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Promoting Nurses Management of Night Shift Sleepiness

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This is to certify that the doctoral study by

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Abstract

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Psych Mental Health Nurse Practitioner, California State University, Long Beach, 2013

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Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Nurses are largely unaware of the problems of night-shift-nurse sleepiness and available strategies to manage night-shift sleepiness. The purpose of this project was to examine nurses' self-perception, awareness of sleepiness, and current strategies to manage this problem in the emergency medicine department of a major academic hospital in the western United States. The validated de-identified Karolinska Sleepiness Scale (KSS) was used to measure the prevalence and intensity of night shift nurses' sleepiness prior to the development of an educational program on strategies to manage sleepiness. Of the 164 registered nurses surveyed, 72 (43.9%) reported sleepiness greater than 7 on the KSS. An educational program was developed and evaluated by a panel of 6 experts who were selected on their clinical, educational, quality improvement, and research in sleep studies. Expert reviews indicated that the education program was 100% relevant, appropriate, and understandable, and provided adequate information on the topic with no recommended changes. The education program was presented to 16 night shift nurses with a pre/posttest survey completed by 14 nurses. Results indicated that participating nurses increased their knowledge of managing strategies for sleepiness from 69% (agree or strongly agree) preintervention to 92% postintervention. Postintervention, there was a 50% increase in the number of nurses who reported benefits from the education intervention. The findings of this project contribute to positive social change by improving nurses' health and quality patient care by advancing nurses' awareness of night shift sleepiness and countermeasure management strategies.

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Dedication

This study is dedicated first and foremost to all night shift nurses in this public academic hospital in Los Angeles and all nurses any where who are working innovatively and relentlessly to advance patient experience and outcomes and globally improve the well-being of people in general and the nursing profession in particular.

This study is also dedicated in loving memory of my father, Chief James Okundolor Esobakponwmen, "The Ikuobasoyewmen of The Great Benin Kingdom," Nigeria: I dedicate this project in your twentieth remembrance anniversary for always empowering, supporting and inculcating in me the sense of educational achievement, family love, and community service.

Also I dedicate this project to my mother, Mrs. Atiti Comfort Okundolor; my brother, Mr. Benjamin Okundolor; my daughter, Chelsea Osaro Okundolor; and the entire Okundolor family all over the world for always believing in me. This is for you, the Okundolor family. In addition, I dedicate this to my brother Mr. Omoruyi Okundolor who was murdered in cold blood in Benin-City, Nigeria during this journey.

Acknowledgments

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Section 1: Nature of the Project

Introduction

The problem of night shift nurse sleepiness compromises delivery of safe and high-quality health care. In addition, staff safety and their ability to provide the appropriate patient care are jeopardized (Fallis, McMillian, & Edwards, 2011). Nurses' sleepiness is pervasive and problematic, but it can be regulated, based on available research and supported by countermeasures. Nurses are largely unaware of the implications of sleepiness and evidence-based strategies to manage and mitigate night shift sleepiness.

In the absence of efforts to raise awareness of the problem or education to introduce evidence-based strategies that promote healthy sleep habits, staff will continue to leave the night shift and even the nursing profession. With this DNP project, I aimed at examining night shift nurses' perceptions of sleepiness and providing education on current strategies to manage this problem in the emergency department at a public academic hospital in Los Angeles, California. The Karolinska Sleepiness Scale (KSS) quantitative screening questionnaire was used to measure the intensity of the nurses' sleepiness. After assessing for sleepiness intensity, I developed an educational program on sleepiness management strategies and provided it to the nurses. I administered a pre- and post-survey to evaluate the nurses' gain in knowledge.

In Section 1, I discuss practice problems associated with night shift nurse sleepiness and the purpose of the project, including the nature and significance of staff education and relevance to nursing practice.

Problem Statement

Nurses fall asleep in all areas in an acute hospital's units with several consequences (Geiger-Brown et al., 2016). However, nurses falling asleep in an emergency department that includes a psychiatric emergency room exposes everyone to greater risks for harm (Hulatt, 2014). These risks further potentiate the adverse consequences of patients' violent acts when unmonitored in psychiatric units, where supervision, vigilance, and attentiveness are the cardinal care essentials, mostly in attempting to avoid restraints and seclusion (Donat, 2014; Hulatt, 2014; Knox & Holloman, 2015).

In the emergency room of this public academic hospital in Los Angeles, a problem was noted with night shift nurses having difficulty staying awake and subsequently requiring disciplinary action. The unit manager reported concerns over this staff practice problem and its potential to affect patient safety and the staff turnover rate.

Patients in the department of emergency medicine (psychiatric emergency and medical emergency rooms) are in a state of dynamic disequilibrium, making it even more important for nurses to stay awake and alert during the night shift (Knox & Holloman, 2015). Precipitators such as circadian dysthymia, sleep-wake disharmony, sleep disturbances, the quiet work atmosphere, slower work activities, low noise level, minimal staff presence, and dimmed lights affect sleep. The swing in the sleep/wake dynamic equilibrium peaks between 2 a.m. and 6 a.m., with sleepiness propensity most powerful and nurses most likely to fall asleep (Fallis et al., 2011; Geiger-Brown et al., 2014).

The problem of night shift nurse sleepiness came to my attention a few years ago when I became one of the nurse managers in the department of emergency medicine at this pulic academic hospital. I was concerned and had several discussions with my clinical nursing director. However, the bueracratic nature of the public academic hospital left us only with the option of disciplining staff progressively, leading to a high turnover rate on the night shift. I began exploring evidence-based interventions to help night nursing staff to improve sleepiness and patient care and the hospital to retain the nurses.

Purpose Statement

The significant impact of nurse sleepiness translates to decreased productivity and compromises in patient and staff safety. It has also been shown to increase organizational liabilities and cost (Short, Agostini, Lushington, & Dorrian, 2015). Increasing the nurses' awareness of the sleepiness problem and modulating strategies will advance self-perceived sleep management efficacy and improve the nurses' inertia (Alspach, 2008; Geiger-Brown et al., 2016; Nejati, Shepley, & Rodiek, 2016). It can also enable line staff and leadership collaboration in recognizing the problem and strategies to moderate the nurses' sleepiness supportively. The purpose of this DNP project was to provide an educational program that promotes awareness and mitigating strategies to manage night shift nurse sleepiness.

Nature of the Doctoral Project

For this doctoral project, I used two survey questionnaires: First, I used the validated KSS tool to assess the intensity of the problem. The KSS is a self-report sleepiness scale that screens for problematic sleepiness levels. The scale has been

validated to measure sleepiness and fatigue (Fallis et al., 2011; Geiger-Brown et al., 2016; Short et al., 2015). In addition, I conducted a pre- and post-survey to assess the results of the educational in-services that were administered to night shift nurses working during the designated survey period. The survey was administered for data collection, but the identity of the survey takers will remain anonymous. Initially, I conducted a review of the literature to identify evidence-based interventions that indicated modulation of night shift nurse sleepiness. Then, I developed an educational program based on the evidence. This program was reviewed by six experts on the subject matter, including clinical experts and the executive leadership. Pre- and post-evaluation questionnaires were used to assess the knowledge base at the beginning and at the conclusion of the in-service education. The educational intervention content addressed the problem in general and the intensity of sleepiness found and provided countermeasure interventions to decrease night shift nurse sleepiness. Awareness of the problem and knowledge of sleep management education that decreases the night shift nurses' sleepiness aligns with the topic of population management, which is consistent with *DNP Essential III* (American Association of Colleges of Nursing [AACN], n.d). The *DNP Essential III*, requires the dissemination of research-based evidence in practice; this project was, thus, addressing a DNP Essential.

Significance

Nurses make up the largest segment of the health care workforce (American Nurses Association [ANA], 2011b). Nurse sleepiness and its consequences are nursing-sensitive performance indicators that can have a significant negative impact on health

care organizational outcomes vis-à-vis patients and the community at large (ANA, 2011a, 2011b). Health care, medical care, and by proxy nursing care are products of the sum of individual nurses' care. Hence, promoting awareness and strategies to manage sleepiness is a keen and vital constituent of nursing practice backdrop and organizational culture (ANA, 2011a, 2011b). It forms the framework that aims to prevent adverse medical errors, improve care, reduce turnover rate, and promote quality (Nejati et al., 2016).

The translation of research evidence on sleepiness into practice by promoting awareness and education regarding effective countermeasure strategies holds significant implications for improving nurses' sleepiness and nursing practice. Additionally, it is relevant to improving nursing-sensitive performance indicators known to have negative implications for nursing and organizational outcomes (ANA, 2011a, 2011b).

The convergence of these adverse consequences made this educational in-service program worthy of and paramount for a doctoral project. The program also impacts patient outcome, nurses' quality of life, and organizational efficiency and productivity (Fallis et al., 2011; Geiger-Brown et al., 2016).

Implication for Social Change

The issue of nurse sleepiness and fatigue during night shift work has been well researched (Alspach, 2008; Ribiero-Silva et al., 2016). Nurses' sleepiness screening assessment, education, and the development of counteracting strategies provide an opportunity for increasing practice safety (Ribiero-Silva et al., 2016). Also, as patient advocates, nurses have a responsibility to their patients to promote quality care through minimization of workplace hazards that could compromise their patients' quality

outcomes. Nurses should recognize their own risk for sleepiness and receive appropriate education on strategies to establish healthy sleep patterns. Educating night shift nurses regarding interventions to address sleepiness can improve patient care and outcome, thus leading to positive social change for both patients and nurses.

Summary

In Section 1, I presented the issue of nurse sleepiness and fatigue during night shift work. The section culminated with a description of the consequences of sleepiness and its impact on nurses' caregiving capabilities. The magnitude of this problem prompted setting the following goals for this study: conducting a screening survey and, then, administering pre- and post-educational surveys regarding the in-service intervention aimed at increasing staff recognition and knowledge of the problem and offering countermeasure strategies to enhance the nurses' sleepiness and fatigue management. The educational intervention program was guided by evidence-based practice concepts and models and a theoretical framework, which informed the implementation of this in-service educational intervention.

Section 2: Background and Context

Introduction

The problem of night shift nurse sleepiness has been well-researched and documented. Several evidence-based, innovative practices have been shown to be effective through sustainable methods and strategies that mitigate night shift nurse sleepiness and its potentially negative consequences. Some of this evidence-based practice (EBP) research features strategies that include rotating shift work, limiting the number of consecutive 12-hour shifts, and minimizing certain overtimes. Other interventions are altering shift-starting and shift-ending times to align and coincide with the propensity for sleep that is utmost eminent between the hours of 2 a.m. and 6 a.m. Also, evidence indicated shortening the work day from the popular 12-hour shift back to 8-hour shift days. In addition, providing routine restorative rest areas, or sleep lounges, and nap times for night shift nurses can mitigate the adverse effects of sleepiness (Aiken, 2011; Alspach, 2008; Dall'Ora, Griffins, Ball, Simon, & Roger, 2008; Fallis et al., 2011; Geiger-Brown et al., 2014; Geiger-Brown et al., 2016; Ribiero-Silva et al., 2016; Rogers, 2008).

However, night shift nurses are largely unaware of the implications of the problem or the evidence-based countermeasures to sleepiness and effective management strategies. The purpose of this project was to assess night nurses' awareness and bridge the knowledge gap through an in-service education program. In this section, I cover the concepts, models, and theories that guided the project. I also discuss the relevance to nursing practice, linking the evidence provided by the reviewed literature to practice, and

describe the local background and context necessitating this project. In addition, I discuss the role of the DNP student and the roles of team members and stakeholders.

Conceptual Framework

Implementing a practice-changing intervention, as I attempted to do with this project, requires the support of a theoretical framework. The Lewin change theory (Shirey, 2013) was used to guide the assessment survey, and the adult learning theory (Kenner & Weinerman, 2011) served to guide the development of the educational in-service program.

The Lewin change model was most appropriate and consistent with a dynamic health care environment and keeping it balanced, thus, forming a sound basis for implementing the recommended project. The Lewin model was the model of choice for this project because it is consistent with changing a deep-rooted, traditional organizational culture that tends to respond slowly to change in the health care business due to the hierarchical and bureaucratic nature of the organization (Kelly, 2011; Stikes & Barbier, 2013). Lewin's change theory delineates a three-stage conceptual construct that entails unfreezing the old, internalized organizational culture with its set beliefs and perceptions in Phase 1. Phase 2, the change phase, provides for making the necessary changes. Last comes the stage of refreezing, or the adoption of the new culture with its beliefs and perceptions.

