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Evidence-Based Practice Self-Study Education Program for Staff Nurses on Genomics

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Walden University

College of Health Sciences

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Nancy Norman-Marzella

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the review committee have been made.

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The Office of the Provost

Walden University
2019

Abstract

Evidence-Based Practice Self-Study Education Program for Staff Nurses on Genomics

by

Nancy Norman-Marzella

MSN, Widener University, 1988

BSN, Salisbury State University, 1983

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

August 2019

Abstract

Nurses routinely obtain genomic data when collecting family health histories. However, they report low confidence in their knowledge and understanding of genomics and the genetically engineered medications prescribed for their patients. The purpose of this project was the development and implementation of an evidence-based online education program about genetics and genomics to increase the nurses' understanding and ability to provide competent care for their patients receiving treatments based on the science of genomics. Knowles's principles of adult learning theory guided the development and delivery of the online education project to 12 medical-surgical registered nurses employed in a hospital in the northeastern United States. The Johns Hopkins nursing evidence-based practice model provided a guideline for organizing and evaluating the level and quality of evidence. A 2-tailed paired *t* test showed that the nurses' knowledge and understanding about genetics and genomics increased after participating in the evidence-based education program. The increase in nurses' knowledge on genomics has the potential to provide nurses with the competence and confidence to collaborate with physicians and pharmacists regarding treatment plans incorporating genomics, resulting in effective team collaboration and a positive social change that could improve patient outcomes.

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Dedication

I want to dedicate this work to my late parents. To my mom who passed away before I began this process but who always knew it was my passion, and for my dad who lost his battle with cancer a year before completing my work. Although I am a first-generation scholar, it was my mom and dad's devotion to their family and community that inspired my passion for knowledge to improve human conditions and decrease disparities in my role as a professional nurse.

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Table of Contents

List of Tables	iv
List of Figures	v
Section 1: Nature of the Project	1
Introduction.....	1
Problem Statement.....	3
Purpose Statement.....	4
Nature of the Doctoral Project	5
Significance.....	6
Summary.....	7
Section 2: Background and Context	9
Introduction.....	9
Concepts, Models, and Theories.....	10
Knowles’s Adult Learning Theory	11
Johns Hopkins Nursing Evidence-Based Practice Model.....	13
Defined Terms	15
Relevance to Nursing Practice	16
Local Background and Context	17
Role of the DNP Student.....	18
Summary.....	19
Section 3: Collection and Analysis of Evidence.....	21
Introduction.....	21

Practice-Focused Question.....	21
Sources of Evidence.....	23
Organizational Commitment to Participate in the Project	24
Participants.....	25
Procedure	25
Protections.....	27
Analysis and Synthesis	28
Summary	28
Section 4: Findings and Recommendations.....	31
Introduction.....	31
Findings and Implications.....	32
Findings.....	32
Unanticipated Limitations or Outcomes	33
Implications.....	34
Recommendations.....	35
Strengths and Limitations of the Project.....	36
Section 5: Dissemination Plan	38
Analysis of Self.....	38
Summary.....	41
References.....	43
Appendix A: Email of Permission to use Figure in DNP Manuscript from the Institute for Johns Hopkins Nursing	49

Appendix B: Genomic Self-Directed Learning Module Pretest/Posttest	51
Appendix D: Education Flyer	58
Appendix E: Program Evaluation	59
Appendix F: Poster Presentation.....	63

List of Tables

Table 1. 2-Tailed, Paired t Test for Pretest and Posttest Scores33

List of Figures

Figure 1. The Johns Hopkins nursing evidence-based practice model.....13

Section 1: Nature of the Project

Introduction

Genetics and genomics are essential to patient care as a result of the discovery of the new genetically engineered treatment methods aimed at symptom management, prevention of disease, and diagnosing and treatment of patients. An understanding of genomics is needed to increase the quality of care provided to patients by 2020 and beyond (Green & Guyer, 2011). Staff nurses on a medical-surgical unit are not comfortable using genomic information; this has created uncertainties about the care of their patients. They feel challenged in discussing genomics with their patients and the new genetically engineered medications that are prescribed. Nurses on all levels must be able to translate research to improve quality and safety “at the point of care” (McGann, 2012, p. 1). It is imperative that nurses have an understanding of genetics and genomics to facilitate better disease management in the delivery of individualized patient care.

The emerging role of healthcare providers in the use of genomics has created challenges in obtaining education, developing competencies, and in the application and use of genomic information at the bedside (Green & Guyer, 2011; Williams, Feero, Leonard, and Bernice-Coleman, 2017). Physicians and pharmacists routinely use genomic information in prescribing care for their patients, but this information is not shared with the nurses who are in the position to explain the care to their patients. The nurses believe they will be more competent in providing patient care if they are educated in the area of genomics.

The application of genomic knowledge in the clinical setting can be achieved through the process of implementation science, systematic steps used to incorporate scientific advances with innovative nursing care (Nilsen, 2015; Williams et al., 2017). Implementation science in genomic education uses an instructional approach to facilitate genomic competency, with an emphasis on developing skills and disseminating knowledge to manage change across the healthcare continuum (Williams et al., 2017). The aim of this project was to work with a hospital in the northeastern United States to provide a group of staff nurses on a medical-surgical unit with an online educational program about genetics and genomics to increase their understanding and ability to competently provide patient care.

According to the American Nurses Association (ANA, 2009), the National Coalition for Health Professional Education in Genetics recommends integration of genetics and genomics across the health professions through educational programs. This DNP project will assist in meeting this recommendation at the local level. Nursing staff education on genomics will assist the nurses in collaborating with physicians and pharmacists. Effective team collaboration can result in a positive social change between the groups to improve patient outcomes.

The emerging role of healthcare providers in the use of genomics has created challenges in obtaining education and developing competencies in the use of genomic information at the bedside (Green & Guyer, 2011). Through this project, I seek to assist a group of staff nurses on a medical-surgical unit in the northeastern United States in

meeting this challenge by providing an education program on genomics to decrease uncertainties about the care they provide to patients.

Problem Statement

Nurses in a medical-surgical unit in the northeastern United States were expressing uncertainties and felt challenged in discussing genomics with their patients and the new genetically engineered medications that are prescribed. Their concern was consistent with the work done by Skirton, O'Connor, and Humphreys (2012) who reported that although a majority of nurses in their systematic review routinely collected genomic data such as family health histories, many of the respondents self-reported a low confidence in their knowledge and understanding of genomics.

Rogers, Lizer, Doughty, Hayden, and Klein (2017) stated that research over the past 2 decades indicated that there has been a small amount of change in nurses' knowledge in genetics and genomics in the clinical setting and reported a gap in the knowledge of the current nursing workforce. This gap has placed patients at risk for not receiving the highest quality of care. For example, in a multiagency magnet-based competency survey on genetics and genomics in nursing, "50.8% of the nurses passed a competency evaluation" with participants averaging "68.3% for their overall score ($SD = 10.4$)" (Rogers et al., 2017, p. 59). According to Montgomery et al. (2017), there is a current gap in best practice related to genetic/genomic research in nursing practice that can be ameliorated through translation, implementation, and dissemination of knowledge.

Although the nursing staff development department in this facility provides education about different types of patient care such as controlling infections and maintaining mandatory Occupational Safety and Health Administration (OSHA) competencies, there have been no programs on genetics and genomics to provide information for the nurses to be able to incorporate it into their care planning for their patients. This information is needed to help nurses to competently address these areas in their plan of care for their patients. In a study on nursing staff education, Chaghari, Saffari, Ebadi, and Ameryoun (2017) discussed the need to include nurses from the beginning in the planning of education programs using a “problem-solving approach” (p. 29). This has created challenges for the organization related to procedures and costs; however, it is imperative that nurses be included in decisions related to education. An online education program that included the nurses as end users in a self-teaching module was more cost effective and minimized procedural concerns about the method of delivering nursing education (Chaghari et al., 2017). In addition, it helped nurses to competently develop plans of care that include genomics and the new genetically engineered medications that are prescribed for their patients

Purpose Statement

The purpose of this project was to educate staff nurses in a local hospital in the northeastern United States about genomics to provide them with the knowledge needed to develop individualized plans of care for their patients. The practice focused question was as follows: Will the implementation of an evidence-based online education program about genetics and genomics increase the nurses’ understanding and ability to

competently provide care for their patients who are receiving treatments based on the science of genomics? By implementing this online program into practice, the nurses were guided by the content grounded in evidence-based research to improve the quality of their care to patients. This program helped the nurses to acquire knowledge about genomics to guide their understanding of disease management and the new genetically engineered medications their patients are receiving and helped them to develop individualized plans of care for their patients.

