing chronic illness at the individual and population levels (Fiandt, 2006). The model involves practical, supportive, and evidence-based interactions between informed and activated patients and prepared and proactive practice teams (Fiandt, 2006).

Chronic Kidney Disease (CKD): An abnormality of kidney structure or renal function as defined by markers of kidney disease or a decrease in GFR below 60 ml/min/1.73m^2 for more than 3 months (Gapira et al., 2020).

Knowledge: The extent to which a person has theoretical and practical information necessary to perform a task, including the ability to apply it again in work (Gapira et al., 2020). In this study, level of knowledge refers to the extent to which nurses are knowledgeable about CKD including, its definition, causes, risk factors, and complications.

Nurse: Healthcare professionals who are focused on serving individuals, families, and communities, ensuring that they achieve, maintain, and recover optimal health and functioning (Gapira et al., 2020). In this study, nurses are registered members of the healthcare team and registered with the nursing council of Jamaica. Nurses who participated in the project worked on the medical wards of the hospital with the expectation of identifying and treating patients with CKD according to established protocol.

Socioeconomic status: Social factors or class of an individual or group. Factors include education, income, and occupation (American Psychological Association, 2021).

Sources of Evidence

Educating nurses on the progression of CKD and emphasizing early identification and management plays a vital role in slowing disease progression and reducing healthcare use and costs. Gapira et al. (2020) study found that 84% of nurses had a moderate level of knowledge related to CKD and 51% of nurses had a moderate level of perceptions regarding inpatient management of CKD while assessing knowledge related to CKD and perceived inpatient management among nurses. Nurses should be given adequate evidence-based knowledge at the university level to enable them to appropriately manage patients with CKD (Gapira et al., 2020).

Hernandez (2019) surveyed 20 nurse practitioners in a local community health center to assess awareness, knowledge, stages of CKD, and the disease progression. Nurse practitioners were provided with pre-test to assess awareness, education material on CKD, and a post-test after 2 weeks of education to assess increased awareness and knowledge retention. After two weeks of education sessions, participants showed an increase in knowledge on the post-test compared to the pre-test, and participants with the most years of experience had the lowest increase in knowledge compared to participants with the lowest years of experience showed the most improvement in knowledge (Hernandez, 2019).

Sinclair et al. (2019) said participants' baseline knowledge scores were poor, with poor pretest scores, compared to post-test scores that showed significant improvement,

after evaluating the effect of an asynchronous web-based e-learning module on general practice nurses' knowledge about chronic kidney disease risk factors and screening practices, and general practice nurses' perceived satisfaction with the e-learning module (Sinclair et al., 2019). The participants gave a high score for their satisfaction with the design of the e-learning module. The results suggested that an asynchronous web-based e-learning module has the potential to improve general practice nurses' knowledge of CKD risk factors and screening practice (Sinclair et al., 2019)

Adejumo et al. (2018) assessed the knowledge of CKD among non-nephrology nurses in Akure, Southwest Nigeria during their mandatory continuing professional development program requiring for practicing license renewal. Knowledge of CKD was assessed using a self-administered questionnaire and approximately 100 nurses participated. Results showed that 15% had nephrology rotation during training, 6% of the respondents had good knowledge of CKD, 55% had fair knowledge, and 37% had poor knowledge. There were significant deficiencies in terms of knowledge of CKD among non-nephrology nurses. Better knowledge was seen from junior and intermediate groups of nurses, and those who had nephrology rotation when compared to the more senior nurses (Adejumo et al., 2018).

Thompson-Martin et al. (2015) aimed to determine if advanced practice nurses working in a primary care setting are knowledgeable about the National Kidney Foundations Kidney Disease Outcomes Quality Initiative (NKF KDOQI) guidelines, as well as, to determine if a CKD education program that uses the NKF KDOQI guidelines could increase CKD knowledge and if the knowledge would be retained. Fourteen

advanced practice nurses participated in the study; a knowledge-based survey was used to measure knowledge outcomes. The results showed a significant increase in knowledge post-intervention, knowledge gained was retained at a one-month follow-up interval (Thompson-Martin et al., 2015).

Based on the sources of evidence reviewed, recommendations are that educating nurses at all levels has provided a positive impact on CKD screening, identification, and management. The positive impact of an educational program on CKD knowledge is a component of evidence-based quality care (Thompson-Martin et al., 2015). Supported by Adejumo et al.'s (2018) study, educational programs aimed at specific knowledge gaps in CKD should be addressed and included in the continuing medical education for nurses. Chronic kidney disease educational meetings are recommended to increase nurses' knowledge (Thompson-Martin et al., 2015). Efforts are required to increase nurses' access to educational opportunities designed to improve and increase knowledge in CKD management, aimed at increasing screening for CKD in the practice setting and improving outcomes of patients affected with the disease (Sinclair et al., 2019).