The full ramification of Lewin's theory resides in its capacity to overcome constraining forces in the organizational culture while maintaining a static equilibrium and resistance to change in perceptual defense of the status quo that is common in health

care organizations (Stikes & Barbier, 2013). The unfreezing in itself is subdivided into three sections: disconfirmation; induction of guilt or survival anxiety; and the generation of psychological safety, or the overcoming of the learning anxiety (Stikes & Barbier, 2013). Contextually, this was the stage where the DNP survey findings were needed. Summarized and communicated, they served to raise the awareness and provoke recognition and reprioritization to address the problem of sleepiness and promote safer workplace conditions through the implementation of the new in-service educational intervention. The in-service education program was shared with organizational stakeholders; it was expected to awaken their awareness of the problematic nature of the night shift nurses' sleepiness at this public academic hospital. It was also expected to raise necessary anxieties in the organizational culture and, hence, the motivation to adopt the sleepiness educational management program hospitalwide, according to Lewin's change theory constructs (Shirey, 2013).

Cognitive redefinition is conceptualized by Lewin as the stage where the organizational leadership and nursing executives begin to realign their values, feelings, and attitude toward learning or doing something to restructure the processes that address the problem (Burnes, 2004). Lewin's model infers that a new standard thus emerges through awareness that sways judgment and evaluation of the current situation toward the search for newer solutions (Shirey, 2013). Change occurs when the learner or the organization has become unfrozen and open to new ideas, as the pre- and post-intervention survey results helped to demonstrate.

Lewin's change phase is suited for testing alternate interventions that may counteract nurse sleepiness. The change phase is also consistent with Deming's (as cited in Stikes & Barbier, 2013) cyclical model of plan-do-study-adopt (PDSA) for testing and evaluating different strategic interventions such as the educational program of this DNP project. This model facilitates the introduction, application, and adoption of research findings and EBP interventions such as the in-service educational program that equips night shift nurses with sleepiness management strategies. It did so through testing the effectiveness of the program through the pre- and post-surveys.

The ability to transition from unit to unit allowed organizational stakeholders involvement, further buy-in, as well as the opportunity to influence the tweaking of the sleepiness management intervention within the broader organizational context. This promoted alignment with the organizational strategic goals, culture and uniqueness in reaching the appropriate synergetic interventional combinations and achieving the desired outcome match (see Kelly, 2011). Also, the simplicity, flexibility, feasibility, and ability of rapid introjection and evaluation of interventions in the change phase of Lewin's theory, using Deming's PDSA cycles, formed the basis of its appeal and, hence, its choice for the educational program on sleepiness management strategies. This uniqueness and its many advantages lend credence to the theory's usefulness as the theoretical framework in the application of research evidence in practice in health care organizations (van Tiel et al., 2006).

Last, the change was acculturated; new awareness and strategies to mitigate nurse sleepiness were being internalized and refrozen, in accordance with Phase 3 of Lewin's

change theory (Hodges & Videto, 2011, p. 149). This final phase of Lewin's theory promoted organizational internalization of the change by providing the newly adopted educational program as part of the new staff orientation training in what Lewin termed *refreezing* (Glanz & Rimer, as cited in Hodges & Videto, 2011, p. 151).

Lewin's theory is commonly used in health care to promote culture change and introduce new paradigms (Kennedy & Young, 2013). It has guided the implementation and adoption of technology in the health care environment. Additionally, it has guided the computerization of nursing systems in the ongoing informatics revolution and fully and successfully integrated electronic medical records (Kennedy & Young, 2013). Hence, this theory was used to guide the assessment survey, the piloting of the recommended educational program, and the implementation of the strategies of sleep management countermeasures for night shift nurses. It aided in reeducation about the need for a strategy in nursing work units that protect nurses' safety. It also helped in dissipating misconceptions and the blaming of nurses for sleepiness and fatigue. Instead, it facilitated organizational acceptance and ownership of the problem by embracing the issues and seeking solutions together (see Appendix A for the Lewin's change phase using Deming PDSA and Figure 1 Lewin's change theory undergoing linear change process from Unfreezing, Change to Refreezing combined for a diagrammatic presentation of the theoretical framework).

I developed the educational program of sleepiness management by using the andragogy and adult learning theory, advanced by Knowles in 1974 (as cited in Kenner & Weinerman, 2011). Andragogy recognizes the distinctive styles of knowledge acquisition

specific to the adult learner as different from those recognized in traditional pedagogy. Adult learning theory was deduced from learning theory concepts and constructs of the organizational development field. Andragogy holds that adults learn based on these four principles: (a) being self-directed, (b) having extensive depth of experience, (c) being ready to learn, and (d) being task motivated. These premises make night shift nurses quite susceptible and receptive to the educational program intervention regarding sleepiness management.

Definition of Terms

The operational definitions of common terms used in the context of this study are as follows:

Karolinska Sleepiness Scale (KSS): A validated tool developed to measure sleepiness (Geiger-Brown et al., 2014).

Nurse sleepiness: Nurse sleepiness is the nurses' propensity to fall asleep propagated by shift work (Chaudhury, Mahmood, & Valente, 2009). According to Alspach (2008), it is the effect of prolonged work hours on alertness and wakefulness.

Power nap: A power nap is abbreviated sleep or state of restfulness when an individual cannot afford his or her customary sleep time (Geiger-Brown et al., 2016).

Shift work: As used in this study, the term refers to all shifts, other than the regular day shift (7 a.m.–6 p.m.). It is often synonymous with *night shift* (Caruso, 2014), in particular in reference to working the graveyard shift, from 7 p.m. to 7 a.m.

Sleepiness: Sleepiness is the force and propensity to fall asleep (Ribiero-Silva et al., 2016).

Relevance to Nursing Practice

Nurses make up the largest segment of hospital staff and a health care organizations' workforce, as reported by the ANA (2011b). As such, nursing-sensitive performance-improvement measures such as the educational program developed in this project hold promising influence for creating a positive practice environment for nurses through awareness and education regarding sleepiness management strategies that could improve quality outcome measures (see ANA, 2011a). The problem of night nurse sleepiness and fatigue holds negative consequences for patients, nurses, and organizations, as well as the public. Recent studies and a report by the Office of the Inspector General (2010) have estimated that one in seven hospitalized patients is harmed by an adverse event, and 44% to 66% of these incidents were considered to be preventable. The Institute of Medicine (2010) approximated the number of deaths, annually, from medical errors at 1,000,000 patients. In addition, Downey, Hernandez-Boussard, Banka, and Morton (2012) evaluated the patient safety indicators of the Agency for Healthcare Research and Quality, from 1988 through 2007, and found minimal overall changes.

Aiken et al. (2011) correlated negative teamwork and workplace environments with deaths among hospitalized patients and found the correlation to be significant. Nurse sleepiness and fatigue contributed to these adverse consequences, noted Autumn, Monica, Jitendra, and Bharat (2016) and Downey et al. (2012). Therefore, modulating sleepiness through the development of an educational program for nurses can bring about a reduction in nurse sleepiness and all its negative attributes (Alspach, 2008). Sleepiness

is bad for the nurses' health as well as patient outcomes (Geiger-Brown et al., 2016), which made the development of this sleepiness management educational program a worthy effort.

This staff education project was expected to contribute to the improvement of patient care through the translation of research findings into practice to promote the nurses' knowledge of strategies to modulate sleepiness. This educational program focused on ways that allowed night shift nurses to self-manage sleepiness both independently and in collaboration with the organization. This project is thus advancing nursing practice through an educational in-service program that promotes awareness and offers sleepiness management strategies.

Literature Review

The literature review was conducted and organized into the following sections better to illustrate the issues: problems with sleepiness, impact of sleepiness, impact of shift work, nurse sleepiness, and sleepiness countermeasures. Also touched upon are the related intervention and financial implication of implementing a sleep lounge.

Problems With Sleepiness

In operationalizing sleepiness, it is essential to distinguish it from fatigue because these terms are often used interchangeably by mistake. Sleepiness can lead to fatigue as well as other precipitators (Ribiero-Silva et al., 2016). In a published research article by Shen, Barbera, and Shapiro (2006), distinguishing characteristics of sleepiness and fatigue are explored by focusing on definition and measurement. The authors posited that sleepiness was a multidimensional and multidetermined phenomenon, best

operationalized by conceptualizing it to produce a specific research project assessment. However, they put forward the greatest consensus regarding sleepiness, the tautological definition of sleepiness as one's tendency to fall asleep, also referred to as sleep propensity, based on one of the earliest standardized tools, the Multi Sleep Latency Test.

Subjective research measurements of sleepiness utilized the most commonly available tools such as the Visual Analogue Scales (VASs), the KSS, the Stanford Sleepiness Scale (SSS), and the Epworth Sleepiness Scale (ESS). The ESS was developed to measure presumed sleep propensity averages over time in an individual; the SSS, KSS, and VASs measure sleep propensity of the subject's sleepiness at a point in time. The downside of the SSS in measuring sleepiness or sleep propensity is that it does "contain adjectives describing sleep propensity, energy/fatigue and cognitive performance" (Shen et al., 2006, p. 65). On the other hand, the KSS and the VASs are comparable and consistent, and both measure propensity of sleep, while the VASs require meticulous methodological specificity, where subjects are questioned in extremes, which could be confusing and contextually varied. At best, the VASs are good for longitudinal assessment over time and between subjects. However, the KSS measures subjects' levels of sleepiness as to normality, ascertaining "fluctuations in sleepiness in response to circadian factors, environmental stimulus, drug effects and so forth" (Shen et al., 2006, p. 65).

Johns (1998) operationally conceptualized sleepiness and defined it as relating to sleep propensity in four measurement process models of sleep and wakefulness, comprising primary and secondary mechanisms. He posited that the drive between sleep

and wakefulness is propelled by sleep drive on the one hand and a presumed wake drive on the other. The preliminary drives are linked to intrinsic neuronal activities in the central nervous system. These drives are influenced by circadian rhythms and need to maintain homeostasis within the dynamism of environmental influences.

From these perspectives, fatigue is viewed as a consequence of sleepiness or sleep deprivation. This conceptualization was also central to Borberly's (as cited in Geiger-Brown et al., 2016) two-process model of sleep, which speculated that sleep-wake homeostasis and circadian rhythms interplay as precursors to sleep drive and sleepiness. Given these research-supported interpretations, sleepiness was conceptually operationalized in the present study as sleep propensity, and fatigue was limited to meaning the aftermath or the consequence of sleepiness, which was measured using the validated ordinal KSS. I am well-aware of the prevalence of fatigue, problems associated with fatigue, and the multivariant causalities and measurements of fatigue. In this study, I also kept in mind the frequent interchangeability of the terms *sleepiness* and *fatigue*, with the latter being an antecedent of the former (Alspach, 2008; Nejati et al., 2016; Ribiero-Silva et al., 2016). However, the focus of the assessment survey is sleepiness, and it is operationalized as the propensity to fall asleep, or sleep propensity (Ribiero-Silva et al., 2016). Hence, fatigue, as referenced in this study is an attribute of sleepiness, given that fatigue may have other causes (Alspach, 2008; Ribiero-Silva et al., 2016).

Impact of Sleepiness

Evidence has shown that sleepiness, sleep deprivation, and fatigue all have negative consequences for the health of the nurse and reduce his or her productivity rate

among other problems. A systematic review by Niu, Chung, Chen, Hegney, O'Brien, and Chou (2011) of 28 published articles found that circadian disturbance leads to decreased vigilance and causes a general feeling of malaise, decreased mental efficiency, decreased work performance, and decreased mental efficiency in shift workers. The filtered systematic review of research articles evaluated studies assessed at Evidence Levels II to IV. Using the levels of evidence, ranked according to the Australian National Health and Medical Research Council, the authors examined quality assessment of randomized controlled trials that were performed separately and independently by two reviewers using the 6-point Cochrane Collaborative Quality Scale Assessment (Niu et al., 2011). The objective of the study was to examine the evidence as it related to cortisol profiles, sleep quality, fatigue, and attention levels among shift workers as a whole and nurses in particular. The findings corroborated the negative impact of shift work on circadian rhythms, sleep quality, fatigue, and attention levels. All of these elements were reported as significant by the reviewers in reducing work performance, and most contributed to critical sentinel events.

In a randomized published research on the impact of sleep deprivation due to night shift work on anesthesia residents' nontechnical skills and cognitive functioning, Neuschwander et al. (2017) conducted a simulation-based pilot study prospectively. The researchers monitored team work, situational awareness, decision making, and crisis task management. The pilot trial compared 20 anesthesia residents randomly after night shift work and night shift sleep by undergoing a simulation session for a period of 3 months. The results indicated significant impairment in residents who did not sleep [14.5 (14-15),

$p < 0.02$] compared to those who slept [12.2 (10.5-13)]. The pilot study showed an association between sleep deprivation and impairment in anesthesia residents' crisis management. The study was limited by the small sample size of 20 anesthesia residents.