Nature of the Doctoral Project

A search for the evidence specific to nursing and genomics was conducted using the following data bases: the Cumulative Index to Nursing and Allied Health Literature, PubMed, EBSCO, Ovid Plus, Google Scholar, Google Chrome, the International Society of Nurses in Genetics, the National Institute of Nursing Research, the National Coalition for Health Professional Education in Genetics, the American Nurses' Associations websites, and the Cochrane Library. The search terms included *nurses*, *nursing practice*, *genetics*, *genomics*, *nursing staff development*, and *continuing education in nursing*. Studies that were published between 2012 and 2018 were included in the search, resulting in 196 abstracts.

The purpose of this educational project was to educate nurses about genomics and increase their knowledge needed to develop individualized plans of care for the patients. There is a current gap in best practice related to genetic/genomic research in nursing practice that can be ameliorated through translation, implementation, and dissemination of knowledge (Montgomery et al., 2017; Polit & Tetano-Beck, 2012). The Johns Hopkins

nursing evidence-based practice model (JHNEBP, Dang & Dearholt, 2017), was used for gathering and evaluating the evidence. Information obtained from the synthesis of the literature helped fill the current gap in practice related to genetic/genomic research in nursing best practice.

Significance

Over the past 2 decades, there has been a small amount of change in the nursing knowledge in genetics and genomics in the clinical setting (Rogers et al., 2017). Nurses have reported a low confidence in their knowledge and understanding of genetics (Skirton et al, 2012). According to the ANA (2009), the National Coalition for Health Professional Education in Genetics recommends integration of genetics and genomics across the health professions through educational programs.

McCabe, Ward, and Ricciardi (2016) surveyed practicing nurses' knowledge of genomic concepts to determine effective strategies for improving patient care through genomic literacy. The survey resulted in a low response rate among practicing nurses ranging from "3% to 44% ($M = 19\%$, $SD = 0.14\%$)" and identified the critical factors of survey topic and length (p. 191). The low response rate demonstrated a lack of confidence in these practicing in their knowledge of genomics (McCabe et al., 2016).

Nurses are at the forefront of patient care in a role that includes patient education, advocacy, and interprofessional collaboration in the management of patient's genomic problems. It is important that nurses have an understanding of genomics because they are at the center of care and are in a position to explain to their patients about the language used in genomics that relates to their treatment plan (Williams et al., 2017).

The outcome of this DNP educational project has the potential for positive social implications for two groups: nurses and patients. Nurses will have the knowledge to interact competently with their patients about genomics and their plan of care relating to new genetically engineered medications prescribed for their treatment. This DNP project will assist in meeting the ANA recommendation at the local level (see ANA, 2009). Nursing staff education on genomics will provide nurses with the competence and confidence to collaborate with physicians and pharmacists about the treatment plan incorporating genomics. Effective team collaboration can result in a positive social change between the groups to improve patient outcomes. Patients will receive education and instructions that help them understand their symptoms and the particular approach used in management of their disease (Montgomery et al., 2017).

Summary

Nurses are ill-prepared to care for patients with genomic problems. The purpose of this project was to educate staff nurses in a local hospital in the northeastern United States about genomics to provide them with the knowledge needed to develop individualized plans of care for their patients. A thorough search of the literature and other relevant data bases were conducted, and this information was analyzed by using the Johns Hopkins Nursing evidence-based (JHNEBP) model. (Dang & Dearholt, 2017). This project is significant to nursing practice because it will help the nurses to be more knowledgeable of genetics and genomics and be more comfortable in educating patients about the new genetically engineered medications they are prescribed. The advancing science of genetics and genomics necessitates educating nurses in basic concepts and

foundational knowledge to facilitate translation in nursing practice. A mandate in the Institute of Medicine (IOM, 1999, 2001, 2003, 2010) highlighted the need for safety in health care through education and leadership in nursing practice. Through education and the knowledge translation process, nurses will gain an understanding of how genomics is used in the clinical setting to improve patient outcomes (Greene-Ryan, Laphan-Morad, Cristofalo, Smith, and Connors, 2016).

In Section 2, I discuss the concepts, models, and theoretical framework guiding the project, the relevance of the project to nursing practice, local background and context of the project, and the role of the DNP student.

Section 2: Background and Context

Introduction

Regardless of academic preparation, to provide care for people/families/groups and communities at the aggregate level across the lifespan, nurses should show capability with consolidating hereditary and genomic data into their practice (ANA, 2011).

Although essential genomic competencies exist, they are not universally adopted (Jenkins, Calzone, Caskey, Culp, Weiner, and Badzek, 2015). Literacy in genomics is a major barrier to implementation in nursing practice. The barriers to literacy include lack of education programs, knowledge, skills, and a basic understanding of genomic science (Calzone, Jenkins, Culp, Bonham, and Badzek, 2013; Donnelly, Nersesian, Foronda, Jones, and Belcher, 2017; Read & Ward, 2016; Rogers, Lizer, Doughty, Hayden, and Klein, 2017; Skirton, O'Connor, and Humphreys, 2012).

Nurses in a medical-surgical unit in the Northeastern United States are expressing uncertainties and feel challenged in discussing genomics with their patients and the new genetically engineered medications that are prescribed. The purpose of this project was to educate staff nurses about genomics to provide them with the knowledge needed to develop individualized plans of care for their patients. The practice focused question was as follows: Will the implementation of an evidence-based online education program about genetics and genomics increase the nurses' understanding and ability to competently provide care for their patients who are receiving treatments based on the science of genomics? Providing a staff education program will promote the development of leaders in practice to advance the improvement of models that encourage nurse

competency in genomics through methods that are readily available, evidence-based, and practice focused (Anderson, Alt-White, Schaa, Boyd, and Kasper, 2015; Chaghari, Saffari, Ebadi, and Ameryoun, 2017) and who possess a basic understanding of genomic science (Calzone et al., 2013; Donnelly et al., 2017; Read et al., 2016; Rogers et al., 2017; Skirton et al., 2012).

Concepts, Models, and Theories

Genetics and genomics influence nursing practice through the discovery of new treatment methods aimed at symptom management and the prevention of disease. Although there has been an interest in indications for genetics and genomics in nursing since the early 1980s, approximately 63% of nurses have reported that their knowledge and confidence about genetics is not adequate, and nurses need this knowledge to provide informed care for their patients (Anderson et al., 2015; Calzone et al., 2013). There have been endeavors to address the gaps in the knowledge of genomic and genetic practice in nursing. A vital point of reference was the foundation of the National Institute of Nursing Research Summer Genetics Institute, which for 15 years has been giving concentrated hands-on training with clinical practice to nurses (Hickey et al., 2018). In an effort to improve the genetic and genomic knowledge of nurses, the American Association of Colleges of Nursing has underwritten the Essentials of Baccalaureate Education for Professional Nursing Practice and the Essentials of Master's Education in Nursing and has accentuated the significance of genomics in the progression of nursing training for clinical practice (Greco, Tinley, and Seibert, 2011; Hickey et al., 2018).

Another development was the advancement of the fundamental nursing skills in hereditary qualities and genomics (ANA Consensus Panel on Genetic/Genomic Nursing Competencies, 2009; Calzone et al., 2010; Calzone et al., 2013). The Genetics/Genomics Competency Center (www.g-2-c-2.org) gives evidence based online genomic instruction by leading experts in genomics (Hickey et al., 2018). Despite the need for nurses' knowledge, additional support is needed to educate nurses on genetics and genomics in nursing practice. In this DNP project, I focused on the current gap in nursing knowledge and the need for staff nurses to build competency in the area of genetics and genomics to facilitate the translation of knowledge to care for their patients.

Knowles's Adult Learning Theory

The adult learning theory by Knowles (1975, 1984) was used to guide the development of this project. *Andragogy* is a term used by Knowles to distinguish principles of adult learning theory (as cited in McEwen & Wills, 2014). Knowles (1975, 1984) posited that the adult learner must have a comfortable learning environment that fosters common trust and that is open to acknowledging contrasting points of view (as cited in McEwen & Wills, 2014). Through an interactive, self-directed education program, nurses used prior learning to develop competencies through explanatory activities using case studies and family health histories to examine the concepts of genetics and genomics in nursing practice.

Genetic/genomic competency in nursing practice is necessary for providing accurate and informed care to patients about the need for treatment, follow up, and referral for hereditary diseases (Boyd, Alt-White, Anderson, Schaa, and Kasper, 2017).

Knowles (1975, 1984) emphasized the following assumptions for the adult learner.