The relationship of the evidence to the purpose of assessing knowledge on the progression of CKD among nurses in the medical wards at a teaching and referral hospital in Jamaica is evident. Gaps exist between what is known from research on CKD guidelines and the application of knowledge (Thompson-Martin et al., 2015). This staff education project has the potential to address the gap in practice by educating nurses on the progression of CKD, aimed at informing nurses, increasing nurses' knowledge using current evidence-based guidelines, and improving the outcomes of patients. Evidence-

based practice guidelines intend to transform medical research and expert opinion into practice recommendations (Thompson-Martin et al., 2015).

The staff education project obtained hospital approval as well as, Walden IRB approval before data was collected. The collection of the evidence was based on a pre and post-test questionnaire. The questionnaire was composed of items including basic demographic questions such as years of experience, level of education, nephrology training experience, department type, age, and gender. In addition to questions that assessed knowledge of CKD, and practice questions based on scenarios on inpatient management.

The use of a statistical package of social science (SPSS) version 23 was used to analyze the data. The value of P at 0.05 was used for the level of significance.

The focus of the staff education project was to assess nurses' knowledge on the progression of CKD. The participants were registered nurses working in the medical wards of the hospital. The number of participants was chosen based on the selection criteria. Nurses working in the medical wards for at least 3 months, those available at the time of the study, and who signed the consent form were included. Nurses working less than 3 months, and nurses on sick leave or maternity leave were excluded from the study. Patients with CKD at different stages are usually admitted or transferred to the medical wards for management, where nurses have the responsibility to be able to identify and manage the patients with CKD.

The participants were informed of how to return the completed questionnaire, which was in a sealed envelope and collected by the DNP student. Questions were created based on professional guidelines and evidence-based practice.

Knowledge of CKD was assessed using a pre-and post-education intervention. The questionnaire was composed of 15 questions and consisted of sections A, B, and C. Section A consisted of questions on demographic information such as years of experience, level of education, nephrology training experience, department type, age, and gender. Section B consisted of questions that will assess knowledge of CKD including definition, risk factors of CKD, stages of CKD, complications of CKD, management of medication adherence, and dietary management of CKD. Section C consisted of practice questions that are based on scenarios of inpatient management. The validity and reliability of the data collection instrument was sought. Face and content validity was evaluated. The reliability of the tool was evaluated to identify any inconsistencies.

The staff education project protected participants, data collection, and result evaluation. Before data collection, ethical approval was obtained from Walden University IRB as well as, hospital approval. Participants' right to confidentiality, privacy, self-determination, and fair treatment was maintained. No monetary compensation was provided. Written informed consent was obtained from participants after a full explanation of the purpose of the project. In conducting this project, I adhered to Walden's social distancing policy. There was no direct patient care activities or participation in the project.

Analysis and Synthesis

The primary focus of this staff education project was to evaluate the impact of education sessions for nurses on the progression of CKD. A staff allocation chart review was used to determine eligibility for inclusion or exclusion of nurses participating in the project. Data analysis was done using the statistical package of social science (SPSS) version 23. Data were cleaned; number-coded without names and ensured there are no missing data in the completed questionnaire. A dependent t-test was used to analyze the data. The level of significance used was p at 0.05.

To assure the integrity of the evidence, the participant's right to confidentiality privacy, self-determination, to fair treatment was observed. Written informed consent was obtained from participants after a full explanation of the purpose of the project. The instrument was created based on professional guidelines and current evidence-based practice. The instrument was validated using official clinical practice guidelines by a panel of experts. Reliability was considered to identify any inconsistencies seen in the tool. During data collection, the same instrument was used for all participants. The questionnaire was administered to the nurses participating in the project to evaluate its level of consistency; each nurse will respond to the questionnaire two times. If the nurses answered the questionnaire in the same manner, then the consistency of the tool would have been observed. Cronbach alpha was used to determine the reliability of the instrument.

The analysis procedures used in this doctoral project to address the practice-focused question have the potential to provide increased knowledge or knowledge at the

highest level to influence healthcare outcomes through education intervention. In addition, the analysis procedures will be helped in the success of the DNP project.