Impact of Shift Work

In an exploratory research study, Lo et al. (2010) examined the long-term effects of working night shift on cardiovascular risks of young women by comparing subjects of rotating shift workers from day shifts (08:00–16:00 hours), evening shifts (16:00–00:00 hours), and night shifts (00:00–08:00 hours). Using a sample size of 16 young female nurses from all shifts and an additional six nurses from day shift, Lo et al. monitored the impact of shift work on autonomous control of heart rate variability such as systolic and diastolic blood pressure (vascular stress) and recovery. Each nurse was electrocardiographically monitored for 48 hours with an ambulatory device, and blood pressure monitoring occurred during work shifts and subsequent off-days.

Significant shift differences were found in vascular stress between the three shift groups studied, using a linear mixed-effect model to adjust for day shifts. The night shift nurses showed a significant increase of systolic and diastolic blood pressure, with an average of 9.7mm Hg ($p < .001$), as compared to the other groups, indicating vascular stress at the same time, even on their days off. These findings further illustrate that working night shift contributes to vascular stress, which can increase the long-term risk for cardiovascular mortality and morbidity (Lo et al., 2010). Additionally, this study, though with a small sample size, did not only reverberate the negative influence of night shift work on nurses' health, but suggested further the presence of residual effects beyond

the night shift worked. These findings corroborated previous research studies by Axelsson et al. (2008) and Sallinen and Kecklund (2010).

Lancman (2016) conducted a single-blind survey in Australia on the effects of fatigue in anesthesia trainees at a major metropolitan teaching hospital to examine the workload, fatigue, and coping strategies during the night shifts. The researchers surveyed 10 anesthesia trainees on night shift, working 5 days on and 2 days off over a period of 93 night shifts. The study generated data out of a total of 165 potentials. The data were analyzed with the use of the KSS. The results indicated that trainees on the night shift slept an average of 6 to 8 hours before reporting for their night shift work. Nonetheless, the results showed a significant increase in sleepiness, with a jump of 3 to 4 points on the KSS; the first working day being the worst (Lancman, 2016).

Additionally, Han, Trinkoff , Storr, and Geiger-Brown (2011) conducted a research study aimed at examining the impact of work schedule and job stress on nurse obesity. The researchers utilized secondary data on 2,103 nurses to measure obesity, using body mass index (BMI) estimations. They used a binary logistic regression model after duly integrating job stress and work-independent constituents and adjusting for demographics, position held by the nurse, mental/emotional distress, health determinants, and genetic or family-related covariance. They reported findings of 55% overweight in the sample.

Compared to the normal and underweight, the findings suggested that overworked and overweight nurses reported less physical exertion (odds ratio [OR] = 0.82, 95% *CI* = 0.72–0.95, $p = .01$) and movement limitation (OR = 1.14, 95%, *CI* = 1.02–1.28, $p = .03$).

Findings were significantly correlating overwork and overweight when compared to underweight and normal individuals (Han et al., 2011; Wang et al., 2014). These finding, linked shift work and long working hours to adverse effects due to decrease in physical activity; altered health behaviors; lack of healthy food availability, adequate breaks, and organizational support, which led to sleepiness, fatigue, and consequential occupational risk factors.

Caruso (2014) found similar negative implications of shift work and long working hours in an overview research article examining the spectrum of chronic diseases associated with shift work. He defined shift work as any shift worked outside the range of 7 a.m. to 6 p.m. He corroborated the effects of sleep deprivation and fatigue with increased risk to the nurses' productivity, obesity, injuries, and development of chronic diseases. Also, he linked sleepiness and fatigue to compromised patient outcomes due to fatigue-related errors.

Cost-related issues were examined by Rosekind et al. (2010). The researchers conducted a study to examine the impact of sleep disturbance on work performance and productivity, using a sample size of 4,188 subjects from four U.S. corporations. The subjects were subdivided into four groups for insomnia, insufficient sleep syndrome, at risk, and good sleep. Collected data were compared using a one-way analysis of variance model to compare productivity and performance among all four groups. When compared, the insomnia group and the insufficient-sleep-syndrome group had the highest correlation with worst productivity, performance, and safety, which resulted in an estimated productivity loss of $1,967 per employee, annually (Rosekind et al., 2010).

The survey was conducted with the use of a limited work survey questionnaire. Further analysis and comparisons of those working regular (7 a.m.–6 p.m.) shifts and those working irregular (outside the 7 a.m.–6 p.m.) shifts showed that irregular-shift workers reported more insomnia and insufficient-sleep syndrome (17.3% vs. 13.8%; $p < 0.01$) and less good sleep (40.5% vs. 49.2%; $p < 0.001$). Also, the irregular group reported acting in an unsafe manner (24% vs. 13.6%; $p < 0.001$). Irregulars in management reported productivity loss (4.2% vs. 3.5%; $p = 0.001$); falling asleep at work (40.2% vs. 35.8; $p < 0.01$); experiencing driving-safety issues, including falling asleep while driving home (25.3% vs. 16.8%; $p < 0.001$), and near-miss accidents (13.5% vs. 8.1%; $p < 0.001$). The authors assessed the salary figures of participating corporations, and the mean estimated productivity loss among the four corporations was $2,531 to $3,980 per employee. The total number of employees at all four corporations was 4,000, with insomnia at 2.5 to a high of 6.1, the annual cost was estimated at $13.2 million (Rosekind et al., 2010).

The general literature corroborated that shift work sleepiness due to sleep deprivation caused an estimated 20%, or one fifth, of all vehicular motor accidents in the United States. In addition, sleepiness has been linked to increased smoking, weight gain, and coronary heart disease. Still, other retrospective longitudinal and control studies found relationships between sleepiness and metabolic syndrome. These studies also showed a significant correlation with increases in BMI, total cholesterol, and triglyceride in night shift workers in comparison with day shift workers (Autumn et al., 2016; Biggi, Consonni, Galluzzo, Sogliani, & Costa, 2008).

Nurse Sleepiness

It has been well-documented through research that nurses working the night shift suffer sleep deprivation, sleepiness, and fatigue (Alspach, 2008; Fallis et al., 2011; Geiger-Brown et al., 2014). Nurse sleepiness is a critical problem for hospitals. Its consequences are exponential for the patient, the nurses, and the institutions for which they work due to increased mortality, morbidity, and risk of medical errors because of sluggishness. Even driving home after work presents a greater risk for vehicular accidents (Fallis et al., 2011; Wisetborisut, Angkurawaranon, Jiraporncharoen, Uaphanthasath, & Wiwatanadate, 2014).

Numerous published research articles linked nurse sleepiness to multivariant negative consequential influences on the nurses, the patients in their care, and the health care organization due the enormous financial impact. The evidence showed that night shift nurses fell asleep or suffered fatigue mainly due to sleep deprivation; secondary reasons were circadian disharmony, working long hours, conditions in the nursing units during the night shift such as dim lights, decreased activity, fewer staff members present, and reduced patient engagement (Biggi et al., 2008; Pietroiusti et al., 2010; Vyas et al., 2012). In their study, titled “Napping on the Night Shift,” Geiger-Brown et al. (2014) pointed out that research on this topic began in the 1950s with train engineers, truck drivers, and industrial workers. The authors linked involuntary sleepiness with increased risk for errors in patient care; heightened risk for job-related injuries; and accidents, including motor vehicular accidents while driving home from work. All these factors

were associated with lost work days and increased health care costs (Geiger-Brown et al., 2016).

In their systematic review of epidemiological studies, Wang, Armstrong, Cairns, Key, and Travis (2011) examined the relationship between shift work and chronic disease (e.g., cardiovascular disease, metabolic syndrome, and diabetes). Results showed that, although shift work impact was inconclusive with respect to breast cancer, its relationship with metabolic syndrome, cardiovascular disease, and diabetes could be corroborated. The filtered research review included 550 published articles reporting clinical trials and randomized control; the evidence was graded as *strong* with the use of the Modified Royal College of General Practitioners' three-star system (Wang et al., 2011).

Sleepiness Countermeasures

In a systematic review of sleep, sleepiness, and performance implications of a limited wake/shift work schedule, Short, Agostini, Lushington, and Dorrian (2015) examined three types of rotational schedule rosters. In this systematic scholarly review, which included five laboratory-based and 17 field-based studies of maritime watchkeepers, ship bridge officers, and long-haul train drivers, the authors examined the results of 6-hours-on/6-hours-off, 4-hours-on/8-hours-off, and 8-hours-on/8-hours-off schedules. Using the KSS, they found that the 4-hours-on/8-hours-off schedule best supported a productive work routine with minimal or no sleep deficits and less sleepiness ($p < 0.01$). Moreover, they found that sleepiness was highest in the group that worked 6-hours-on/6-hours-off on shift, beginning with days rather than nights. However, their report was based on small homogeneous sample studies and limited literature; therefore,

they recommended expanding the research work to a heterogeneous population with particular emphasis on more conventional scheduling (Short et al., 2015).

Geiger-Brown et al. (2016) conducted original research to assess the barriers to implementation of napping and the experiences of those nurses who did take naps during their night shifts in a two-hospital pilot study. Of the six units, implementation occurred only on one unit. On the successful implementation unit, a total of 153 30-minute nap breaks were taken by the night shift nurses. They reported that 44% of the nappers were *highly sleepy* before napping and reported *average helpfulness* of the naps as 7.3 on a 1- to 9-point scale (where 1 = *not sleepy*, 5 = *neutral,* and 9 = *very sleepy*), with 43% achieving *light sleep,* and 14% achieving *deep sleep*.

Also, Fallis, McMillan, and Edwards (2011) explored nurses' perceptions, experiences, practices, and barriers regarding napping and not napping on the night shift. The authors used a convenience sample of 13 critical care night shift nurses, with an average of 17 professional years of nursing practice, with 10 napping on a regular basis and two not wanting to nap due to sleep inertia. The data were correlated for the need to nap during the shift and the benefit of napping for those who did take a nap. The results were linked to patients' and nurses' safety. This qualitative research was summarized under three major themes: (a) environmental scan, (b) impact of napping—energized or disoriented, and (c) consequences of not napping—foggy thinking. Of those who did nap regularly, 77% reported benefits such as feeling energized, refreshed, improved mood, and clearer judgment (Fallis et al., 2011).

In another exhaustive systematic review of the literature in 2014, Nejati, Shepley, and Rodiek (2016) conducted a secondary analysis of research studies on the causes of nurses' fatigue from sleepiness, barriers preventing nurses from taking restorative breaks, consequences of nurses' fatigue for patients, staff, and facility outcomes. The study posited that a well-designed break room played an important part in the nurses' job satisfaction and performance. Also, they recommended restorative break activities such as mindfulness exercises like yoga, tai chi, or meditation. This was correlated with results of a study by Stefencyk (2009), who found that nurses who took breaks outside the units were refreshed, less fatigued, and more engaged with their colleagues. Nejati et al. (2016) also concluded that scheduled nap strategies, sleep hygiene, and caffeine use were shown to be efficacious in transportation and aviation industries. In 12 studies, napping was found to be effective in counteracting the effects of sleepiness, sleep deprivation, and sleep-induced fatigue (Nejati et al., 2016).

In a meta-analysis of 32 studies, Ruggiero and Redeke (2013) integrated the efficacy of napping as a countermeasure to fatigue, sleepiness, and sleep deprivation. The analysis supported the proposition that naps were an effective stratagem for fatigue and sleepiness and could serve as a countermeasure to sleepiness and fatigue. Given the efficacy of this intervention, as reported in the literature, napping was recommended in this DNP project as a means to mitigate the nurses' sleepiness on their night shifts.

In their review of the research literature, Chaudhury, Mahmood, and Valente (2009) found a correlation between nursing environmental designs and the reduction of nursing errors and night shift nurses' increased efficacy in an acute hospital unit. In their

review and analysis, the authors examined research published between 2001 and 2008 and concluded that improving nurses' work environment was critical to improving the quality of nursing care. Baker and Nussbaum (2011) also found, in their survey of registered nurses (RNs), that working environments that supported and empowered nursing practice played an important role in improving nurses' fatigue, burnout, turnover rate, performance, productivity, and job satisfaction.

Local Background and Context

As a nurse manager in a public safety-net hospital, I was bothered by the high rate of staff separation due to sleeping while on duty, in particular of experienced and hard-working nurses. Hospital policy banned sleeping in the hospital's clinical areas, and doing so, warranted disciplinary action that would, eventually, lead to separation. My leadership group started reviewing the literature to assess the evidence. Surprisingly, the literature provided a multiplicity of strategies to moderate night shift nurse sleepiness.