Knowles assumed that as a person matures, they need the following:

1. The need to know – adults need to know why they need to learn something.
2. Self-concept – their self-concept moves from one of being dependent to one of being self-directed.
3. Experience – they accumulate a large amount of experience that can serve as a rich resource for learning.
4. Readiness to learn – real-life problems or situations create a readiness to learn in the adult.
5. Orientation to learning – his or her time perspective changes from one of postponed application of knowledge to immediacy of application.
6. Motivation – motivation to learn is stimulated by internal stimuli rather than external stimuli. (as cited in McEwen & Wills, 2014, p. 403)

Nurses are essential in translating evidence-based research into practice for sustainable changes (Fineout-Overholt, Williamson, Gallagher-Ford, Melnyk, and Stillwell, 2011).

Nurse-led education can improve the use of genetic/genomic research in clinical practice (Hickey et al., 2018). This project disseminated an on-line, self-directed educational program has resulted in the translation of genetics and genomic knowledge for staff nurses to use in planning care for their patients.

Johns Hopkins Nursing Evidence-Based Practice Model

White and Dudley-Brown (2012) stated that the translation of knowledge includes “the exchange, synthesis, and ethically sound application of knowledge” (p. 26). There are several models that can be used to translate research into clinical practice. The Johns Hopkins nursing evidence-based practice (JHNEBP) model was developed and tested by a team of nursing researchers at Johns Hopkins Hospital in 2002 (Dang & Dearholt, 2017). An example of how the model has been used includes its effective implementation to decrease postoperative urinary retention (Buchko & Robinson, 2012). Permission to use and reproduce the figure of the Johns Hopkins nursing evidence-based practice (JHNEBP) model for this manuscript was obtained from the Institute for Johns Hopkins nursing (Appendix A). The JHNEBP model (Dang & Dearholt, 2017) was used in this project (see Figure 1).

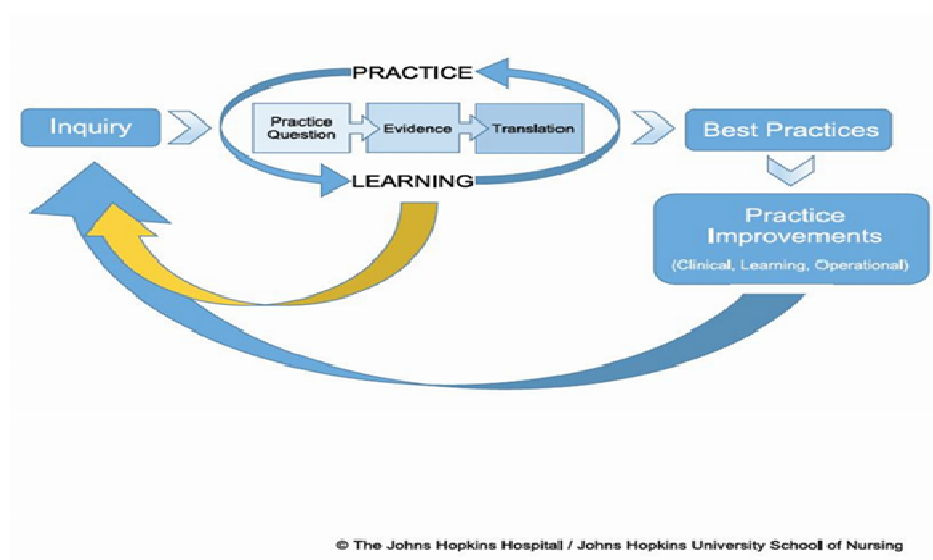


Figure 1. The Johns Hopkins nursing evidence-based practice model. Reprinted from the Johns Hopkins Medicine website by D. Dang and S. Dearholt, 2017. Retrieved from http://www.hopkinsmedicine.org/evidence-based-practice/jhn_ebp.html.

The model includes three steps: (a) identifying a practice question, (b) conducting a search for the evidence related to the question, and (c) a synthesis of the evidence that can be used to inform decisions in practice (Dang & Dearholt, 2017). The first step in the model was to define the practice problem. In this step, I identified the practice-focused problem of staff nurses at a local hospital in the Northeastern United States who were concerned about the need to gain more knowledge in genetics and genomics based on their experiences with new medications and treatments being prescribed for their patients.

The next step was to conduct a review of the literature related to the practice problem. The JHNEBP model (Dang & Dearholt, 2017) provided a guideline for evaluating the level and quality of evidence. This guide was used to search and organize the research from the review of the literature. The evidence indicated that the project is relevant in practice. Several researchers stated that nurses do lack confidence in their knowledge of genetics and genomics and also provided information about effective methods to disseminate research to the nurses (Calzone, Jenkins, Culp, Bonham, and Badzek, 2013; Donnelly, Nersesian, Foronda, Jones, and Belcher, 2017; Jenkins, Calzone, Caskey, Culp, Weiner, and Badzek, 2015; McCabe, Ward, and Ricciardi, 2016; Montgomery et al., 2017; Read & Ward, 2016; Rogers, Lizer, Doughty, Hayden, and Klein, 2017; Skirton, O'Connor, and Humphreys, 2012; Williams et al., 2017).

The final step in the JHNEBP model (Dang & Dearholt, 2017) was the translation of the research into practice to inform the practice problem. Translation included the development and implementation of an action plan, evaluating and reporting the outcomes, and disseminating the findings.

Defined Terms

Terms used in this project included *competency, dissemination, education, framework, genetics, genomics knowledge translation, and pedigree*. For the purpose of this project, the words or phrases in italics were defined as follows:

Competency: The ability to use sound thinking and clinical judgment including the acquisition and assimilation of new knowledge, professional values, and belief in the use of one's potential and capacity. (Anderson et al., 2015).

Dissemination: The means and methods used to share the results of research to stakeholders to improve the practice of nursing (Timmins, 2015).

Education: Current authoritative knowledge based on evidence from research about the science of genetics and genomics that can be used to facilitate knowledge acquisition, and improve the ability to make sound judgments related to genetics and genomics in nursing (ANA, 2009).

Framework: Concepts that provide structural meaning that can be used to assess and evaluate evidence before, during and after the implementation of a project (Helfrich et al., 2010).

Genetics: The science of studying genes related to human disorders and diseases (ANA, 2009).

Genomics: The investigation of human genes and how they interact together including other factors that can influence this interaction such as psychological, social, culture, and the environment (ANA, 2009).

Knowledge translation: An effective process that involves analyzing, synthesizing, sharing, and exchanging the results of research on a body of knowledge for the purpose of improving patient and health care outcomes (Curtis, Fry, Shaban, and Considine, 2017).

Pedigree: A drawing that uses agreed upon symbols to depict the history of a patient and their family's health including inherited diseases (ANA, 2009).

Relevance to Nursing Practice

Nursing practice needs to develop with a specific end goal to coordinate evidence based genomic science into educating nurses in the use of research discoveries for practical application. Barriers in genomic literacy include the integration of knowledge from research into clinical practice, limited experience in emerging genetic/genomics terminology, and lack of education that supports new knowledge from genetic/genomic resources that can be used in the practice setting (Hickey et al., 2018). Limited resources that support funding of continuing education for the initial training of nurses creates barriers to nurse competency in genomics (Calzone et al., 2010). A central component of the National Institute of Nursing Research (NINR) Strategic Plan is nursing genomic instruction, and the combination of this learning into the nursing science, so that nurses can use omics to improve patient outcomes (NINR, 2016; Hickey et al., 2018).

There have been endeavors to address gaps in genomic knowledge in nursing. A vital point of reference was the foundation of the NINR Summer Genetics Institute (SGI), which has provided clinical training to nurses over the past decade (Hickey et al., 2018).

Other advancements included the fundamental nursing skills in hereditary qualities and genomics (ANA Consensus Panel on Genetic/Genomic Nursing Competencies, 2009; Calzone et al., 2010; Calzone et al., 2013). The Genetics/Genomics Competency Center (www.g-2-c-2.org) provides evidence based online genomic instruction by experts in genomics (Hickey et al., 2018). In addition, the ANA and the International Society of Nurses in Genetics (ANA & ISONG, 2016), recommends integration of genetics and genomics across the health professions through educational programs. This DNP project will focus on the need for nursing staff to gain knowledge in genetics and genomics by providing an education program.

Local Background and Context

Genetics and genomics influence nursing practice through the discovery of new treatment methods aimed at symptom management and the prevention of disease. In a hospital nursing education department located in the northeastern United States, nursing staff on a medical-surgical unit have expressed concerns about their limited understanding in the relevance of genetic and genomic and, believe they were inadequately prepared to incorporate genomic information into their daily clinical practices. For example, the nurses shared examples such of the new advances in precision medicine and the pharmacologic agents that are being ordered for their patients.