Summary

The goal of this staff education project was to evaluate the outcomes of an education program geared toward nurses on the medical wards in a teaching and referral hospital on the management of CKD, aimed at informing nurses, increasing their knowledge to slowing the progression of CKD and improving the outcomes of patients. A dependent t-test was used to analyze the data. Section 4 includes findings and implications of the project and recommendations as well as strengths and limitations of the project.

Section 4: Findings and Recommendations

Introduction

CKD is a major public health burden because of its increasing prevalence and incidence in developed and developing countries. In a teaching and referral hospital located in Jamaica, there was a gap in nursing practice. Nurses in the organization lacked requisite knowledge and current evidence-based practice guidelines on CKD, and therefore were not able to teach patients diagnosed with CKD. Given the rapid increase in the incidence and prevalence of CKD in Jamaica, newly diagnosed CKD patients at the hospital, and frequent admissions of patients at different stages of CKD, there is a need for awareness and education to slow the progression of CKD. Hence, the practice-focused question was: Will educating nurses on the progression of CKD increase their knowledge in order to enable them to teach their patients?

The purpose of this staff education project was to evaluate the impact of education sessions for nurses regarding progression of CKD. This approach aligns with the practice-focused question by educating nurses and increasing their knowledge on CKD to slow its progression and improve outcomes of patients.

A 15-slide PowerPoint presentation about progression of CKD was conducted by me to increase nurses' knowledge based on evidence-based practice guidelines for slowing progression of CKD. Informed consent forms were signed and collected from all participants based on inclusion criteria. A pre-seminar test questionnaire was administered before the presentation, and a post-seminar test was administered after the presentation to determine nurses' knowledge levels. Data were collected and deidentified.

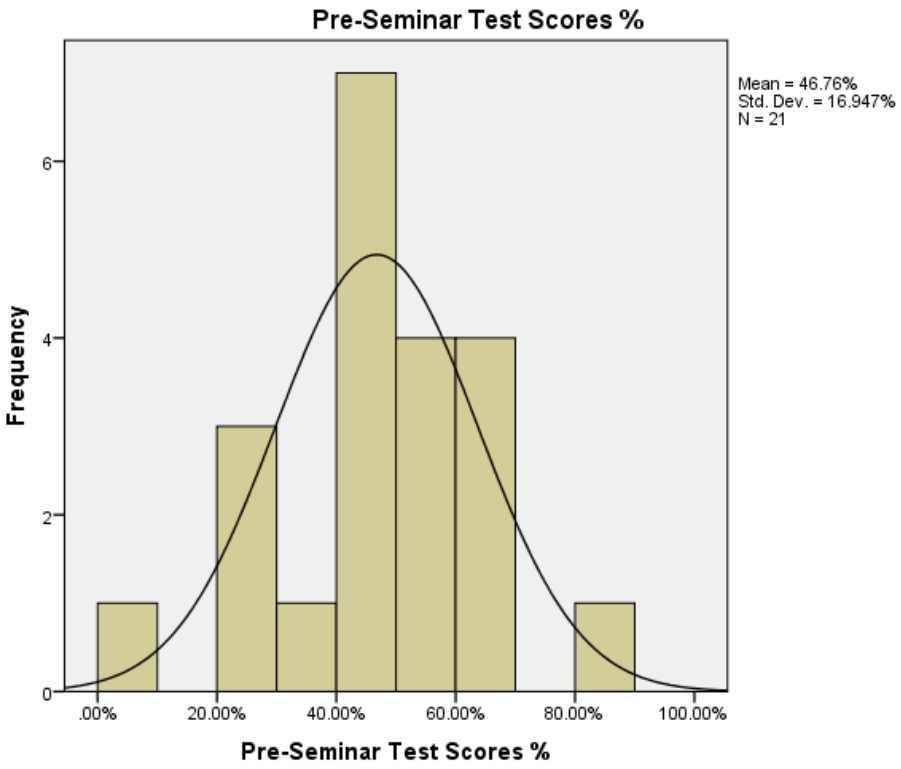
Analytical strategies involved a review of the dataset to ensure all participants had both sets of data. Means of 21 nurses' knowledge scores were computed before and after the seminar using SPSS 23. Then, a dependent t-test was conducted of nurses' knowledge scores on the pre-and post-seminar tests using SPSS. This dependent t-test determined if the seminar had any effect on nurses' knowledge of progression of CKD.

Findings and Implications

Findings from evidence revealed that the pre-seminar test (M= 46.76, SD = 16.95%) and post-seminar test (M = 59.38, SD = 13.29%) about nurses who attended the seminar on the progression of CKD, indicates an improvement in memory recall, $t(20) = -4.011$, $p < .005$. In other words, there was a significant increase in nurses' knowledge owing to the 4 hours of the seminar of 12.6 ±14.4. Frequency tables for the pre-seminar and post-seminar test scores were analyzed using Means and Standard Deviation for participants in the seminar.