Considering that the nurses at this public hospital were no different from many others in the United States, including those who had served as subjects in reviewed studies, it stood to reason that the problem of night shift nurse sleepiness and fatigue at this hospital would respond in a similar manner to some of the countermeasures proposed or yet to be discovered. Similar, of course, were consequential errors and mistakes due to sleepiness, and it seemed reasonable to examine at this hospital what many authors had pinpointed in other places to pertain to night shift nurses' falling asleep or being fatigued (Alspach, 2008; Biggi et al., 2008; Pietroiusti et al., 2010; Vyas et al., 2012). Although evidence abounds linking sleepiness and fatigue to negative outcomes for both patients

and nurses, hospitals such as this public hospital are either in denial or reluctant to embrace the problem and address it organizationally by exploring one of numerous EBP strategies such as napping on the night shift to address the problem (Geiger-Brown et al., 2014).

This hospital was aiming for magnet status and was thus in the process of evaluating ways to improve nursing quality measures related to patient care. Therefore, this staff education program to address the problem of night nurse sleepiness and effective countermeasure strategies aligned with quality improvement initiatives the hospital was envisioning.

The Role of the DNP Student

In 1999, the AACN articulated four different roles for nursing scholarships, which were (a) discovery, (b) teaching, (c) application, and (d) integration (AACN, n.d.). In consideration of these four dimensions of scholarship, practice scholarship falls under the application domain, recognizing the practice of clinical knowledge advancement and application (AACN, n.d.). Consequently, the DNP student's role in the educational program was to promote the evidence-based approach to solving the problem of night shift nurses' sleepiness. It was also consistent with the application and integration of scholarship knowledge through the project (AANC, 2016). The DNP scholarship student's role at this hospital was that of project manager and educator. I, therefore, researched and developed this in-service program. I also worked as one of the nurse managers in this public hospital and had seen staff struggling with the difficulty of staying awake. I had explored a comprehensive number of countermeasure options

provided in the research literature, and I was confident that educating the staff would empower the staff and potentially improve patient care. The role of this DNP student/scholar was thus to translate research into practice to enhance night nurse productivity and, perhaps, provide additional recommendations for practice changes to the profession.

Roles of the Project Team Members

In this section, I describe the roles of the projected team members, which were limited in number and included the clinical nursing director, who was my immediate supervisor, and her superior, the chief nursing officer. They provided input regarding the educational content and feedback on overall project feasibility, as well as authorization of the project. Other team members were subject matter experts, who validated the content of the in-service educational program. The team was briefed on the research problem and background information; they were allowed to contribute ideas and share their experiences related to the topic.

Summary

In Section 2, I reviewed the conceptual framework used to direct this project, with its definition of commonly used themes. I related the relevance of the proposed DNP project to nursing practice. I provided a review of the literature defining the problem and describing its impact in general and on shift workers in particular. I reviewed literature specific to nurse sleepiness and strategies postulated to mitigate the problem. The local contextual background and my role as the DNP project manager, as well as the roles of

other team members were discussed. In Section 3, I discuss the practice-focused questions, the sources of evidence used, and analysis and synthesis of the findings.

Section 3: Collection and Analysis of Evidence

Introduction

In Section 3, I examine the practice-focused questions to be answered by this project, analyze and synthesize the evidence to support the project, and provide linkage to the project design. I discuss steps taken to protect the participants' rights and anonymity, population and sampling, and project evaluation.

Practice-Focused Questions

The issue of nurse sleepiness and fatigue due to night shift work has been well-documented by research (Alspach, 2008; Ribiero-Silva et al., 2016). The consequences associated with sleepiness or sleep deprivation and fatigue are compromising both patients' and nurses' safety. These consequences have also been shown to be very costly to health organization in the presence of varied and efficacious modulators. One such effective countermeasure is napping during the night shift (Autumn et al., 2016).

There has been resistance to the implementation of effective countermeasures, and barriers have been put in the way of interventions in the practice environment, despite overwhelming research evidence (Alspach, 2008; Autumn et al., 2016; Ribiero-Silva et al., 2016). Policies and protocols even exist that banish the sleeping of nurses during their night shift work. The questions to be answered by the findings of this DNP project were as follows:

1. What is the prevalence and intensity of night shift nurses' sleepiness, as measured with the validated Karolinska Sleepiness Scale?

2. Will an educational program on sleep habits increase night shift nurses' awareness of the sleepiness problem and knowledge regarding managing strategies to overcome the problem?

Sources of Evidence

I conducted an electronic search of the literature using the following databases: CINAHL, Medline, PubMed, Google Scholar, EBSCO, Cochrane Database of Systematic Review, Medline/Ovid, and the Walden University library. Key words used in the search were *night shift and sleepiness, night nurses and sleepiness, night nurses and fatigue, power napping, nurses' sleepiness, fatigue, sleepiness and fatigue countermeasures, effects of shift workers,* and *rotation shift workers.* To exhaust the available research literature, Boolean string was used with the following terms: *nurses' sleepiness or fatigue, night shift nurse and sleepiness and fatigue, sleepiness and countermeasures.* Research results older than 10 years were excluded from this review of the literature, except for primary or classic research work.

Analysis and Synthesis

The research literature helped in describing the background and formulating the definition of the night shift nurses' sleepiness problem examined in this project, as well as the consequences of the problem and effective countermeasures, including increased awareness of available EBP interventions. Because my research proposal included a recommendation for the development of night shift nurses' sleep countermeasures, the sources of evidence used focused specifically on interventions known for their determinate influence on reducing shift workers' and nurses' sleepiness.

Protections

Before starting the project, I obtained approval from the Institutional Review Board (IRB Approval Number 11-13-18-0507540) of Walden University and the site IRB Approval Number 18-00927 (See Appendix B). Prospective participants were given an invitation and information about the study, and they signed the anonymous questionnaire consent form (Appendix B of the DNP Manual as modified by site IRB), before participating in the project. Participation was voluntary and noncompensatory. All data collected were confidential and did not permit identification of the participants. Participants could withdraw from the project at any time if they changed their minds and wished to withdraw their consent. I will keep the data for the required 5-year period after completion of the project.

Project Design and Methods

The DNP project was conducted in two phases. In Phase 1, I used the KSS to assess night nurses' sleepiness at the project site. The KSS is a validated tool to measure the risk level of sleepiness in night shift nurses (see Appendix C). Permission was obtained to use the tool for this doctoral project (see Appendix D). Prior to providing the staff education intervention program, night shift nurses were asked to complete the KSS survey. The surveys were left in the area to be completed during break time, between the hours of 2 a.m. and 6 a.m. Participants took the de-identified survey that was left in the area during their breaks and placed the completed form in an envelope in the break room. The completed forms in the envelope were collected and aggregated daily by me as the project investigator. Project information was posted prior to the survey week by the time

clock, where staff gather for assignment, and announced to staff during shift huddles. The study invitation and information remained posted throughout the study period as approved by the site IRB. Participants received no compensation, and participation or nonparticipation would have no impact on staff employment, bonuses, or promotion. All data collected were to be kept confidential and anonymous.

The educational program was developed and presented in a 30-minute power point presentation to a panel of experts, including stakeholders, for approval. The panel of experts invited to participate included (a) the clinical nursing director, Department of Emergency Medicine, a sleep study expert; (b) the associate nursing director, Quality Assurance and Improvement; (c) the nurse manger, Trauma Emergency Services; (d) the medical director, Neuro-Psychiatric Department; (e) a DNP, a psychiatric mental health nurse practitioner and adjunct faculty member for neuropsychiatry and sleep study research; and (f) a clinical research analyst, Sleep Laboratory. This panel of experts has 140 years of combined experience in the field of sleep studies, neurobiological sciences, shift work sleepiness, and working in the public academic hospital as stakeholders. The presentation illustrated the problems associated with night nurse sleepiness, the consequences for staff and patients, and interventions (see Appendix E). The purpose, significance, and implications of this project and its findings were expected to support known methods to modulate nurse sleepiness. The panel of experts evaluated the educational program for the relevance, appropriateness, and understandability, and it assessed whether it provided adequate information on the subject matter.

The information gathered from the participants included number of years working as a nurse, number of years on night shift, and stratagems used to mitigate sleepiness. Data were collected and analyzed, and the survey results are presented in tables found in Section 4.

Population and Sampling

The survey participants were drawn as a convenience sample from a population of RNs working the night shift in the Department of Emergency Medicine (DEM) at the public academic hospital's emergency department (ED), which comprised a 12-bed trauma/critical care pod, base station, 20-bed psychiatric pod, 35-bed adult medical emergency pod, 12-bed pediatric pod, 4-bed jail emergency room (ER), 12-bed medical observation station, and 12-bed trauma observation area. The night shift staff of the DEM was the target population for this DNP project. The target population provided the convenience sample of RNs who had permanently worked the night shift over a 6-month period. The convenience sample of those working during the survey period included both male and female RNs. Excluded were all staff members with diagnosed sleep-related disorders such as sleep apnea that were not associated with working the night shift.

Data Collection and Analysis

The Karolinska Sleepiness Scale (KSS). A staff of RNs working the night shift in the DEM took the survey, using the KSS, which elicited the nurses' perceptions of their sleepiness during their night shifts between the hours of 2 a.m. and 6 a.m. This scale has been validated in numerous studies to measure sleepiness and fatigue and was found to measure incidental sleep propensity (Fallis et al., 2011; Geiger-Brown et al., 2016;

Short et al., 2015). A KSS validation study was conducted by Kaida et al. (2006), in which the authors compared its consistency with electroencephalographic (EEG) performance variables. The researchers investigated the validity and reliability of the KSS with a sample of 16 healthy participants by measuring behaviors and other subjective indicators of sleepiness (Kaida et al., 2006). The researchers found that the KSS results were closely related to those of the EEG with a mean value of $r = 0.56$. They concluded that the KSS was a useful indicator of sleepiness with high validity (Kaida et al., 2006). I applied for and received permission to use the KSS in this project (see Appendix D).

Data were collected and analyzed to measure the participants' sleepiness with the KSS to determine if it is at problematic levels, as previous research indicated (Geiger-Brown et al., 2016). The KSS survey questionnaire assesses self-perceived sleepiness on a scale from 1 to 9, interpreted as follows: 1 = *very alert;* 3 = *alert, normal level*; 5 = *neither alert nor sleepy*; 7 = *sleepy, but no effort to keep awak*e; 9 = *very sleepy, great effort to keep awake, fighting sleep.* The even numbers were skipped without values, or left blank. A value >7 is significant for sleepiness that is disruptive and problematic. Assessing night shift nurses' sleepiness using the KSS instrument measured the nurses' sleepiness problem in this major public academic hospital and provided results to indicate the need for an EBP educational program to offer measures to modulate the night shift nurses' sleepiness.

The evaluation questionnaire. The evaluation questionnaire was used to ascertain pre- and post-scores for the educational intervention designed to raise

awareness of the problem and knowledge about strategies to manage night shift nurse sleepiness. The evaluation questionnaire survey (see Appendix F) was developed using a 5-point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*). The survey was used to evaluate the participants' perceived skills, knowledge, and confidence regarding the staff education program on sleepiness awareness and management strategies. An open-ended question regarding recommendations was included at the end of the survey. The results were to be kept anonymous and reported through descriptive statistics and graphical representations. I hypothesized that the findings would be consistent with and validating past research findings. The pre/post educational program and questionnaires were initially evaluated by an expert committee that included sleep experts, the clinical nursing director, the night shift assistant managers, a quality improvement educator, and a consultant. The experts evaluated the educational program for relevance, appropriateness, understandability and the adequacy of the information provided on the topic. The pre/post education intervention data were analyzed using descriptive statistics and a *t* test for mean average to measure knowledge gained during the RN's in-service section.

Project evaluation plan. I evaluated this project with the use of a formative and summative evaluation process. The goal of this survey was to assess night shift nurses' sleepiness and develop an educational intervention program as countermeasure management of sleepiness. I discussed the interpretation of the findings first with nursing executives and the organizational leadership at the hospital, using diagrams and tables

intended to elicit the nurses' self-perceived awareness and countermeasure management of sleepiness during the educational intervention.

Summary

In summation, in this DNP project, I sought to survey night shift nurses at a major public academic hospital's DEM for the presence of sleepiness, using the KSS, and develop an educational in-service program to raise awareness of the problem and increase the knowledge level regarding strategies to modulate the problem of nurse sleepiness. The professional literature supported the implementation of an educational program as a countermeasure to mitigate sleepiness. The educational program developed in this project outlined a stratagem for the pilot project using a pre/posttest quantitative design and the Lewin change theory as the theoretical framework to guide implementation. Investing resources in funding the viability of this intervention was essential, considering the cost of the nurse turnover rate and other consequences associated with sleepiness.