Based on the gap in knowledge on genetics/genomics, the focus of this doctoral project provided an education program on genetics and genomics for the nursing staff to use to help them gain knowledge about the best evidence in genetics/genomics in nursing practice. The JHNEBP model (Dang & Dearholt, 2017) was used to review, organize,

and synthesize the evidence, and the Knowles adult learning theory (1974; 1984) was used in the implementation of the project.

Role of the DNP Student

The nursing profession is resilient and committed to transforming practice through research, innovations, and knowledge to improve patient outcomes. Genomics is an emerging science that combines holistic nursing, including biophysical and psychosocial concepts, with collaborative interdisciplinary practice. The role of the DNP student in genomics is to facilitate the translation of research into practice. The project is an example of how the DNP students lead a group of staff nurses in evidence-based knowledge acquisition to achieve genomic knowledge to improve the care they provide to their patients. As a member of the International Society of Nurses in Genetics (ISONG), I have served on the education committee, a committee that recruits leaders in genomics in the areas of research, education, and clinical practice to inform members and the public about topics relevant to genomics in nursing.

The setting for this project is a hospital, located in the Northeastern United States. This agency employs approximately 2,000 employees and many nurses that have been with the organization for at least 20 years. Staff nursing on a medical surgical unit at the hospital have identified the need to learn about genetics and genomics to provide care for their patients. Nursing staff stated they have limited knowledge and do not feel comfortable caring for their patients when their doctors and pharmacists prescribe treatments that include genomic and genetics as part of their plan of care. The hospital supports education programs and strategically place value on the development of their

staff through education programs in their mission, vision, regulatory and compliance statements. The important goal for this project was for nurses to gain genetic and genomic knowledge to advance safe and efficient care, and to improve their patients' understanding of the prescribed medications and treatment plans.

The motivation for this doctoral project proposal was based on my professional commitment to the development of nursing staff, and the influence of personalized medicine and genomics in my clinical practice. I anticipate the project will improve nursing knowledge synthesis in the application of evidence based genomic research in a clinical setting.

Summary

Nurses believe they are ill-prepared to care for patients with genomic problems (Calzone et al., 2013). The purpose of this project was to educate staff nurses in a local hospital in the northeastern United States about genomics to provide them with the knowledge needed to explain individualized plans of care for their patients. Historically, nurses have identified indications for the use of genetic and genomic knowledge in nursing practice, however, they express a lack of confidence in knowledge of genetics and genomics to care for their patients (Anderson et al., 2015; Calzone et al., 2013). Knowles (1975; 1984) theory of adult learners was used to guide the development and implementation of this evidence-base project because it provided an understanding of the characteristics of nurses as adult. The JHNEBP model (Dang & Dearholt, 2017) was selected for this project because it provided a problem-focused method to search, review, organize, and synthesize the evidence-based literature and a guide for implementing an

evidence-based practice project. The definitions of the terms explained the context for this project to facilitate an understanding of how genomics can be used in the clinical setting when providing patient care (Greene- Ryan, 2016). Several professional organizations have endorsed the need for educating nurses in genetics and genomics including the American Association of Colleges of Nursing (AACN, 2006), American Nurses' Association (ANA, 2009, 2011), the American Nurses' Association and the International Society of Nurses in Genetics (ANA & ISONG, 2016), and the National Institute of Nursing Research (NINR, 2016). The advances in personalized medicine, and a belief in the need to use the evidence from research to inform nursing practice are the motivation for this project.

In Section 3, I discuss the practice-focused question, and the sources of evidence used to address the practice question including how the evidence identifies an appropriate way to answer the question. I discuss how the evidence will be generated for the doctoral project and include a systematic description of the participants, the procedures, and the protections associated with the project. The analysis and synthesis describe the systems used in the project to record, track, organize, analyze, and synthesize the evidence.

Section 3: Collection and Analysis of Evidence

Introduction

Nurses routinely collect genomic data and implement interventions based on genetically engineered medications prescribed for their patients; however, they have limited confidence in their knowledge and understanding of genomics. Nursing staff literacy and understanding of the relevancy of genetic/genomics in nursing practice will improve with an education program that addresses gaps in knowledge based on genomic nursing competencies. The ANA and ISONG (2016), recommends integration of genetics and genomics across the health professions through educational programs. Limited resources that support funding of continuing education for the initial training of nurses creates barriers to nurse competency in genomics (Calzone et al., 2010). The purpose of this project was to educate staff nurses in a local hospital in the Northeastern United States about genomics to provide them with the knowledge needed to develop individualized plans of care for their patients. In Section 3, I discuss the practice-focused question and sources of evidence, identify the participants and the procedure for the project, and discuss the protections of the participants and the analysis and synthesis of the project.

Practice-Focused Question

Nurses in a medical-surgical unit in the Northeastern United States have expressed uncertainties and felt challenged in discussing with their patients about genomics and the new genetically engineered medications that are prescribed. The practice focused-question was as follows: Will the implementation of an evidence-based

online education program about genetics and genomics increase the nurses' understanding and ability to competently provide care for their patients who are receiving treatments based on the science of genomics? Their concerns were consistent with the work done by Skirton et al. (2012), who reported that although most nurses in their systematic review routinely collected genomic data such as family health histories, many of the respondents self-reported a low confidence in their knowledge and understanding of genomics.

The purpose of this educational project was to educate nurses about genomics and increase their knowledge needed to develop individualized plan of care for the patients. There is a current gap in best practice related to genetic/genomic research in nursing practice that can be ameliorated through translation, implementation, and dissemination of knowledge (Montgomery et al. (2017). The JHNEBP model (Dang & Dearholt, 2017) was used for collecting, analyzing, synthesizing, and evaluating the evidence. Information obtained from the synthesis of the literature can fill the current gap in practice related to genetic/genomic research in nursing best practice.

Knowles's adult learning (1975; 1984) theory was used in this project. Knowles emphasized the following assumptions for the adult learner. Knowles assumed that as a person matures, they acquire the following attributes as adult learners: (a) meaningful use of knowledge, (b) self-directed learning, (c) learning based upon past experiences, (d) real-life problems increase a sense of urgency for learning, (d) desire for immediate application of knowledge, and (e) motivation to learn based on intrinsic stimuli (as cited in McEwen & Wills, 2014).

Sources of Evidence

A search for the evidence specific to nursing staff education and genomics was conducted using the following databases: the Cumulative Index to Nursing and Allied Health Literature, PubMed, EBSCO, Ovid Plus, Google Scholar, Google Chrome, the International Society of Nurses in Genetics, National Institute of Nursing Research, the National Coalition for Health Professional Education in Genetics and the American Nurses' Association websites, and the Cochrane Library. The search terms included *nurses, nursing practice, genetics, genomics, nursing staff development, and continuing education in nursing*. Studies that were published between 2012 and 2018 were included in the search, resulting in 196 abstracts.

Abstracts were reviewed if they met the following parameters: Qualitative, quantitative, or mixed-method research, evidence-based practice guidelines, and theoretical studies. Only peer-reviewed studies specifically addressing the search terms were included for review. Excluded from the search were dissertations and unpublished research. There was a total of 76 sources reviewed, and 55 were excluded because they did not meet the established criteria. A total of 21 studies were found to meet the inclusion criteria consisting of retrospective cohort nonexperimental studies, systematic reviews, descriptive and correlational studies, a meta-analysis, and cross-sectional survey and were included in the literature review.

Seminal work was included in addition to current sources no more than 5 years old. Current evidence-based research on each of the search terms was reviewed. Principles of the adult learning theory guided the selection of the on-line education

program. The pretest/posttest method was used to evaluate if additional knowledge was obtained by participating in the education module.

Using the JHNEBP model (Dang & Dearholt, 2017), the selection of the education program was facilitated through a thorough search of the literature for an evidence-based approach. Based on the evidence, an existing teaching program, the Genomic Self-Directed Learning Module was used in the project (Hetteberg, Jenkins, Harvey, and Prows, n.d., Appendix B). This education program was selected because it was previously developed and tested for validity and the accuracy of content. Permission to use this educational program was obtained from the nurse researcher.

Organizational Commitment to Participate in the Project

In this project, I first presented an overview to obtain a commitment letter of support from the organization leadership from a hospital in the Northeastern United States (see Walden University Appendix A of the Manual for Staff Education DNP Scholarly Project, Site Approval Form, 2017, p. 13) The administration was unable to participate in the project due to unanticipated changes, and another site was selected, a nursing association with hospital-based medical surgical staff nurses who had expressed the need for a genomics and genetics education program. After the site agreement was signed, the administration identified key stakeholders who served as experts to review and evaluate the content of the program by completing a Formative Review Questionnaire (Appendix C). The experts reviewed the course content and the pre- and post-test and provided their evaluation by completing five questions on a Likert-type scale adapted from the Appraisal of Guidelines for Research & Evaluation II (AGREE II,

Brouwers et al., 2010). Concerns from the experts were addressed, and they were asked to review the changes made relating to their concerns. This process continued until an agreement was received from the experts about the clarity and applicability of the program.