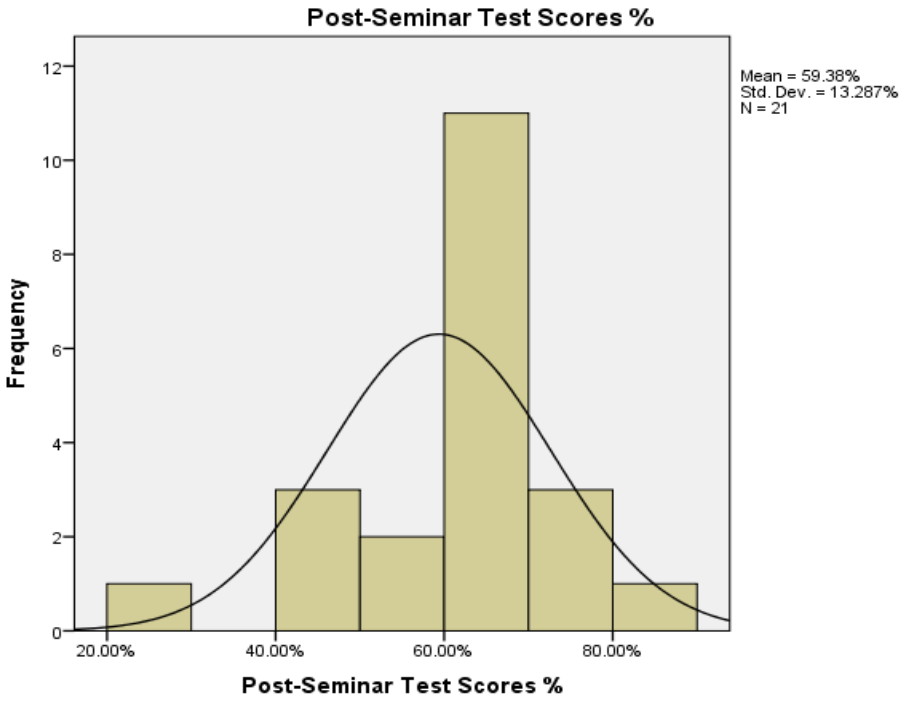
The pretest consisted of 15 questions, which included knowledge related to CKD, and questions based on inpatient management of CKD. The histogram of the knowledge scores is shown in Figure 1.

Figure 1
Pre-Seminar Test Scores



The posttest consisted of the same 15 questions, which included knowledge related to CKD and questions based on inpatient management of CKD (see Figure 2).

Figure 2
Post-Seminar Test Scores



The pre-seminar mean score was 46.76%, with a standard deviation of 16.95%. At the end of the presentation, the post-seminar mean score was 59.38%, with a standard deviation of 13.29%, indicating that knowledge increased. The t-test thereafter confirmed that this difference in knowledge was significant and not due to chance (see Table 1)

Table 1
Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Seminar Test Scores %	46.7619%	21	16.94670%	3.69807%
	Post-Seminar Test Scores %	59.3810%	21	13.28712%	2.89949%

Table 2
Pearson Correlation Coefficient

		N	Correlation	Sig
Pair	Pre-Seminar Test Scores %	21	.568	.007
	Post-Seminar Test Scores %	21		

The total number of participants for the pre-seminar and post-seminar tests was 21. The standard deviation on the pretest was 16.95% and the posttest was 13.29%. The standard error mean on the pretest was 3.7% and 2.7% on the posttest (see Table 1). Also, the Pearson correlation coefficient for the pretest and posttest correlation was 0.56, with $p < .05$ (see Table 2). A dependent t-test was calculated to compare the mean pretest score to the posttest score. The mean on the pretest was 46.76 (SD = 16.95%), and the mean on the posttest was 59.3 (SD = 13.29%). A significant increase from pre-test to post-test was found, with $t(20) = -4.011$ and $p < .005$.

Unanticipated limitations or outcomes and their potential impact on the findings of this staff education project included a limited number of participants. This limitation affects the generalization of the findings to the general population of nurses in Jamaica.

The implications resulting from the findings in terms of individuals, communities, institutions, and systems will be of a positive effect and based on evidence-based practices. Nurses will be equipped with the requisite knowledge and better positioned to educate their patients, families, and communities on the progression of CKD, to slow the disease progression.