Section 4: Findings and Recommendations

My aim in this project was to assess the prevalence and intensity of night shift nurse sleepiness among RNs at a safety-net public academic hospital using the validated Karolinska Sleepiness Scale (KSS). In addition, I conducted a pre- and post-educational intervention survey to ascertain the efficacy of the evidence-based education program in promoting sleepiness moderating management strategies to improve night shift nurses' sleepiness. Section 4 contains the KSS survey results used to screen for intensity and prevalence of DEM night shift nurses' sleepiness problem. The next step in this project was to develop a staff education intervention program on the management of sleepiness with a program evaluation by a panel of experts. Sixteen nurses then participated in the educational program; data analysis and results are presented in Section 4. Also, in this section, I discuss the strengths and limitations of the project.

Findings and Implications

Karolinska Sleepiness Scale Results

All RNs working the night shift 7 p.m. to 7 a.m. (N = 198) were invited to participate in the project. Out of the 198 nurses invited to participate, 164 met the inclusion criteria for the project: RNs, working the 12-hour shift, 7 p.m. to 7 a.m. in the DEM. Table 1 represents the KSS survey results for the 164 night shift RNs in the DEM. Eighty-seven of the RNs scored their sleepiness between 1 and 5, *very alert* to *neither alert nor sleepy*. Seventy-seven RNs scored their level of sleepiness between 6 to 9, indicating a rating between *neither alert nor sleepy* to *very sleepy, great effort to keep*

awake, fighting sleep. Seventy-two RNs indicated a score of 7 and above, which the KSS defines as problematic and disruptive.

Table 1

Karolinska Sleepiness Scale (KSS) Survey Result (N =164)

	Anchors of the Scale	*n*
1.	Very alert	25
2		3
3.	Alert, normal level	34
4		10
5.	Neither alert nor sleepy	15
6		5
7.	Sleepy, but no effort to keep awake	31
8		16
9.	Very sleepy, great effort to keep awake, fighting sleep	25
Total		164

Expert Panel Program Evaluation

The panel of six experts reviewed and evaluated the evidence-based educational intervention program on night shift nurses' awareness and management strategies to mitigate sleepiness. The program was evaluated for relevance; appropriateness; understandability; and provision of adequate information on the topic, with questions to be answered with *yes* or *no*. Table 2 represents panel results. The six experts answered *yes* indicating that the program was relevant, appropriate, understandable, and providing

adequate information on strategies to counter sleepiness. After review of the pre- and post-test questionnaires, the panel of experts did not recommend changes.

Table 2

Expert Panel Review of Education Program

	Expert Panel Review Results (n = 6)	Yes	No
1	Is the education program relevant to night shift RNs?	6	0
2	Is the education program appropriate for night shift RNs?	6	0
3	Is the education program understandable?	6	0
4	Does the education program provide adequate information on topic?	6	0
5	Do you recommend any changes to the pre/post education questionnaire?	0	6

Staff Educational Program and Evaluation

The education program was then implemented with a small group of night shift RN staff (n = 16) in the DEM. Site approval documentation for staff education for doctoral project was obtained (see Appendix G). The second question to be answered by this project concerned the efficacy of the developed evidence-based educational intervention program aimed at advancing nurses awareness and management strategies to counteract night shift nurse sleepiness. The effectiveness was measured as RNs' knowledge gain through pre- and post-intervention survey responses.

All 164 RNs who participated in the KSS survey were invited to attend the staff educational program on Sleepiness Awareness and Management Strategies (see Appendix E). A total of 16 night shift nurses in the DEM participated in the educational program, and 14 participants completed the program evaluation. Two of the 16 did not complete the questionnaire (see Appendix F).

Initially, I administered the pretest to the RNs, and then the educational program intervention was discussed; after that, a posttest was conducted. In Tables 3 and 4 I show the night shift RNs' responses to each question pre- and posteducational intervention, respectively. The first few questions elicited staff awareness responses of the problem of night shift nurse sleepiness and associated consequences. Thus, to the first question, I know about night shift nurses' sleepiness problem, there were 13 responses preintervention as follows: 1 *strongly disagreed* (SD = 1), 5 *agreed* (A = 5), and 7 *strongly agree* (SA = 7), with one blank uncompleted response. Postintervention responses were completed as A = 2 and SA = 12 and jumped from SA = 7 of 13 (53.8%) pre- to 12 of 14 (85.7%) post-education intervention. This represents an approximately 32% difference in postintervention responses, indicating an increased awareness in night shift nurses' sleepiness problem. Question 2 asked about if working night shift can lead to heart disease. Preeducation responses were 5 Neutral (N = 5), A = 5, and SA = 4, and posteducation responses were A = 3 and SA = 10, with one unanswered question postintervention. Therefore, corresponding to knowledge gained from SA 4 of 14 (28.5%) to 10 of 13 (76.9%), jumping 48.4% pre- and post-education respectively. Question 3 asked about if sleepiness on night shift decreases productivity. Nurses'

responses went from N = 1, A = 5 and SA = 8 preintervention to A = 2 and SA = 12 postintervention. Question 4 addressed if sleepiness can lead to metabolic syndrome. Pre- to post-education responses were N = 4, A = 4, SA = 5 and A = 2, SA = 12 respectively. Question 5 asked if night shift work raises morbidity/mortality rate. Answers ranged from N = 2, A = 6, SA-6 pre- and post-education A = 3 and SA = 11postintervention. This represented a 35.7% increase in knowledge gained from SA 6 of 14 (42.8%) to 11 of 14 (78.57%) pre/post education intervention. Question 6 asked about strategies to mitigate sleepiness. Preeducation responses were D (Disagree) = 3, N = 2, A = 6, SA = 3 as compared to a postresponse of D = 1, A = 4, and SA = 7. Question 7 asked if workers could manage their sleepiness during the night shift. Responses were D = 1, N = 4, A = 5, SA = 3 pre- and post-education N = 1, A = 5, and SA = 7, with one unanswered question each accordingly.

Similarly, Question 8 elicited if it would be beneficial to have a sleep lounge for night shift staff napping. Nurses responded pre SD = 1, N = 4, A = 6, and SA = 2 to post SD = 1, SD = 3, A = 2, and SA = 7. Likewise, to Question 10: I could benefit from sleepiness management education program, preresponses were D = 1, N = 3, A = 6, and SA = 4, but posteducation intervention responses were A = 3 and SA = 11. Question 10 indicated that after the sleepiness management education, night shift nurses felt they could benefit from the education, indicating the potential and importance of this evidence-based educational program. There was a 50% jump in nurses' SA responses from four of 14 (28.5%) to 11 of 14 (78.5%). Question 11 stated, I often fall asleep driving home after nightly shifts. Responses to this question were as follows: SD = 1, D =

4, N = 3, A = 3, and SA = 1 pre-education whereas, postresponses were SD = 5, D = 3, A = 3, and SA = 3. The next three questions elicited the number of years the nurse has been working the night shift from three choices. Four responded 1 to 5 years, two were between 5 and 10 years, and eight responded over 10 years.

In analyzing and discussing the effectiveness of the evidence-based educational program, postintervention responses support that knowledge of the program as well as strategies to mitigate nurses' night shift sleepiness were gained. In particular, with reference to questions that stimulated staff sleepiness countermeasure strategies, such that combined SA and A responses to "I know strategies to manage night shift sleepiness," eight of 14 (57.1%) staff reported having sleepiness strategies preintervention, as compared to 12 of 13 (92.3%), with one nonresponse postintervention. This corresponds to 35.2% more awareness in sleepiness management strategies. In addition, on sleepiness management, eight of 14 (57.1%) staff responded to: "I can manage my sleepiness during the night shift," whereas 12 of 13 (92.3%), with one response left blank, gave this answer postintervention.

These results indicated an increase in a self-perceived sleep management efficacy gain in knowledge after the education program. Nurses' awareness of night shift sleepiness medical consequences increased by 48.4% with heart diseases, 47.7% in metabolic syndrome, and 42.9% in morbidity and mortality. Fifty percent of the nurses reported that they could benefit from a sleepiness management education program.

Table 3

Preintervention Survey Results (n =14)

Please indicate your level of agreement with the following statements	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
I know about night shift nurses' sleepiness problem	1	0	0	5	7 (*n*=13)
Working night shift can lead to heart disease	0	0	5	5	4
Sleepiness on night shift decreases productivity	0	0	1	5	8 (*n*=13)
Sleepiness can lead to metabolic syndrome	0	0	4	4	5
Night shift work raises morbidity/mortality rates	0	0	2	6	6
I know strategies to manage night shift sleepiness	0	3	2	6	3
I can manage my sleeping during the night shift	0	1	4	5	3(*n*=13)
I think it would be beneficial to have a sleep lounge for night shift staff napping	1	0	4	6	2(*n*=13)
I will leave this hospital if I cannot leave night shift	2	4	5	1	2
I could benefit from sleepiness management education	0	1	3	6	4
I often fall asleep driving home after nightly shifts	1	4	3	3	1(*n*=12)

Table 4

Posteducation Intervention Survey Results (n = 14)

Please indicate your level of agreement with the following statements	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
I know about night shift nurses' sleepiness problem	0	0	0	2	12
Working night shift can lead to heart disease	0	0	0	3	10(*n*=13)
Sleepiness on night shift decreases productivity	0	0	0	2	12
Sleepiness can lead to metabolic syndrome	0	0	0	2	12
Night shift work raises morbidity/mortality rates	0	0	0	3	11
I know strategies to manage night shift sleepiness	0	1	0	4	7(*n*=12)
I can manage my sleeping during the night shift	0	0	1	5	7(*n*=13)
I think it would be beneficial to have a sleep lounge for night shift staff napping	1	3	0	2	7(*n*=13)
I will leave this hospital if I cannot leave night shift	4	2	4	1	3
I could benefit from sleepiness management education	0	0	0	3	11
I often fall asleep driving home after nightly shifts	5	3	0	3	3

Staff were asked to list three commonly utilized strategies to modulate night shift sleepiness in an open-ended question at the end of the survey questionnaire. Table 5 shows the emerging themes from responses filled in by RNs. Strategies for managing night shift sleepiness included *using coffee* with 10 of out 14 (71.4%) reporting coffee use; six of 14 (42.8%) *staying busy during the night shift*; four of 14 (28.6%) *napping during the night shift*. Other listed strategies included *exercising, drinking energy drinks,* and *sleeping prior to the start of the night shift* (see Table 5).

Table 5

Common Themes: Results of Nurses' Sleepiness Strategies

	Themes	Value
1	Coffee	10
2	Napping	4
3	Exercise	4
4	Energy Drink	4
5	Staying busy	6
6	Sleep prior to shift	4
7	Healthy meal	1
8	Light	1
9	Stopping on my way home to sleep	1

Implications

Findings from the literature search linking negative impacts of sleepiness on night shift nurses were translated into practice to improve outcomes. The results demonstrated nurses' propensity for problematic sleepiness during night shift working hours with high

prevalence and intensity consistent with the literature. Data also revealed a lack of knowledge on the part of RNs regarding the consequences of night shift sleepiness. The findings further established the existence of problematic sleepiness at this public academic hospital, validating research findings and further necessitating an intervention such as this educational program. In addition, RNs showed increased susceptibility to falling asleep at high rates and intensities. These results provided the foundation for the development of the night shift nurses' evidence-based educational intervention program on sleepiness awareness and management strategies to mitigate the problem. Based on the positive results of the educational program (n = 14), indicating an increase in knowledge posttest, the educational program can be considered for all newly hired RNs working night shift. Shorter work shifts and increased organizational support would also contribute to improving the problem of nigh shift nurse sleepiness. These results answered Project Question 1 regarding night shift nurses' sleepiness prevalence (44%) and intensity greater than seven (KSS >7) at this public academic hospital, indicating a clear existence of the problem. The intervention program can contribute to positive social change through increasing night nurse knowledge of sleepiness and strategies to address the problem. The potential to lessen the night nurses' sleepiness can improve productivity and responsiveness to patient care, thus promoting positive social change.

Recommendations

While these findings were significant and demanded immediate countermeasures such as use of the evidence-based educational program developed in this project, the sample size of nurses (n = 14) participating in the educational program and evaluation

was small; thus, results cannot be generalized to other populations without further study. Recognition of sleepiness in night shift nurses can benefit health care organizations in recognizing the problem and promoting staff education to develop sleepiness countermeasures for implementation by night shift nurses. The health care organization and nursing staff can work together to support a mutually healthier work environment.

Contributions of the Doctoral Project Team

The project team of content experts reviewed and advised on the appropriateness of the project content. Nursing leadership advised on the relevance to hospital goals and provided necessary avenues for communicating with staff by inviting me to the huddles and creating time for the evidence-based educational program intervention on scheduled in-service times. In addition, the clinical nursing director was instrumental in apprising upper leadership of the project as well as approving the project's implementation and serving as site advisor and facilitator.