Participants

After the experts reviewed and approved the education program, the nurses association agreed to post the recruitment flyer to the nursing staff from a medical-surgical unit on their website (see Appendix D). The inclusion criterion for participants in this project was medical-surgical registered nurses employed in hospitals in the Northeastern United States. Any participant was free to withdraw from the project by opting not to complete the program once they accessed and read the permission in Survey Monkey[®]. The participants were not be monetarily compensated for their participation in the project. Participants were asked to evaluate the self-study module as part of the program evaluation process. The program has been approved by the ANA and nurses who complete the education program including the pre- and post-tests, and program evaluation will receive a Certificate of Completion.

Procedure

Upon review and approval of the program by the experts, the nursing staff received an educational flyer distributed through an online nursing association website with the link to the program in Survey Monkey[®]. The link provided information to access the education program containing the permissions, pretest, posttest, program evaluation, and certificate of completion. The module in Survey Monkey[®] began by

describing the program and obtained voluntary permission to participate. Nursing staff were asked to click OK if they agreed. Another way for participants to decline participation was to log out of the program if they did not agree with the permission statement. After nursing staff accepted the permission to participate, they began the program by answering 11 pretest questions. Then, participants were asked to leave their Survey Monkey[®] browser open and to follow the directions for copying and pasting the education program link into a new browser to complete the education program. Once the program was completed, participants returned to the Survey Monkey[®] browser to complete 11 posttest questions and 13 program evaluation questions. The posttest question and the 13 program evaluation questions were on the same questionnaire at the end of the program (Appendix E). There was a notice at the end of the program for nurses to download and print off their certificate of completion in Survey Monkey[®]. In this way, nursing staff received credit for completing the program directly from the education program in Survey Monkey[®] maintaining anonymity of the participants from me.

Based on Knowles's adult learning theory (1975, 1984) I focused on evidenced-based knowledge of genetics and genomics through a self-directed, on-line education program created for adult learners and included informational case studies with self-test quiz at the conclusion of the education module. Using the JHNEBP model (Dang & Dearholt, 2017), the selection of the education module was facilitated through a thorough search of the literature for an evidence-based approach. A variety of resources that nurses use in practice were hyperlinked for participants to explore in the module, for example, the ANA, ISONG, Centers for Disease Control and Prevention, and Genetics/Genomics

Competency Center. The anticipated time to complete the education module was 30 to 45 minutes and included a 5 to 10 minute pretest/posttest and program evaluation.

Participants received a certificate of completion after completing the posttest and program evaluation for their professional portfolios. An aggregated summary of the results was shared with the nurse researcher who created the education program (see Hetteberg et al., n.d.) as stated in the permission agreement to use the module and to support the ongoing effort in disseminating genetic and genomic education to staff nurses.

Protections

The Walden University Institutional Review Board (IRB) reviewed this project to assure there were no risks to subjects who participated in a study. The goal of Walden University's DNP program is to facilitate the development of students as scholarpractitioners and nurse leaders. The education program that was used already exists through a secure online login accessed through a link on Survey Monkey[®]. No password or user name was required to access the education program on the website.

The nursing genomic education program was an online self-study continuing education activity for professional staff, and is an acceptable staff development project for DNP practice. A signed agreement from the agency in the Northeastern United States to provide the staff development project was obtained and included with the project approval process per Walden DNP IRB process for "Site Approval Documentation for Staff Education Doctoral Project" (Walden University, DNP Manual for Staff Education, 2017, p. 13). Each participant received the "Consent Form for Anonymous

Questionnaire” before to agreeing to participate in the project (Walden, DNP Manual for Staff Education, 2017, p. 14).; After approval of the DNP project by the Committee, the University Research Review, and Walden’s IRB, the education program was implemented.

Analysis and Synthesis

The system used for recording, tracking, organizing, and analyzing the evidence was Survey Monkey[®] and Microsoft Excel[®]. The results of the pretest and posttest were analyzed to determine if there was an increase in nurses’ knowledge and confident about genetics and genomics after completing the education program. The results of the analysis sought to determine if the education program on genomics improved nurses’ knowledge and confidence in discussing genetics and genomics with their patients. The nurses completed a program evaluation that were analyzed separately, and will be shared with the nurse researchers that developed the genomic self-directed learning module (see Hetteberg et al., n.d.) program as stated in the permission agreement to use the program. The results of the data are included in the Table 1 of this project.

Summary

Nurses believe they are ill prepared to care for patients with genomic problems (Calzone et al., 2013). The purpose of this project was to educate staff nurses in a local hospital in the northeastern United States about genomics to provide them with the knowledge needed to explain individualized plans of care for their patients. The practice-focused question was, will the implementation of an evidence-based online education program about genetics and genomics increase the nurses’ understanding, and ability to

competently provide care for their patients who are receiving treatments based on the science of genomics? Using the JHNEBP model (Dang & Dearholt, 2017), the selection of the education program was facilitated through a thorough search of the literature for an evidence-based approach. Based on the evidence, an existing teaching program, the Genomic Self-Directed Learning Module was used in the project (see Hetteberg et al., n.d.). This education program was previously tested for accuracy and existing content validity, and verified through written communication with the nurse researcher (see Hetteberg et al., n.d.). The procedure to implement the project included obtaining a site agreement to participate in the program. The organization identified key stakeholders to evaluate the use of this education program for their nursing staff. Stakeholders evaluated the program using formative review questions with Likert-type responses. The AGREE II, (Brouwers et al., 2010) was used to develop the stakeholder's formative review questions. The framework included Knowles (1975, 1984) theory of the adult learner that was used to select and appropriate education program for the nursing staff. The protections explained the process for approval of the project from the Walden University Institutional Review Board prior to implementation and how participants' anonymity and confidentiality was assured. Examples of the Walden University Institutional Review Board's consent and permission forms that were used in the project were included in the proposal appendices. The procedure for the online project included a pre/posttest questionnaire along with a self-directed, online education program. A 2-tailed paired *t*-test was used to determine if the implementation of an evidence-based online education program about genetics and genomics increased the nurses' knowledge and confidence

when interacting with their patients who are receiving treatments based on the science of genomics. Individual responses were compared for each of the participants and analyzed using a 2-tailed paired t -test to determine if there was a statically significant difference between the means of the two groups. This project abided by the Walden University Institutional Review Board's guidelines for protection of participants in this project

In Section 4, I discuss the findings and implications of the project, provide recommendations for how this project can be used to address the gap in genomic and genetics in evidence-base nursing practice, the positive implications for social changes, and identify the strengths and limitations of the project.

Section 4: Findings and Recommendations

Introduction

Genetics and genomics influence nursing practice through the discovery of new treatment methods aimed at symptom management and the prevention of disease. Nurses in a medical-surgical unit in the Northeastern United States have expressed uncertainties and felt challenged in discussing genomics and the new genetically engineered medications that are prescribed with their patients. This was consistent with Skirton et al. (2012) who reported that although a majority of nurses in their systematic review routinely collected genomic data such as family health histories, many of the respondents self-reported a low confidence in their knowledge and understanding of genomics. The practice-focused question was as follows: Will the implementation of an evidence-based online education program about genetics and genomics increase the nurses' understanding and ability to competently provide care for their patients who are receiving treatments based on the science of genomics? The purpose of this project was to educate staff nurses in a local hospital in the Northeastern United States about genomics to provide them with the knowledge needed to develop individualized plans of care for their patients. Principles of Knowles (1975; 1984) the adult learning theory guided the selection of the on-line education program on genomics for nurses. The JHNEBP model (Dang & Dearholt, 2017) was used to search, organize, and synthesize the evidence. Based on the evidence from a library search of nursing education programs on genomics, an existing teaching program, the Genomic Self-Directed Learning Module was used in the project (see Hetteberg et al., n.d.).

After IRB approval (Walden IRB approval no. 05-01-19-0294783), the sources of evidence were obtained by using the previously developed online program on nursing and genomics (see Hetteberg et al., n.d.) to create an online pretest and posttest survey in Survey Monkey[®]. There was a total of 11 pretest and 11 posttest questions followed by 13 program evaluation questions. The survey was distributed online through a state nurses' association website in the Northeastern United States through an announcement and a link on their site. When the project concluded, individual responses were compared for each of the participants and analyzed using a 2-tailed paired *t* test to determine if there was a statically significant difference between the means of the two groups using the statistics program in Microsoft Excel[®].