The results of the findings are designed to improve the quality of healthcare delivery and systems in the institution based on evidence-based practice guidelines and create social and physical environments that will promote the best quality healthcare outcomes.

The potential implications of positive social change are the creation of a committed, educated, and empowered nursing group with the requisite knowledge ready to teach their patients about CKD. Patients become educated and empowered through effective communication within the healthcare system. The implementation of the CCM has the potential to enhance the professional practice of nursing, improve staff and patient education, improve patient care, and serve as a guide in practice to slow the progression of CKD.

Recommendations

The proposed or recommended solutions that will potentially address the gap in practice, as informed by the findings discussed above will be developing and

implementing evidence-based practice guidelines that will allow nurses' involvement to educate at different levels throughout the hospital on CKD. Improvement in CKD education has the potential to benefit the organization, health care professionals, insurance companies, and patients.

The CCM (see Appendix A) is an organized evidence-based framework that encourages high-quality chronic disease management and improving care at the healthcare provider, patient, and systems level (Fiandt, 2006). The questionnaire (see Appendix B) was used for the pre/post-test analysis of the nurses enrolled in the seminar. SPSS software version 23 was used to provide statistical analysis of the pre/post-test clinical data.

Contribution of the Doctoral Project Team

The doctoral project team consisted of the Project Chair, a committee member, the University Research Reviser (URR), and the principal investigator. I was the principal investigator and my role included identifying the gap in practice, defining the problem, identifying the project, identifying registered nurses that met the inclusion criteria of the project, obtaining signed informed consent, setting measurable objectives for the project, conducting the seminar, collecting data needed for evaluating of the project and producing a written report on the findings.

As the DNP student, my role was to analyze, synthesize, evaluate, and disseminate the findings from the de-identified coded pre-test/post-test data, then provide recommendations for practice change. Presenting and participating in the seminar on

educating nurses on the progression of CKD was a great experience and the reviews were encouraging.

Strength and Limitations of the Project

The strengths of the staff education project include an increasing number of nurses educated, encourage, and empowered to teach their patients about CKD, which has the potential to reduce the number of patients diagnosed and admitted for CKD-related issues, as well as a reduction in the utilization of the hospital services. Secondly, the implementation of the staff education project at the teaching and referral hospital will achieve the organizational vision statement and improve healthcare standards. The project will also reflect evidence-based practice approaches geared towards educating and empowering patients to be partners in their care and slowing the progression of CKD. Another strength of the project was the international acceptance and wide use of the CCM in other projects.

The limitation evident in the staff education project was the small number of participants (N=21). Having more participants would allow for an increased number of patients benefitting from the teaching of CKD. Secondly, the study was conducted on registered nurses in a teaching and referral hospital, therefore generalizability of the results to other teaching and referral hospital and other healthcare professionals was not possible.

Future projects should focus on educating other healthcare professionals which will lead to improvement in the CKD population. Additionally, the integration of the CCM should be used as a guideline for education sessions due to its potential to enhance

high-quality chronic disease management and improve care at the healthcare provider, patient, and systems levels.

Section 5 will address the dissemination plan, analysis of self, and a summary.

Section 5: Dissemination Plan

This staff education project could be disseminated through the organization's monthly back to basics and nursing staff development division meetings as a PowerPoint presentation. Findings could enable healthcare professionals, leaders, directors, and administrators to incorporate educational programs targeting knowledge gaps involving CKD regularly during continuing medical education hours for nurses. In addition, the CCM could be used as a guideline for future staff education programs to improve staff interactions with patients and management of chronic diseases.

Based on the nature of the product, audiences that would be appropriate for dissemination of the project to the broader nursing profession would include healthcare professionals, including nephrology and non-nephrology nurses. This study could benefit renal and medical clinics. Information could also be shared through presentations at conferences including the Dorothy Patterson Research and Nursing and Midwifery Conferences as poster presentations.

Analysis of Self

Self-analysis allows me to evaluate my thoughts and behavior, and also acknowledge my personal growth and development. The DNP project has helped improve my knowledge, confidence, communication, and leadership skills in the roles of practitioner, scholar, and project manager. As a practitioner, my communication skills improved as I confidently and effectively engaged key stakeholders who influenced the project and its implementation. My role in terms of leadership and clinical judgment has been improved. I began this project by identifying a gap in nursing practice and then

developed and answered the research question using appropriate sources of evidence. As a DNP nurse, effective communication, leadership, and collaborative skills are central to the development and implementation of practice guidelines and standards of care.