Strengths and Limitations of the Project

It is assumed that health care organizations and nursing leadership have the best interest of their nurses at heart and are additionally committed to providing workplace safety and promoting patient quality care and outcomes. The KSS screening assessment and pre- and posteducational intervention evaluation of nurses' sleepiness with the use of a descriptive self-perceived sleepiness survey were built on the premise that all staff could be trusted to answer the survey questionnaires accurately and honestly to represent the true propensity of night shift nurse sleepiness. It was also assumed that the health care organization was supplementing and adapting evidence-based research findings in

practice. The project will advance nursing practice because night shift nurses need optimal self-efficacious sleepiness-mitigating management strategies grounded in the translation of evidence-based approaches from research into practice for better decision making and practice outcomes (Zaccagnini & White, 2011).

The benefits of this educational intervention will be experienced in the fostering of engagement, promotion of quality care, and increased productivity by optimizing the overall health of nurses and their patients, while supporting cost-effectiveness of health care organizations. It is also expected that nurses' greater awareness of night shift sleepiness will lead to improvement in the nurses' adopting recommended strategies to alleviate the problem. It is also expected that the benefits include a safer environment where quality care can be rendered, which emphasizes nursing-sensitive improvement initiatives (IOM, 2004).

The KSS screening assessment and the educational intervention evaluation survey were limited by self-reported sleep propensity. In addition, a convenience sample of nurses was used, drawn from RNs who worked in the ED at a 600-bed inpatient metropolitan safety-net academic hospital. This ED setting may not represent EDs in other locales, and the findings may not apply to other patient care settings such as ICUs, medical-surgical units, operating rooms, pediatric care units, inpatient psychiatric units, and other urban or suburban community hospitals. The findings of this project cannot be generalized to other health care settings or nurses.

Summary

This DNP project explored the prevalence and intensity of the night shift nurses' sleepiness problem at the project site, a major academic hospital in the western United States. The results of the KSS data analysis at this academic hospital corroborated research evidence gleaned from the professional literature. The educational program developed to raise the nurses' self-awareness of the problem and available management strategies to counteract night shift nurse sleepiness was provided to a panel of experts for content review. Results from the panel review indicated that the educational program was 100% relevant, appropriate, understandable, and providing adequate information on the topic of night shift nurse sleepiness. The pre/post educational-program survey results indicated that participating night shift nurses gained knowledge about the problem of sleepiness and strategies to improve the problem. Though only a small portion of RNs (n = 14) participated in the initial educational in-service, additional in-services will be conducted for night shift RNs working in other areas of the hospital. While this small segment of the total sample was considered adequate for completing the capstone project for the DNP degree, published results will take into account the findings of the total sample (N = 164).

Section 5: Dissemination Plan

The problem of night shift nurse sleepiness is pervasive and counterproductive to health care organizations. However, the problem is met with punitive actions from health care organization leadership and staff. Even then, staff are unaware of the prevalence of this problem and EBP-modulating strategies to mitigate night shift nurse sleepiness. Assessing the prevalence and providing an evidence-based education program regarding the problem as well as management strategies to mitigate night shift nurse sleepiness was expected to deepen the understanding of underlying issues, promote EBPs that lead to the establishment of healthier work environments for nurses and alleviate dependent negative outcomes. Findings from this project provide greater awareness of the night shift nurse sleepiness problem and effective management strategies. The project revealed significant information about night shift nurse sleepiness, provided management strategies, and shifted the perception away from blaming the nurses for falling asleep to shared collaborative approaches to addressing the problem.

Findings will be disseminated through power point, poster, and podium presentation and discussions among nurses in psych emergency rooms; emergency department staff; nurse managers; clinical nursing directors; the chief nursing officer; and those stakeholders who influence policies, including the chief quality officer and research council. All participants will be presented with a summary brief of the project's key points, results, recommendations, and copies of a summary of the project findings during dissemination. The presentation session will be scheduled during regular nursing grand rounds. Grand Rounds consist of a nursing and leadership forum to share performance

improvement projects at the project site. The presentation of the results at a Grand Rounds lecture will inform staff of sleepiness management strategies and guide the leadership in handling night shift nurses' sleepiness issues. Presenting the results of this project to stakeholders who make policy decisions would promote further support. They need the information to facilitate communication, educate staff and leadership, and sustain the dialogue that is consequential to policies influencing health care work environments and health-related outcomes.

The final project results, when all subsequent educational sessions have been completed postgraduation, will be presented at nursing seminars and conferences and be published in health care and nursing journals, given the broader implications for health care working environments and patient outcomes. Nurses form the largest part of the health care industry; however, other health care professionals can benefit from this project. Dissemination can be extended to medical professionals and other health care team members engaged in shift work. Poster, conference presentation, and publication within health care communities will be considered for further dissemination of the project findings. Hence, the emphasis has been tailored in the project to ensure consistency with American Psychiatric Nurses Association standards for research publications. Consideration will also be given to advocacy to influence legislative processes related to the implementation of sleep countermeasure programs in health care work environments.

Analysis of Self

As a Scholar

The translation of research to clinical practice to promote outcome metrics and patient outcome are some of the cardinal expectations of a DNP graduate. This scholarly journey was interesting, intriguing, and sometimes frustrating, as might be expected with any new endeavor. Nonetheless, the beauty was chiefly in the processes encountered and the learning that followed the rigorous measures required to achieve project completion. It has challenged my resolve at times, but it managed to bring out resilience and the best in me as a scholar. The process tested my determination and reassured me of my tenacity to succeed at the doctorate level. According to Levett-Jones et al. (2010), clinical reasoning demands proper matching of innovative ideas with resources at the right time when pertinent and appropriate, rather than holding tight to the old conventional management tools offered. This project challenged a conventional archetype with regard to conceptualizing the night shift nurse sleepiness problem and how it has been addressed in the past. It interjected a new paradigm, starting with raising awareness of the problem and providing evidence-based educational instruction to advance the nurses' self-efficacy regarding sleepiness management strategies. It also responded to a critical need for a comprehensive and pragmatic needs assessment in articulating and assessing all aspects of the problem.

The role of a scholar prepares the student like me to conduct necessary inquiry through research and EBP that, according to Hodges and Videto (2011), assists the scholar/educator who is carrying out the investigation to focus on the population and

antecedents to the problem. This project took many turns before it resulted in an educational program. I took the less traveled road and learned to navigate through multiple IRB approvals. Scholarship—though complex, metaphysical, and philosophical at times—necessitated an understanding of the nursing clinical practice influence encapsulated in all spheres of health care delivery. Hence, I was endowed with paramount research backing to impact nursing practice and the greater community on a spectrum consistent with a doctoral-level of knowledge. The DNP program has prepared me with the academic foundation necessary to investigate and champion a scholarly improvement, while inculcating in me the meticulousness of scholarly inquisition in perpetual evolution and translation of new knowledge to improve practice in particular and society by extension.

As a Project Developer

The conceptualization of managing this DNP project was central to the rapid evolution of the key role and its responsibilities necessitating advance practice nursing independent practice. A new leadership role, autonomy, flexibility, and the impetus to translate research and evidence-based inquiry into practice to improve quality care and outcomes, while eradicating the problem of nurse sleepiness, defined my role (see Zaccagnini & White, 2011). The learning that has taken place just navigating the big county system was quite extensive in itself. The purpose for this project and the experience it was meant to provide were drawn from DNP Essentials with particular emphasis on leadership, quality improvement, safety, and respect for human dignity

while modulating nurses' sleepiness and increasing their awareness of the implications within the treatment settings.

In light of the learning achieved and all the gains made during these past years, the negotiation and involvement of key stakeholders at all levels, the dissemination of the evidence-based knowledge, the navigation of organizational bureaucracy to pilot this intervention and, given the proper identification of the problem, supported by research as a common issue, this project can benefit not only nursing but other fields as well while I polish my approach to project management (see Hodges, & Videto, 2011; Kettner, Moroney, & Martin, 2008; Laureate Education, 2011; Wendel, Durso, Cayea, Arbaje, & Tanner, 2010). At the same time, the learning and gains made have been exponential and prepared me as a project developer to embark on new ideas, pilot them, and disseminate the findings at professional conferences, in journals, and through discussion forums.

In the process of completing this DNP program, I have submitted an abstract for a podium presentation, worked on a manuscript for journal publication, and received a productivity and quality program award for "innovating for impact" from the County of Los Angeles for another project that I successfully implemented as the project developer.

As a Professional

To promote receptiveness, translation, adoption, and sustenance of research into practice, it is imperative to obtain the cooperation and involvement of key stakeholders during planning and implementation (Sanders & Kirby, 2012). One of the recommended facilitators of research adoption and dissemination is organizational-level acceptance and willingness to change the culture to one of safety in a mostly dynamic institution adapted

to and committed to improving outcomes (Sanders & Kirby, 2012). Knowledge of nursing and its philosophy are essentially intertwined. A key aspect of the process is relating professional development to nursing practice and the nursing practitioner. Nurses are not individuals who simply provide support for healing; they also provide an approach to healing, ranging over a host of multifaceted and diverse innovations that contribute to the global society. Therefore, professional altruism and commitment to wellness within a philosophical social realm will manifest as the professional evolves from an individual who ensures the goals of the patients, their families, and the communities in which they live and work to one who optimizes all aspects of life (McEwen &Wills, 2011). Adherence to essential principles and practice of the profession define the cardinal component of professional development. The interrelationship between the individual and professional integration defines the professional nurse's roles. My individual embrace of my professional role invites ongoing professional development to ensure positive outcomes for all interactions between the professional practitioner and his patients as individuals seeking wellness. The consummate professional nurse is one who projects all the goodness of a professional nurse ideologically actualized; embodies and represents the constituent nursing profession of yesterday, today, and tomorrow; and is one step ahead on the road to achieving the consummate professional nurse status. As an evolving professional, I cherish the thought of leaving a body of work and projecting the best in nursing practice academically and clinically. This DNP completion was one step in the right direction for me.

Summary

The development of this DNP intervention project has taken a long and arduous path before it resulted in this evidence-based education program. This project holds the promise of future projection the problem of night shift nurse sleepiness encountered in health care organizations. Translation of research into practice to solve problems and increase nursing knowledge provides nurses the tool set necessary for managing the problem of night shift sleepiness, as articulated in the Essentials of DNP by Zaccagnini and White (2013).

The results of this project were synthesized, analyzed, and interpreted through descriptive statistics to answer the two research questions posed for this DNP project. Indications, recommendations, and limitations of the project were discussed. Nurses' awareness empowers self-efficacy in sleepiness management strategies and benefits the hospital leadership through collaborative approaches to promoting awareness of the problem and the use of night shift sleepiness countermeasures. This project has the potential to influence and contribute to the global nursing practice and lead to positive social change. In addition, as the project manager of this DNP project, I have grown increasingly enthusiastic as a scholar/practitioner, change agent, project manager, clinical professional and lifelong learner. As a scholar, I have, through this project, laid the foundation for further research opportunities in the field of nurse sleepiness and sleep hygiene inquiries. Dissemination of the results holds the potential for influencing future nursing-practice changes with positive social implications for patient care and health care settings.