Findings and Implications

Findings

The project was implemented on-line using Survey Monkey[®] and analyzed using a 2-tailed paired *t* test with Microsoft Excel[®]. The pre- and post-test self-directed, online staff education project was comprised of a sample size of 12 surveys respectively. The average time it took participants to complete the program was 36.5 minutes. A 2-tailed paired *t* test was used to determine if the implementation of an evidence-based online education program about genetics and genomics increase the nurses' understanding and ability to competently provide care for their patients who are receiving treatments based on the science of genomics. The results indicated that nurses scored significantly higher ($p < .05$) on the posttest after completing the nursing education program on genomics with almost a 50% increase. The following results were obtained pretest ($N = 12$, $M =$

4.75, $SD = 3.67$), posttest ($N = 12$, $M = 10.55$, $SD = 0.67$), and paired t test ($t = 2.23$, $p < .001$; Table 1).

Table 1

2-tailed, Paired t test for Pretest and Posttest Scores

Nurses' pretest scores	Nurses' posttest scores	N	$M(SD)$	t	df	p
3	10	12	4.75(3.67)	2.23	10	<.001
4	11					
3	10					
0	11					
6	9					
9	10					
9	11					
2	10					
1	11					
1	11					
9	11					
10	11					

The project demonstrated that the implementation of the education program did improve nurses' understanding and ability to provide competent care for their patients who are receiving treatments based on the science of genomics.

Unanticipated Limitations or Outcomes

There was an unanticipated change in the survey site from a hospital setting to a nurses' association website in the Northeastern United States. The change was due to unforeseen challenges with the hospital's availability. The purpose of this project was to educate staff nurses in a local hospital in the Northeastern United States about genomics to provide them with the knowledge needed to develop individualized plans of care for their patients. The new site provided access to the same-targeted population, medical-

surgical nurses employed in the in-patient hospital setting. However, only 12 nurses completed the survey. It is not clear how the small number may have affected the results obtained; however, the level of significance was significant.

Implications

The use of genomics in healthcare has created challenges in obtaining education and developing competencies for application at the bedside (Green & Guyer, 2011). By implementing this online program into practice, the nurses were guided by the content grounded in evidence-based research to improve the quality of their care to patients. According to the ANA (2009), the National Coalition for Health Professional Education in Genetics recommends integration of genetics and genomics across the health professions through educational programs. This DNP project met this recommendation at the local level for a small group of medical surgical nurses practicing at the bedside in the Northeastern United States.

Nurses reported more confidence in their knowledge of genetics and genomics after participating in the online education program on genomics. The increase in nurses' knowledge on genomics has the potential to provide nurses with the competence and confidence to collaborate with physicians and pharmacists about a treatment plan incorporating genomics, resulting in effective team collaboration and a positive social change between the groups to improve patient outcomes.

It is imperative that nurses understand genetics and genomics to facilitate better disease management in the delivery of individualized patient care (Montgomery et al, 2017). This project implemented an evidence-based program to educate nurses about

genetics and genomics, and nurses reported greater confidence in understanding and ability to provide competent care for their patients receiving treatments based on the science of genomics.

The outcome of this educational project has the potential for positive social implications for two groups: nurses and patients. Participating in an education program that increases nurses' knowledge about genetics and genomics has the potential to increase their ability to interact competently about genomics with their patients and to develop plans of care relating to new genetically engineered medications prescribed for their treatment.

Recommendations

The results of the program support the continued use of online nursing education programs on genetics and genomics to improve nurses' knowledge and confidence in the care of their patients with genetic and genomic problems. Although there was a small sample size, evidence that the results of the project were statically significant for increasing nurses' knowledge of genetics and genomics through the education program suggests that the project is of value and should be repeated with a larger sample size. The same method for delivering the education program is recommended because nurses unanimously reported that the online format provided ease of access to the education material and a convenient way to complete the program in a small amount of time. The education program included links to serve as references for nurses during the education program. The participants reported that they did not believe links were necessary because the knowledge needed was contained in the program. Therefore, another recommendation

is to remove the links from the education program because they were reported to not be necessary to complete the program.

The results of the project support the overall use of on-line nursing education programs to improve nurses' knowledge and confidence, and this model could be used for other needs in staff nurses' education.

Strengths and Limitations of the Project

A limitation of the project included the need to change from the in-patient hospital setting to a state nurses' association education website. The new site provided access to the same-targeted population, medical-surgical nurses employed in the in-patient hospital setting. However, only 12 nurses completed the survey. It is not clear how the small number may have affected the results obtained; however, the level of significance was very impressive. Although the hospital was not able to participate in the project, the outcome and summary data will be shared with the organization in the case they wish to adopt the education program for their staff in the future.

Another limitation was the small sample size, although the results from the sample did demonstrate a statistically significant increase in knowledge from pretest to posttest scores, therefore, as formerly stated, this project should be repeated with a larger group of nurses for a comparison.

A strength of this project included the quality and method of delivery of the education program to increase the competence and of nurses to interact with their patients and other healthcare professionals. An understanding of genomics is needed to "improve the effectiveness of healthcare" by 2020 and beyond (Green & Guyer, 2011, p.206). Staff

nurses reported the program was a quality program that was easy to access, convenient in the on-line format, and improved their confidence in caring for their patients after completing the education program on genomics.

Another strength of the project was that it addressed the gap in practice related to nurses' lack of knowledge in genetics and genomics (ANA & ISONG, 2016; Calzone et al., 2013; Hickey et al., 2018; Jenkins, et al., 2015; Rogers et al., 2017). Participants reported an increase in their confidence that addressed the gap in knowledge regarding how to care for their patients who have genetic and genomic problems.

A third strength was that nurses' unanimously reported a high level of satisfaction in the use of the on-line nursing education programs to improve nurses' knowledge and confidence in the care of their patients with genetic and genomic problems.

Section 5: Dissemination Plan

To disseminate the results of the project, I will submit an abstract and summary for podium and/or poster presentation to the nurses' association that participated in the education program to present during their annual conference (Appendix F). I will also present a summary of the finding to the organization's leadership. An abstract will be submitted to the ISONG to present at one of their meetings. The program evaluation results will be shared with the nurse researcher as part of the agreement to use the program; in addition, I will share a summary of the results. I will do a follow up visit with the hospital that helped identify the problem and share a summary of the results with the stakeholders with recommendations for future implementation.

Analysis of Self

This project was aligned to the DNP Essentials aimed at improving nurses' knowledge and skills related to best clinical practice in the care of patients with genetic/genomic problems at the bedside (see ACCN, 2006). A goal for this project was to have a positive impact on the delivery of patient-centered care by supporting nursing staff's education needs for patients with genomic and genetics problems. This goal was achieved by providing a staff education program that was grounded in evidence-based research. Although my project included a well-developed plan, I found the implementation of the project was a challenge because of a change in the site's availability to implement my project.

The small projects that I had completed during my practicum were all implemented in the same organization. I felt supported in my role and became familiar

with one site throughout my practicum, which helped me to understand the education needs of nursing staff, the responsibility of planning and initiating a project, and the importance of identifying a need from within the organization. The implementation of this project was more complex and sometimes stressful primarily due to the changes that were taking place among the leadership of the organization. When it became apparent that my initial site was not able to accommodate my project, I overcame this challenge by searching for and selecting a new site. The nurses and administration in the hospital where I had planned my project had been supportive of the project. However, the hospital was in the process of transitioning and merging with a larger hospital system, which prevented them from adding new projects to their schedule. As a project leader, a pragmatic, real-world approach involved letting go of the issues with a lower priority or under review by other leaders and coalescing support for a higher priority change to research a new site for my project (see Shirey, 2011).

It was challenging to look for a new site, and during my search, I shared the requirements of my project and my desire to provide an education program on genomics and genetics to nursing staff with a state nursing association. The association was excited to be able to offer this project at no cost as a learning resource for medical-surgical staff nurses on their website and agreed to offer the program. I was disappointed to have to abandon my former site, but I enjoyed learning about the logistics of working with a state nursing organization and their requirements for offering an education program. I was initially concerned about the change in site, but I believe the program was able to reach a broader audience of staff nurses with the new site.

Another challenge was with the small response rate of my survey, but I feel fortunate that the response rate was adequate to complete my data analysis and determine if the results of my project, the long hours, and additional planning would provide significant evidence to support the education project. I was impressed by the results of the survey and appreciated working with a program that had been developed for nurses to use online. The online education program improved access to the nurses, and they responded that the program helped them meet their needs for education in the area of genomic science.