Scholarly nursing practice is characterized by discovery of new phenomena and application of discoveries in increasingly complex practice situations (AACN, 2006). Providing leadership and effective communication skills and education of healthcare professionals involving management of CKD is essential. There is a need for more evidence-based educational programs or in-service training on CKD. I strongly believe if nurses are educated, empowered, and encouraged, they will teach their patients, and patients will be empowered to make changes. To improve the health status of a population, healthcare professionals should have a basic curriculum that includes core competencies involving health promotion and disease prevention (AACN, 2006).

As the project manager, I was responsible for promoting advocacy and best healthcare practices. Since the development of this project, I have been incorporating CCM approaches in many clinical activities. I have also shared the model in terms of improving staff interactions with patients as well as all aspects of the healthcare system, from delivery systems to support for self-management, with a focus on patient-centered and evidence-based care. In my role as the project manager, I had to answer questions regarding status of CKD in the population, the impact of CKD on nursing practice, and the organization. I believe results of this project will encourage stakeholders to implement educational programs involving CKD that will improve healthcare professionals' knowledge as well as patients. This project was designed to focus on

educating nurses regarding progression of CKD, with the aim of slowing the disease progression.

Results from the project can be incorporated into other practice settings. The CCM can be used to educate nurses regarding progression of other chronic diseases. Nurses lack the requisite knowledge and current evidence-based practice guidelines regarding CKD to teach their patients. As a long-term professional goal, I intend to continue educating healthcare professionals, patients, and their families on chronic diseases, with the hope of being informed, slowing progression, and improving outcomes.

The major public health burden of CKD, number of patients diagnosed with this disease, late referrals to nephrologists, and lack of requisite knowledge to educate patients were challenges. I addressed the increasing number of nurses who are empowered, encouraged, and ready to teach patients about CKD and other illnesses, whether at the bedside or in clinics.

Summary

The increasing prevalence and incidence of CKD is a major healthcare burden in developing and developed countries. Providing requisite knowledge on CKD can reduce its burden and slow disease progression as evidenced by this scholarly project. It is hoped that educational sessions on CKD progression will inspire practices to address other chronic diseases.

References

Adejumo, A. O., Akinbodewa, A. A., Iyawe, I. O., Emmanuel, A., & Ogungbemi, O. (2018). Assessment of knowledge of chronic kidney disease among non-nephrology nurses in Akure, South-West Nigeria. *Saudi Journal of Kidney Diseases and Transplantation*, *29*(6) 1417-1423.

Agency for Healthcare Research and Quality. (2017). Integrating chronic care and business strategies in the safety net toolkit. https://www.ahrq.gov/ncepcr/care/chronic-tool/intro.html

American Psychological Association. (2021). Socioeconomic status https://www.apa.org

Anderson, J., & Malone, L. (2015). Chronic care undergraduate nursing education in Australia. *Nurse Education Today, 35*(12), 1135-1138. https://doi.org/10.1016/j.nedt.2015.08.008

Bodenheimer, T., MacGregor, K., & Stothart, N. (2005). Nurses as leaders in chronic care. *British Medical Journal, 330*(7492), 612–613. https://doi.org/10.1136/bmj.330.7492.612

Chicca, J. (2020). Adults with chronic kidney disease: Overview and nursing care goals. *American Nurse Association.* https://www.myamericannurse.com

Cockwell, P., & Fisher, L. (2020). The global burden of chronic kidney disease. *Lancet, 395*(10225), 662-664. https://doi.org/10.1016/S01406736736(19)32977-0

Coleman, K., Austin, B. T., Brach, C., & Wagner, E. H. (2009). Evidence on the chronic care model in the new millennium. *Health Affairs*, *28*(1), 75–85. https://doi.org/10.1377/hlthaff.28.1.75

Couser, W. G., Remuzzi, G., Mendis, S., & Tonelli, M. (2011). The contribution of chronic kidney disease to the global burden of major non-communicable diseases. *Kidney International, 80*(12), 1258-1270. https://doi.org/10.1038/ki.2011.368

Dobber, R. (2021). Early detection of chronic kidney disease can save lives and cut costs. https://www.weforum.org

Ferguson, T. S., Tulloch-Reid, M. K., Younger-Coleman, N. O., Wright-Pascoe, R. A., Boyne, M. S., Soyibo, A. K., & Wilks, R. J. (2015). Prevalence of chronic kidney disease among patients attending a specialist diabetes clinic in Jamaica. *West Indian Medical Journal*, *64*(3), 201–208. https://doi.org/10.7727/wimj.2014.084

Fiandt, K. (2006). The chronic care model: Description and application for practice. *Topics in Advanced Practice Nursing, 6*(4).