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Appendix A: Lewin's Theoretical Framework

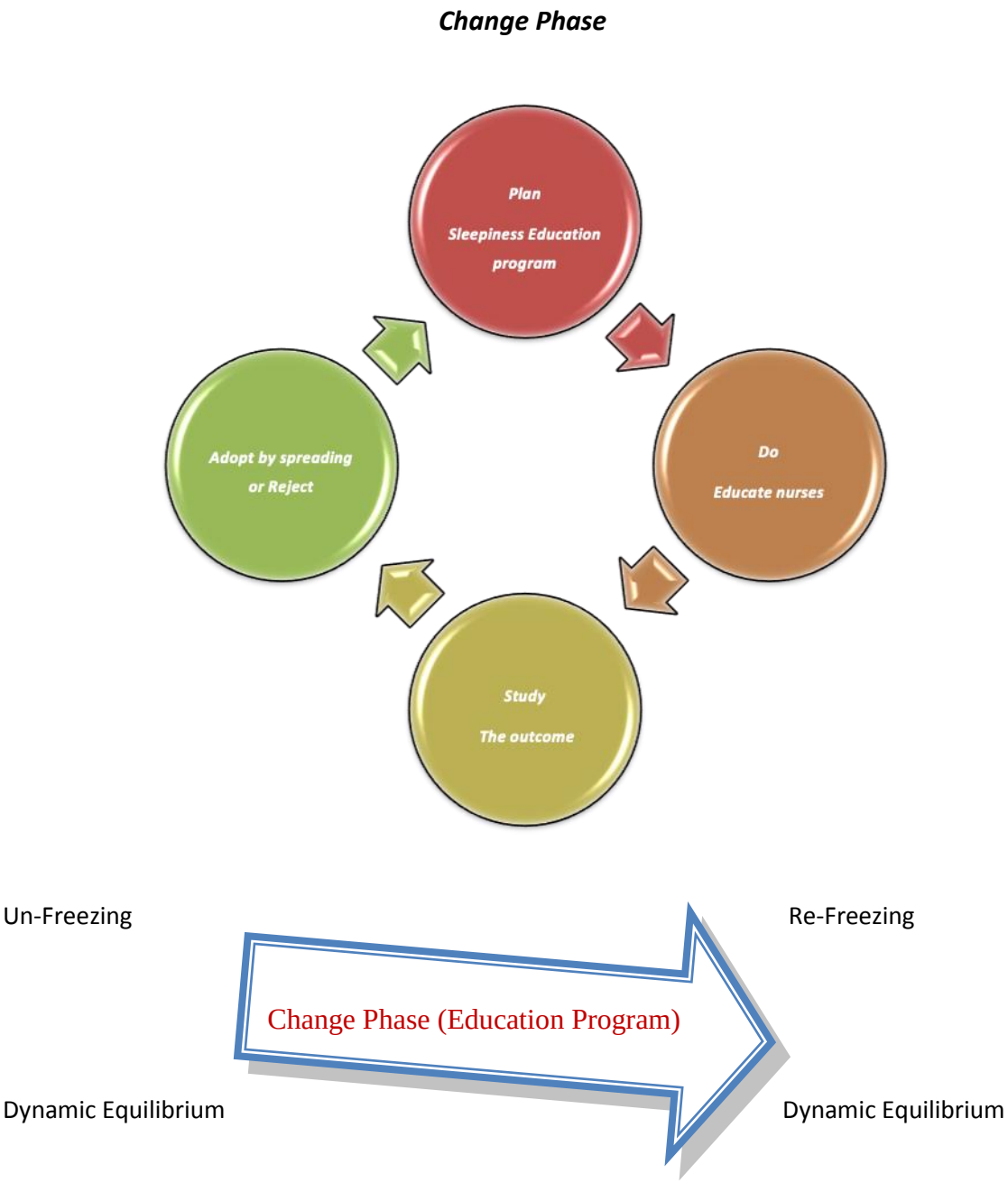


Figure 1. Diagrammatic presentation of the theoretical framework based on Lewin's theory synergy with Deming's cyclic PDSA during the change phase.

Appendix B: Site IRB Project Approval

Proposal #HS-18-00927

[redacted] Institutional Review Board

Date: Dec 05, 2018, 01:30pm

To: Sunday Okundolor
[redacted]

From: [redacted] Institutional Review Board

TITLE OF PROPOSAL:
Evidence-Based Education Program: Promoting Nurses' Management of Night Shift Sleepiness (Night shift Nurses sleepiness management strategies)

Action Date: **12/5/2018** Action Taken: **Approve**

Committee: Institutional Review Board

Note: Your iStar application was reviewed on December 5, 2018.

The project was APPROVED.

The materials submitted and considered for review of this project included:
1. iStar application dated 11/14/2018 and revised on 12/2/2018
2. Karolinska Sleepiness Scale
3. Pre-and post-education surveys
4. Permission letter from [redacted] Medical Center ED, dated 10/14/18
5. Research Information sheet

Based on the information submitted for review, this study is exempt from 45 CFR 46 according to §46.101(b) as category 2.

As research which is considered exempt according to §46.101(b), this project is not subject to requirements for continuing review. You are authorized to conduct this research as approved. The project has been entered in the iStar database. ***Please notify the IRB of any significant changes that may alter the Exempt status of this research activity.***

Please refer to the strikethrough copy of the information sheet modified by the IRB on 12/5/2018. You must use this document for obtaining informed consent from study participants. A clean copy was uploaded at iStar 24.4.

NOTE: *Provide the PI's contact information in the information sheet before use.*

Attachments: InfoSheet_Sleepiness_12.5.18_IRB edits.docx

DHS Level of Support: (3) Research performed at [redacted] sites with potential benefit to [redacted] patients in the future. [redacted] will allow access to resources, but the study must cover the cost of these resources.

Approved Documents: view

This is an auto-generated email. Please do not respond directly to this message using the "reply" address. A response sent in this manner cannot be answered. If you have further questions, please contact your IRB Administrator or IRB/CCI office.

RESEARCH INFORMATION SHEET

You are invited to take part in a research study. This project aims to assess the prevalence and intensity of sleepiness among night shift nurses and provide an evidence-based education program to mitigate night shift sleepiness. You are invited as a possible participant since you are a registered nurse in the department of emergency medicine. Your study participation is very important.

Procedures:

If you agree to take part, you will complete a sleepiness scale as well as brief questionnaires. An evidence-based educational session on night shift sleepiness will be conducted during an in-service education period. Pre- and post-questionnaires will be distributed and analyzed thereafter. An envelope will be provided where you can leave your completed survey.

Risks and Benefits:

Some of the questions may make you feel uneasy. You can choose to skip or stop answering any question that makes you uncomfortable. You may not receive any direct benefit for participating in this study. However, your participation may provide data and insights that may be mutually beneficial to you and your organization.

Privacy:

All your responses will be anonymous; we will not collect any information that will identify you in any way. Any reports, presentations, or publications related to this study will share general patterns from the data. The questionnaire data will be kept for a period of at least 5 years.

Voluntary Nature of the Project:

Your participation in this project is voluntary. There are no consequences to you if you decline to participate. If you decide to join the project now, you can still change your mind later.

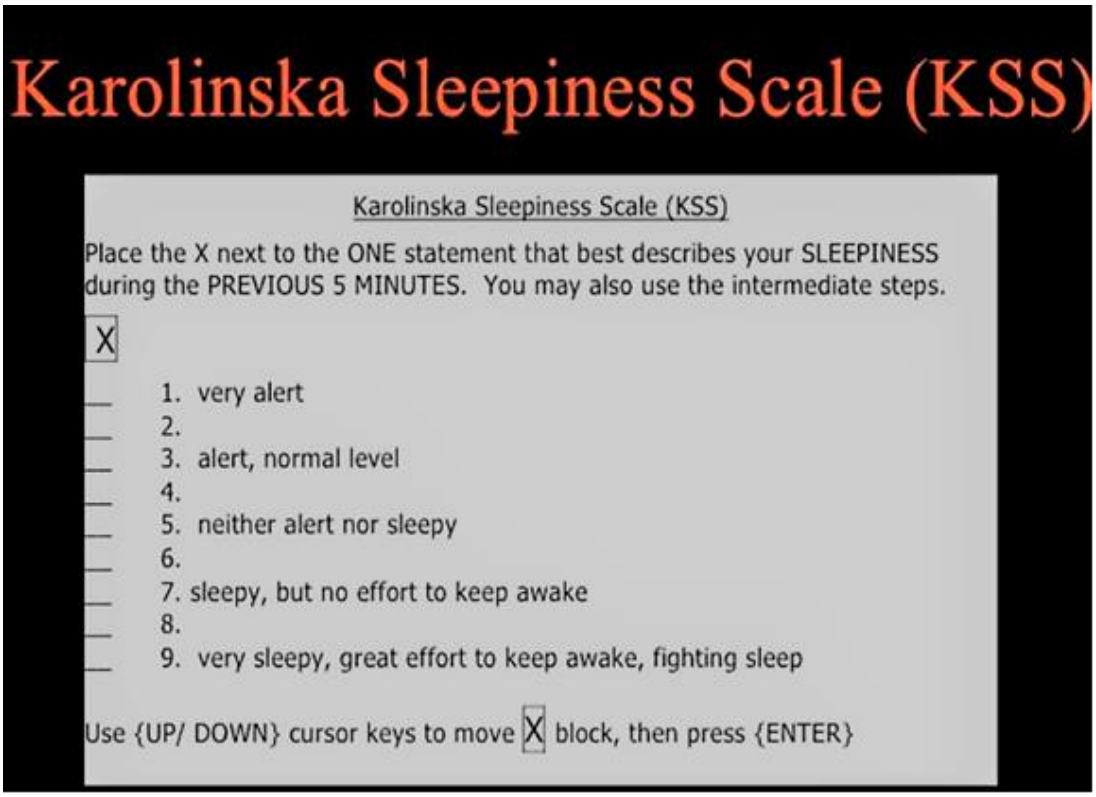
Questions and Contact information:

If you have any questions about the research or the survey, please contact [redacted]

If you have questions or concerns about your rights as a research participant, please call the [redacted] Institutional Review Board at [redacted] irb@usc.edu

Version Date: 12/5/2018

Appendix C: The Validated Karolinska Sleepiness Scale (KSS)



Appendix D: Copy Right License Agreement

SPRINGER NATURE

Title:	Karolinska Sleepiness Scale (KSS)
Author:	Azmeh Shahid, Kate Wilkinson, Shai Marcu et al
Publication:	Springer eBook
Publisher:	Springer Nature
Date:	Jan 1, 2011

Logged in as: [redacted]

LOGOUT

Order Completed

Thank you for your order.

This Agreement between [redacted] ("You") and Springer Nature ("Springer Nature") consists of your license details and the terms and conditions provided by Springer Nature and Copyright Clearance Center.

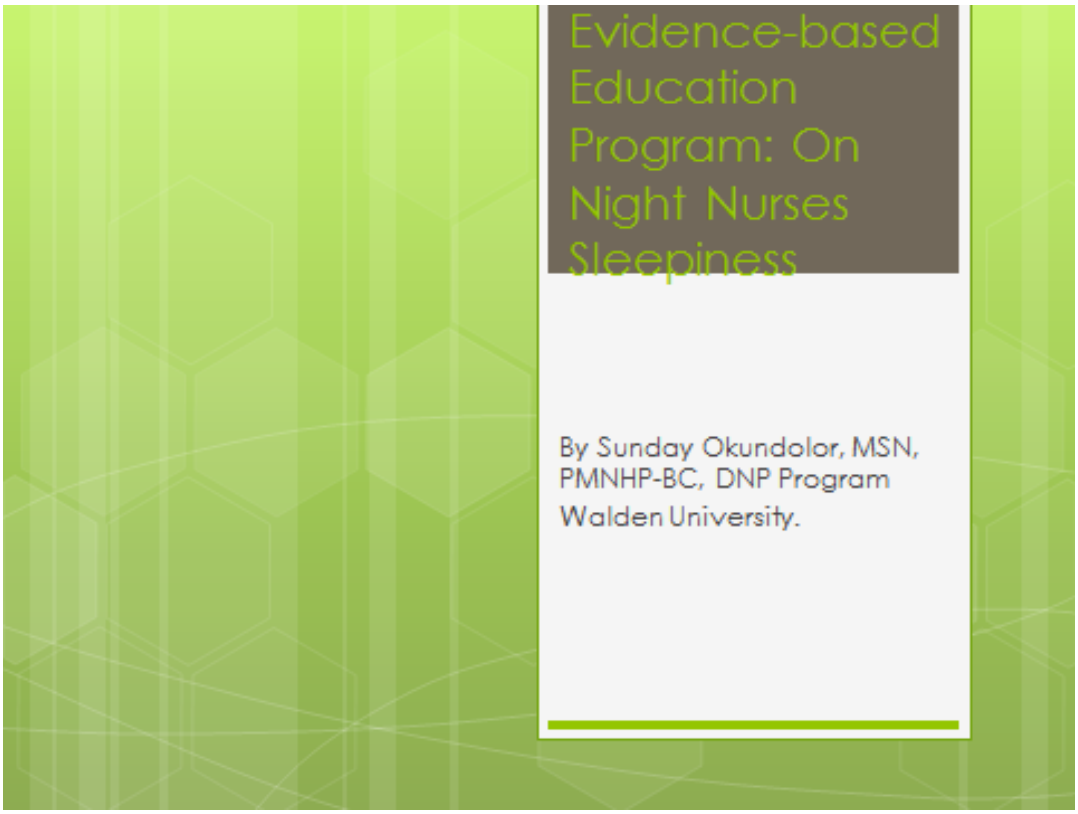
Your confirmation email will contain your order number for future reference.