The patient and family health history provides an abundance of critical information and insights about a patient's health and health risks (Claassen et al., 2010; Valdez, Yoon, Qureshi, Green, and Khoury, 2010). I believe it is imperative that nurses have access to evidence-based knowledge about genomic science to provide an individualized plan of care for their patients, and my DNP project was developed with this belief in mind. Genetics and genomics in nursing continues to evolve in the scope of nursing practice (ANA, 2011). To assist in the process of integrating genomic science in nursing practice, I worked with the nurses to identify some of the barriers that were preventing them from obtaining additional knowledge about genomic and genetics in nursing practice. The greatest obstacle for nurses to overcome was their lack of confidence in caring for their patients with genomic problems. It took several meetings to determine that their main concern was their lack of knowledge, which created uncertainties, and this was the problem that the project addressed. The gap in practice that

I identified was supported in the evidence during my literature review (see Skirton et al., 2012).

Despite to obstacles of securing another site that was appropriate to implement the project, statistically, significant improvement in posttest responses indicated that the findings support the need for education programs for staff nurses on genetics and genomics. The results support the evidence for organizational commitment in genetics and genomics nursing education programs to improve nurses' knowledge and confidence. This project supports a long-term goal of working on projects that will assist nurses in gaining knowledge in genetics and genomics in the practice setting. Health care systems are complex organizations that can benefit from evidence-based projects on genetics and genomics aimed at meeting the challenges of nurses as they strive to provide safe and competent individualized patient care.

Summary

Nurses on all levels must be able to translate research to improve quality and safety “at the point of care” (McGann, 2012, p. 1). It is imperative that nurses have an understanding of genetics and genomics to facilitate better disease management in the delivery of individualized patient care. The emerging role of healthcare providers in the use of genomics has created challenges in obtaining education, developing competencies, and in the application and use of genomic information at the bedside (Green & Guyer, 2011; Williams et al., 2017). The purpose of this project was to provide a nursing education program on genetics and genomics to improve nurses' knowledge and confidence when caring for their patients who are receiving treatments based on the

science of genomics. In this DNP project, I focused on the current gap in nursing knowledge and the need for staff nurses to build competency in the area of genetics and genomics to facilitate the translation of knowledge to care for their patients. Although there was a small sample size, the project was statistically significant for improving nurses' knowledge and confidence of genetics and genomics through an online nursing education program and is worth providing to nurses to improve their knowledge of genetics and genomics.

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Appendix A: Email of Permission to use Figure in DNP Manuscript from the Institute for

Johns Hopkins Nursing

Request permission to reproduce the following figure in my DNP project to explain how I used the model in my project manuscript

Kim Bissett <kjewett1@jhmi.edu>

Mon 8/12/2019 8:11 AM

Hi Nancy,

You have permission to use the graphic as described below. Best of luck on your DNP.

Kim Bissett

The Institute for Johns Hopkins Nursing

This message was sent with High importance.

Nancy Norman-Marzella

Thu 8/8/2019 10:03 PM

JHNEBP Model and Tools- Permission.docx

272 KB

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2 KB

2 attachments (274 KB)

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This message was sent with High importance.

Nancy Norman-Marzella

Thu 8/8/2019 10:03 PMijn@jhmi.edu

JHNEBP Model and Tools- Permission.docx

272 KB

Good evening,

I am a student at Walden University and I would like to reproduce the attached figure in my DNP project to depict and explain how the JHNEBP model was used. Please direct me to the appropriate person so that I can ascertain if this is allowable and obtain permission in writing. Thank you for your consideration in this matter.

Respectfully,

Nancy Norman-Marzella, DNP Student

Appendix B: Genomic Self-Directed Learning Module Pretest/Posttest

Genetics is Relevant Now - Pretest/Posttest

Instructions: Once you complete the posttest, please show your certificate to the staff development coordinator.

Pretest/Posttest

1. Hereditary risk factors influence the development of many common diseases.

- True
- False
- Uncertain

2. Genomics is being translated into clinical practice by:

- a. Taking a three-generation family history to assess risk and inform prevention.
- b. Using genetic tests to screen for and to diagnose an increasing number of diseases.
- c. Managing disease through targeted genetic therapies.
- d. All of the above
- e. B and C only
- f. None of the above
- g. Uncertain

3. Which of the following use genotype information:

- a. Pharmacogenetics
- b. Characterizing tumors to individualize therapies
- c. Both A and B

d. Neither

e. Uncertain

4. Continually developing genetic technologies are improving our understanding of the genetic contributions to common diseases.

a. True

b. False

c. Uncertain

5. To which population does NCHPEG recommend the integration of genetics knowledge and skills into their practices?

a. Nurses

b. Physicians

c. Social Workers

d. All health care professionals

e. Uncertain

6. The Essential Nursing Competencies and Curricula Guidelines for Genetics and Genomics focuses on only the nurses of the future.

a. True

b. False

c. Uncertain

7. Kevin, who was tested for a mutation that is associated with HNPCC, felt that nurses can:

- a. Help bridge the existing gap of genetics information provided to patients
- b. Help patients find credible sources of information
- c. Support patients during the genetic testing process
- d. All of the above
- e. A and B only
- f. Uncertain

8. As exemplified by Helen's story in which she had a newborn with Trisomy 13, health professionals are oftentimes uncomfortable with giving bad news because they have inadequate knowledge about genetic conditions such as Trisomy 13.

- a. True
- b. False
- c. Uncertain

9. Various stories illustrate that genetic testing for at risk, asymptomatic family members may:

- a. Help them make informed life and reproductive choices
- b. Enable the use of genotype targeted therapies
- c. Allow families to make adjustments to accommodate the eventual needs of a family member found to have a gene mutation associated with a debilitating disorder
- d. Enable the use of available prevention strategies

- e. All of the above
- f. All except D
- g. All except C
- h. Uncertain

10. As illustrated by the genetic nursing experts' interviews and the patient stories genetics/genomics are relevant to only OB, pediatric and psychiatric nurses' practices.

- a. True
- b. False
- c. Uncertain

11. How confident are you with your knowledge of genetics and genomics in your nursing practice?

- Not at all confident
- Not so confident
- Somewhat confident
- Very confident
- Extremely confident

Posttest instructions

Please complete the Program Evaluation.

Appendix C: Project Stakeholders Introduction and Formative Review of Program Questions Regarding Project Pretest/Posttest

This module is a collaborative product of the XXX

Module Purpose

To inform nurses about the relevance of genetics and genomics to patient care and nursing practice.

Module Learning Objectives

1. Identify the relevance of genetics and genomics to patient care.
2. Identify the relevance of genetics and genomics to nursing practice.

The Importance of the Genomic Era to Nursing Practice

The “Genomic Era” began in earnest with completion of the human genome sequence in April 2003, adding momentum to the clinical application of genomic research. Genomics is the study of all the genes in the human genome and their functions and interactions. Genomics is being translated into clinical practice on a daily basis.

Examples include:

1. Taking a three-generation family history to assess risk and inform prevention;
2. Using genetic tests to screen for and to diagnose an expansive number of diseases; and
3. Managing disease through targeted genetic therapies (treatment based on genotype).

Individualized Treatments Based on Genotype

Examples of treatments based on genotype include:

Genotyping for drug selection and /or dosage (also known as pharmacogenetics).

Pharmacogenetics

Tumor genotyping to determine how aggressive a cancer is, and about what medication is most likely to target and kill specific tumor tissues. Herceptin (trastuzumab), used to treat metastatic breast cancer in which tumors over express the HER2 protein http://www.breastcancer.org/research_herceptin_100305.html
Tarceva (erlotinib) and Iressa (gefitinib) designed to specifically counteract molecular aspects of non-small cell lung cancers
http://www.lungcancer.org/health_care/focus_on_lc/treatment/new_treatment.htm
Gleevec (imatinib), a FDA approved drug for the treatment of BCR-ABL+ CML
<http://www.cancer.gov/newscenter/qandagleevec>

The Relevance of Genetics and Genomics to Nursing Practice

New genetic technologies are improving our understanding of the genetic contributions to common, complex disease that constitute major public health issues:

Diabetes

Heart disease

Alzheimer disease

Genetic and genomic information and technology can be found at all levels of care:

Prevention (e.g., increased risk from family history/genetic predisposition)

Screening (e.g., newborn screening; cystic fibrosis carrier screening)

Diagnosis (e.g., genetic testing)

Prognosis (e.g., natural history of disease)

Selection of treatment (e.g., identify the most effective therapy options)

Core Competencies in Genetics Essential for All Health- Care Professionals

In January 2001, the National Coalition published the Core Competencies in Genetics Essential for All Healthcare Professionals for Health Professional Education in Genetics (NCHPEG or "NITCH-peg")

The American Nurses Association is a founding member of NCHPEG along with the National Human Genome Research Institute and the American Medical Association. NCHPEG recommends that all healthcare professionals integrate genetics knowledge and skills into their practices.