Gapira, B. E., Chirondaa, G., Ndahayoa, D., Theos, M. P. M., Tuyisengea, M. J., & Rajeswarana, L. (2020). Knowledge related to chronic kidney disease (CKD) and perceptions on inpatient management practices among nurses at selected referral hospitals in Rwanda: A non-experimental descriptive correlational study. *International Journal of Africa Nursing Sciences, 13*

https://doi.org/10.1016/j.ijans.2020.100203.

Hernandez, J. (2019). Chronic kidney disease: The need to increase nurse practitioner awareness. https://digitalcommons.acu.edu/etd/171

Howard, D. H., & Falk, R. J. (2008). The kidney care prevention program: An innovative approach to chronic kidney disease prevention. *Commentary, 69*(3), 233-236.

Ikpasaja, D. E. (2021). Educating nurses to help promote diabetes self-care management in primary care. https://scholarworks.waldenu.edu/dissertations/10503

Institute for Healthcare Improvement. (2021). *Changes to improve chronic care*. http://www.ihi.org

Kramer, H., Soyibo, A., Forrester, T., Boyne, M., Markossian, T., Durazo-Arvizu, R., Luke, A., & Cooper, R. (2018). The burden of chronic kidney disease and its risk factors in Jamaica. *Kidney International, 94*(5), 840-842. https://doi.org/10.1016/j.kint.2018.07.025

Levey, A. S., Eckardt, K., Tsukamoto, Y., Levin, A., Coresh, J., Rossert, J., Zeeuw, D., Hostetter, T. H., Lameire, N., & Eknoyan, G. (2005). Definition and classification of chronic kidney disease: A position statement from kidney disease: Improving global outcomes (KDIGO). *International Society of Nephrology, 67*, 2089-2100.

Llewellyn, S. (2019). The chronic care model, kidney disease, and primary care: A scoping review. *Nephrology Nursing Journal, 46*(3), 301-312, 328.

Ministry of Health. (2018). Chronic non-communicable diseases (CNCDs).

https://www.moh.gov.jm

National Kidney Foundation. (2021). Global facts: About kidney disease. https://www.kidney.org

Narva, A. S., Norton, J. M., & Boulware, L. E. (2016). Educating patients about CKD: The path to self-management and patient-centered care. Clinical Journal of the American Society of Nephrology, 11(4), 694-703. https://doi.org/10.2215/CJN.07680715

Paige, N. M., & Nagami, G. T. (2009). The top 10 things nephrologists wish every primary care physician knew. *Mayo Clinic Proceedings, 84(2),* 180-186. https://doi.org/10.1016/S0025-6196(11)60826-4

Pintz, C., Posey, L., Farmer, P., & Zhou, Q. (2021). Interprofessional care of people with multiple chronic conditions: An open-access resource for nursing educators. *Nurse Education in Practice, 51.* doi: 10.1016/j.nepr.2021.102990

Shlipak, M. G., Tummalapalli, S. L., Boulware, L. E., Grams, M. E., Ix, J. H., Jha, V., Kengne, A. P., Madero, M., Mihaylova, B., Tangri, N., Cheung, M., Jadoul, M., Winkelmayer, W. C., & Zoungas, S. (2020). The case for early identification and intervention of chronic kidney disease: conclusions from a kidney disease: Improving global outcomes (KDIGO) controversies conference. Kidney International, 99(1), 34-47. doi: https://doi.org/10.1016/j.kint.2020.10.012

Sinclair, P. M., Kable, A., Levett-Jones, T., Holder, C., and Oldmeadow, C. J. (2019). An evaluation of general practice nurses' knowledge of chronic kidney disease risk factors and screening practices following completion of a case study-based

asynchronous e-learning module. Australian Journal of Primary Health, 25, 346-352. https://doi.org/10.1071/PY18173

Thangkratok, P., Vararuk, A., Silawan, T., Piaseu, N. (2019). Role of nurses in implementing chronic care model in subdistrict health-promoting hospitals. Science, Engineering and Health Studies, 13(2). https://doi.org/10.14456/sehs.2019.9

Thompson-Martin, Y., McCullough, P. A., & Agrawal, V. (2015). Impact of an educational program for advanced practice nurses on knowledge of kidney disease outcomes quality initiative guidelines. *Nephrology Nursing Journal, 42*(5), 455-460, & 496.