Please go to <http://www.nchpeg.org/content.asp?dbsection=basic&dbid=1> to review the Core Competencies

Essential Nursing Competencies and Curricula Guidelines for Genetics and Genomics

In September 2005, more than 50 nurses met to discuss the Essential Nursing Competencies for Genetics and Genomics proposed as integral for nurses in practice today, as well as for those who will be practicing in the future.

This group, representing professional nursing organizations and key policy stakeholders, identified and agreed upon the minimal essential competencies for all nurses.

To learn more about the Essential Nursing Competencies and Curricula Guidelines for Genetics and Genomics, click <http://www.nursingworld.org/ethics/genetics/>

Has your specialty nursing organization endorsed the document? To find out, click <http://www.nursingworld.org/ethics/genetics/endorsements.htm>

developed by Carol Hetteberg, MSN, CNS, Jean F. Jenkins, PhD., RN, FAAN, Erin K. Harvey, MS, CGC, and Cynthia A. Prows, MSN, CNS

Stakeholder Formative Review Questions

After a review of the project objectives and content, please answer the following questions about using the education module.

1. The scope and purpose of the information presented relating to the treatment of patients with genetic conditions is clearly presented.
 - a. strongly agree
 - b. agree
 - c. neutral
 - d. disagree
 - e. strongly disagree

2. The objectives of the education program are specifically described.
 - a. strongly agree
 - b. agree
 - c. neutral
 - d. disagree
 - e. strongly disagree

3. The case studies are specific and unambiguous.
 - a. strongly agree
 - b. agree
 - c. neutral
 - d. disagree
 - e. strongly disagree

4. The clinical information presented is sufficient to answer the questions in each of the genomic case studies.
 - a. strongly agree
 - b. agree
 - c. neutral
 - d. disagree
 - e. strongly disagree

5. The information presented to nurses can be put in to practice.
 - a. strongly agree
 - b. agree
 - c. neutral
 - d. disagree
 - e. strongly disagree

Appendix D: Education Flyer



Free Nursing Continuing Education Online Program on Genomics

This nursing education program is part of a DNP project in partial fulfillment of the Doctor of Nursing Practice program at Walden University's College of Health Sciences. Participation in the online nursing genomics education program is anonymous and voluntary. Certificates of completion are available at the end of the program. The American Nurses Association has formerly approved this education program for CEUs. The goal of the project is to increase nurse's awareness of genetics and genomics in nursing practice. The program takes about one hour to complete and includes an online self-directed learning module on genomics through nurse and patient case-studies across the nursing practice continuum, a pre and post-test, and a program evaluation. To participate, please access the program at the following link on Survey Monkey® <https://www.surveymonkey.com/XXX>

Appendix E: Program Evaluation

1. How well did this module meet your expectations?

- Beyond my expectations
- As I expected
- Somewhat
- Not at all

2. Please rate the overall quality of this module.

- Excellent
- Good
- Fair
- Poor

3. Which statement most closely reflects your reaction to the interviews of genetics nursing experts portion of the module:

- a. The genetics nursing experts provided new information that I had not considered before.
- b. The genetics nursing experts reinforced my thoughts about the relevancy of genetics/genomics to patient care and nursing practice.
- c. The information provided by the genetics nursing experts did not meet my learning needs.
- d. The information provided by the genetics nursing experts detracted from the overall quality of the module.

4. Which statement most closely reflects your reaction to the patient stories portion of the module?

- a. The patient stories provided new information that I had not considered before.
- b. The patient stories reinforced my thoughts about the relevancy of genetics/genomics to patient care and nursing practice.
- c. The patient stories did not meet my learning needs.
- d. The patient stories detracted from the overall quality of the module.

5. How likely are you to use one or more of the module's external web sites as resources in your practice?

- Very likely
- Somewhat likely
- Not at all likely

6. How likely are you to use one or more of the module's external web sites as resources for additional self-education in genetics?

- Very likely
- Somewhat likely
- Not at all likely

7. Please rate the effectiveness of the objectives to the module's overall purpose: To inform nurses about the relevancy of genetics and genomics to patient care and nursing practice.

- Effective
- Somewhat effective

Not at all effective

For questions, 8-9, please rate the quality of the module as it relates to enabling you to achieve each of the learning objectives:

8. Objective 1: Identify the relevancy of genetics and genomics to patient care.

Excellent

Good

Fair

Poor

9. Objective 2: Identify the relevancy of genetics and genomics to nursing practice.

Excellent

Good

Fair

Poor

For questions, 10-11 please evaluate the design and format of this module.

10. How would you rate the module navigation?

Intuitive

Adequate

Cumbersome

Unmanageable

11. Which statement most closely reflects your reaction to the audio portions of the module (genetics nursing experts and patient stories)?

The audio enhanced my interest in the module content.

- The audio interfered with my learning because it was cumbersome to download/listen to with my computer.
- The audio helped me learn the module content.
- The audio was unnecessary since the content was available in text format.

12. Please rate your level of satisfaction with learning about the relevancy of genetics and genomics to patient care and nursing practice in a web-based, self-paced format.

- Completely satisfied
- Somewhat satisfied
- Not at all satisfied

13. From where did you access the module? (Check all that apply)

- My home computer
- A relative's or friend's computer
- Work computer
- Publicly available computer (such as at a library)
- Other

Appendix F: Poster Presentation

EVIDENCE-BASED PRACTICE SELF-STUDY EDUCATION PROGRAM FOR STAFF NURSES ON GENOMICS

Nancy Norman-Marzella, MSN, NP, RN, DNP Student

Introduction

- ❖ The use of genomics in healthcare has created challenges that include:
 - ❖ Educating staff nurses at the center of care.
 - ❖ Developing competencies in the clinical setting, and
 - ❖ Applying and using genomic information at the bedside (Green & Guyer, 2011; Williams et al., 2017).

Objective

- ❖ Work with a hospital in the northeastern United States to provide an online educational program on genetics and genomics to a group of staff nurses on medical-surgical units.
- ❖ The goal of this project was to increase nurses' understanding, and ability to competently provide care to their patients.

Problem – Gap in Practice

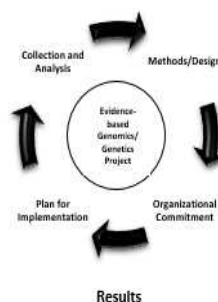
- ❖ Nurse have a need for genetics and genomics information.
- ❖ Nurses at the bedside routinely care for patients with diseases with genetic & genomic implications such as heart disease, cancer, cerebrovascular disease, and diabetes (Rogers et al., 2017).
- ❖ In the past two decades, there has been a small amount of change in the level of knowledge in genetics and genomics for nurses in the clinical setting (Rogers et al., 2017).
 - ❖ Nurses report low confidence in their knowledge (Skirtan et al., 2012; McCabe et al., 2016).

Implications for Practice

- ❖ Potential to contribution to positive social change by facilitating effective team collaboration and patient advocacy in the care of patients with genetic & genomic problems.
- ❖ It provide staff nurses with competence and confidence.
- ❖ Effective team collaboration.
- ❖ Increase knowledge and guidance for patients.

Methods

- ❖ Use a nursing education programs, developed and tested for validity and accuracy to educate nurses at the bedside on genomics.
- ❖ Distribute the nursing genomics education program online including a pre and posttest survey.
- ❖ Analyze and synthesize the results to see if the education program increases nurses' understanding and ability to competently provide care to their patients.



- ❖ The results indicated that nurses scored significantly higher ($p < .05$) on the posttest after completing the nursing education program on genomics with almost a 50% increase. The following results were obtained pretest ($n = 12$, $M = 4.75$, $SD = 3.67$), posttest ($n = 12$, $M = 10.55$, $SD = 0.67$), and paired t test ($t = 2.23$, $p < .001$) (Table 1).

Table 1. 2-tailed, Paired t -test for Pretest and Posttest Scores

Nurses' Pretest Scores	Nurses' Posttest Scores	N	MSD	t	p
3	12	12	4.75(3.67)	2.23	<.001
4	11				
3	10				
11	11				
6	9				
9	10				
9	11				
3	10				
1	11				
1	11				
9	11				
10	11				

Recommendations

- ❖ The results of the program support the continued use of online nursing education programs on genetics and genomics to improve nurses' knowledge and confidence in the care of their patients with genetic and genomic problems.
- ❖ Although there was a small sample size, evidence that the results of the project were statically significant for increasing nurses' knowledge of genetics and genomics through the education program suggests that the project is of value and should be repeated with a larger sample size.
- ❖ The same method for delivering the education program is recommended.

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