Wouters, O. J., O'Donoghue, D. J., Ritchie, J., Kanavos, P. G., & Narva, A. S. (2015). Early chronic kidney disease: Diagnosis, management, and models of care. Nature Review Nephrology, 11(8), 491-502 https://doi.org/10.1038/nrneph.2015.85

Appendix A: The CCM framework developed for the staff education project

Appendix B: Questionnaire

QUESTIONNAIRE

Educating Nurses on the Progression of Chronic Kidney Disease

Section A: Demographic characteristics of the study population

In this section of the questionnaire, these general questions are related to you. Please answer all items by ticking the applicable box.

1. Department: Medical Wards: **3 [ ] 4 [ ] 7 [ ] 8 [ ] Medical Annex[ ]**

2. Educational level:

Registered Nurse: Certificate [ ] Bachelors [ ] Masters [ ] Doctoral Degree [ ]

3. Age group (years): **20- 30 years [ ]; 31 - 40 years [ ]; 41 – 50 years [ ]; 51 – 60 years [ ]; > 60 years [ ]**

4. Gender: **F [ ] M [ ]**

5. Years of nursing experience at UHWI: **< 2 years [ ]; 2-5 years [ ]; 6-10 years [ ]; More than 10 years [ ]**

6. Previous rotation in nephrology: **Yes [ ] No [ ]**

Section B: Knowledge related to Chronic Kidney Disease (CKD) among nurses

Your knowledge related to CKD is being tested. Please circle the correct answer.

1. What is the definition of Chronic Kidney Disease (CKD)?

A. A condition of chronically elevated serum creatinine and urea which is usually reversible with appropriate management.

B. Structural or functional kidney damage that can lead to impaired kidney function that persists for 3 months or more with or without alteration of glomerular filtration rate (GFR).

C. Irreversible and permanent elevation of serum creatinine.

D. Elevation of serum urea/BUN.

2. Which of the following is NOT a function of the kidneys?

A. Kidneys help remove waste and excess fluid

B. Kidneys filter the blood

C. Kidneys control the production of red blood cells

D. Kidneys produce insulin

3. What are the risk factors for CKD?

A. High blood pressure

B. Diabetes mellitus

C. Autoimmune disease

D. All of the above

4. In Jamaica what gender is commonly affected by CKD?

A. Male

B. Female

C. Both are equally affected

5. Which age group is most commonly affected by CKD in Jamaica?

A. <20 years

B. 20-40 years

C. 41-60 years

D. > 60 years

6. Which of the following is the most appropriate marker for kidney function?

A. Creatinine clearance/Glomerular Filtration Rate

B. Urine volume

C. Serum BUN and Creatinine

D. Hemoglobin level

7. Goals of antihypertensive therapy in patients with CKD include the desire to

A. Slow the rate of progression and reduce proteinuria

B. Prevent the progression of cardiovascular complications

C. None of the above

D. Both A and B

8. In how many stages is CKD classified?

A. 1 stage

B. 2 stages

C. 3 stages

D. 4 stages

E. 5 stages

9. Important drug to avoid in preventing kidney function deterioration

A. Gentamicin

B. Enalapril

C. Augmentin

D. None of the above

E. All of the above

10. What are the forms of Renal Replacement Therapy (RRT)?

A. Dialysis

B. Kidney transplant

C. All of the above

D. None of the above

Section C: Questions based on the scenario on inpatient management of CKD

In this section of the questionnaire, your knowledge related to the inpatient management of CKD is being tested. Please circle the appropriate letter.

1. What is the estimated glomerular filtration (eGFR) rate in a patient with stage 3 CKD?

A. 60-90 ml/min/1.73m^2

B. 30-60 ml/min/1.73m^2

C. 15-30 ml/min/1.73m^2

D. <15 ml/min/1.73m^2

2. What dietary education would you give to a stage 4 chronic kidney disease patient?

A. Low protein, low sodium, low potassium, low phosphate diet

B. High protein, low sodium, low potassium, high phosphate diet

C. Low protein, high sodium, high potassium, high phosphate diet

D. Low protein, low sodium, low potassium, high phosphate diet

3. What is the blood pressure goal for a patient with CKD?

A. 120/70 mmHg

B. 125/75 mmHg

C. 130/70 mmHg

D. 130/75 mmHg

4. Which of the following is a potential complication of CKD when eGFR is <60 ml/min/1.73m^2?

A. Anemia

B. Bone disease

C. Stroke

D. Malnutrition

5. Which of the following is an important predictor of cardiovascular disease in CKD patients?

A. Albumin in the urine

B. Anemia

C. Estimated glomerular filtration (eGFR) rate >90ml/min

D. All of the above