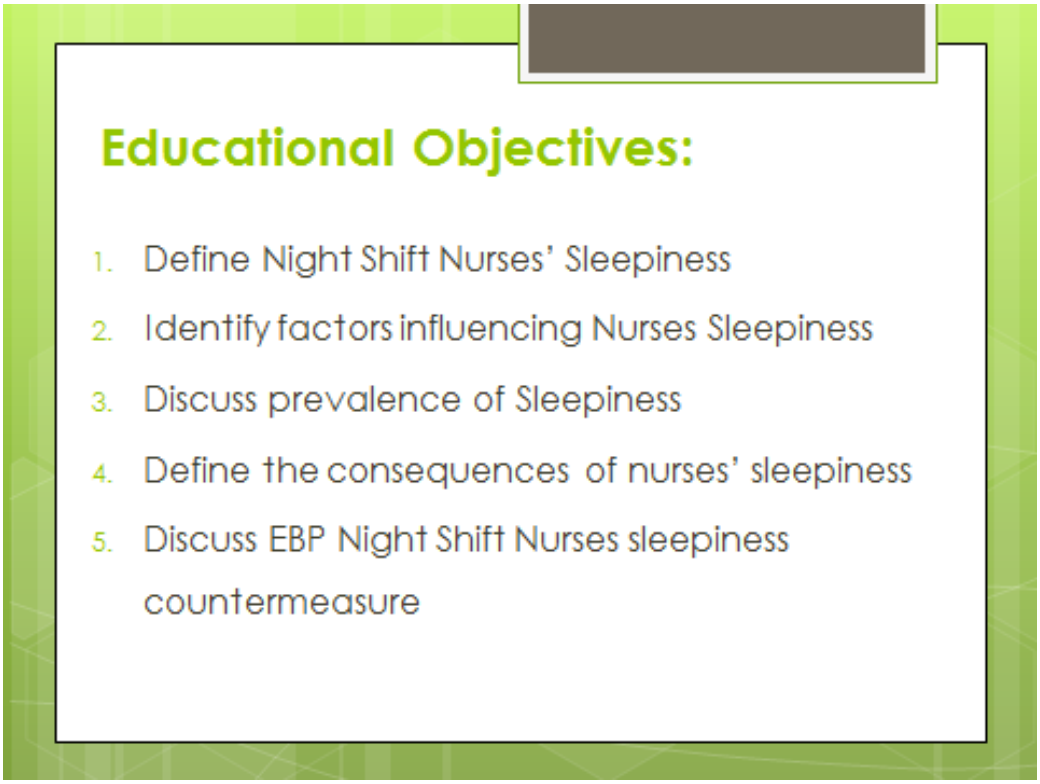
printable details

License Number	4372201315114
License date	Jun 18, 2018
Licensed Content Publisher	Springer Nature
Licensed Content Publication	Springer eBook
Licensed Content Title	Karolinska Sleepiness Scale (KSS)
Licensed Content Author	Azmeh Shahid, Kate Wilkinson, Shai Marcu et al
Licensed Content Date	Jan 1, 2011
Type of Use	Thesis/Dissertation
Requestor type	academic/university or research institute
Format	print and electronic
Portion	figures/tables/illustrations

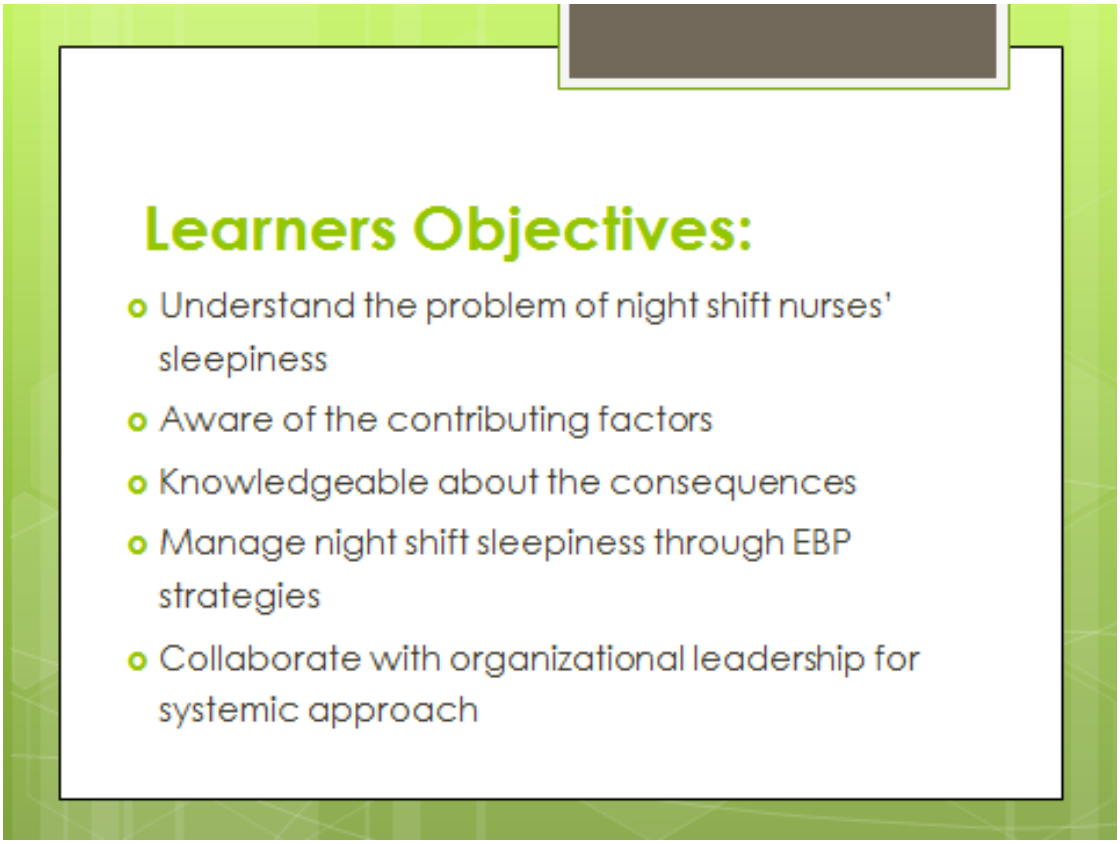
Number of figures/tables/illustrations	1
Will you be translating?	no
Circulation/distribution	<501
Author of this Springer Nature content	no
Title	Nurse Manager
Instructor name	Dr. Jennings-Sanders
Institution name	Walden University, Minnesota
Expected presentation date	Dec 2019
Order reference number	Karolinska Sleepiness Scale (KSS)
Portions	Karolinska Sleepiness Scale (KSS). In: Shahid A., Wilkinson K., Marcu S., Shapiro C. (eds) STOP, THAT and One Hundred Other Sleep Scales. Springer, New York, NY DOI https://doi.org/10.1007/978-1-4419-9893-4_47
Requestor Location	Sunday Okundolor [redacted]
	Attn: [redacted]
Billing Type	Invoice
Billing address	
Total	

Appendix E: Sleepiness Awareness and Management Strategies

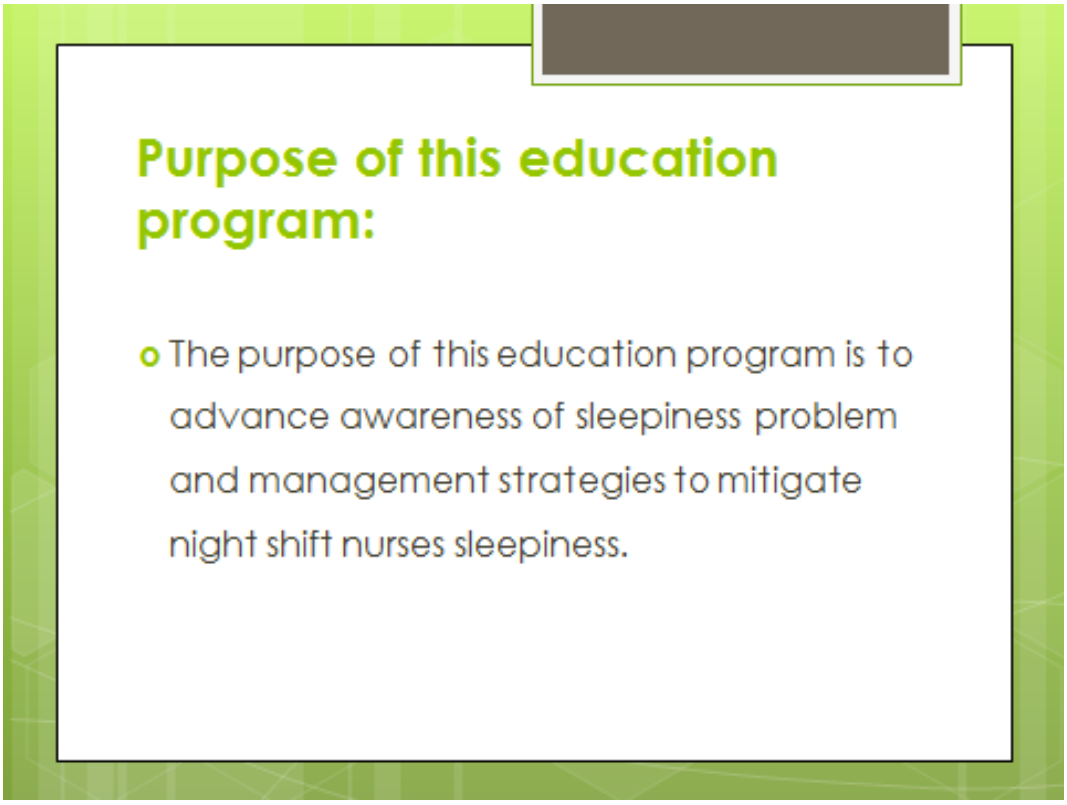


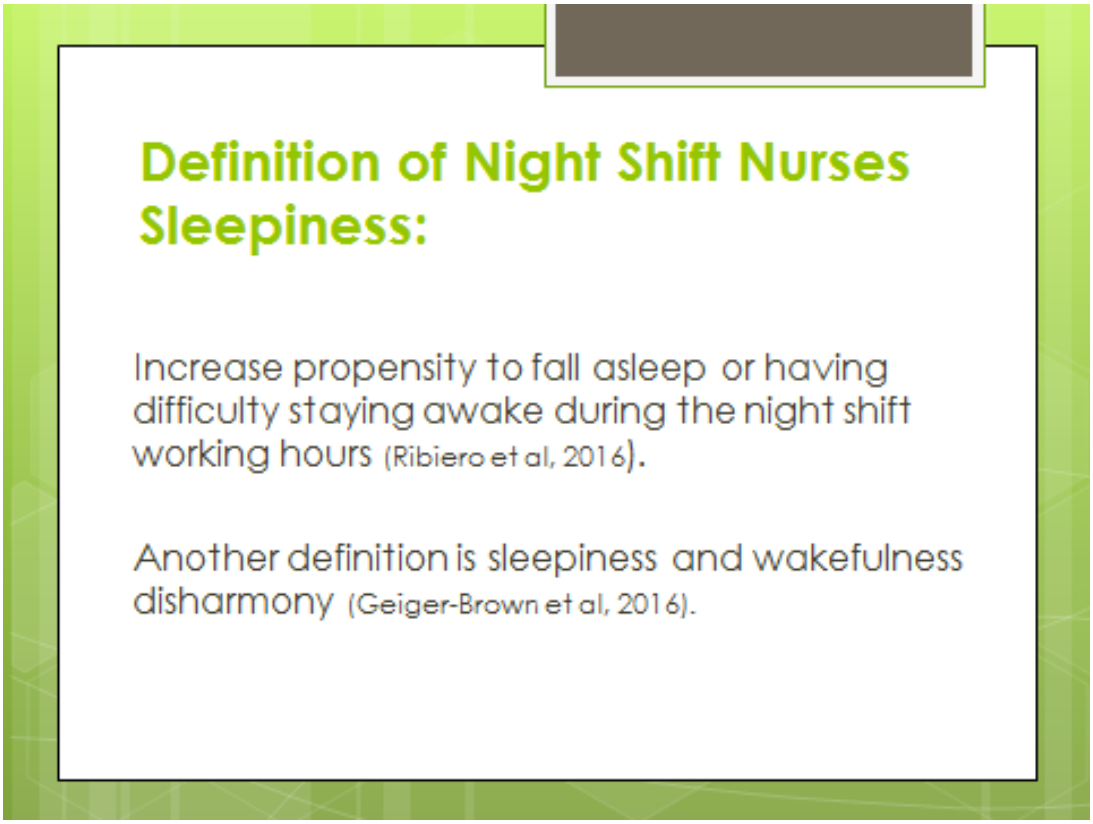

Educational Objectives:
1. Define Night Shift Nurses' Sleepiness
2. Identify factors influencing Nurses Sleepiness
3. Discuss prevalence of Sleepiness
4. Define the consequences of nurses' sleepiness
5. Discuss EBP Night Shift Nurses sleepiness countermeasure

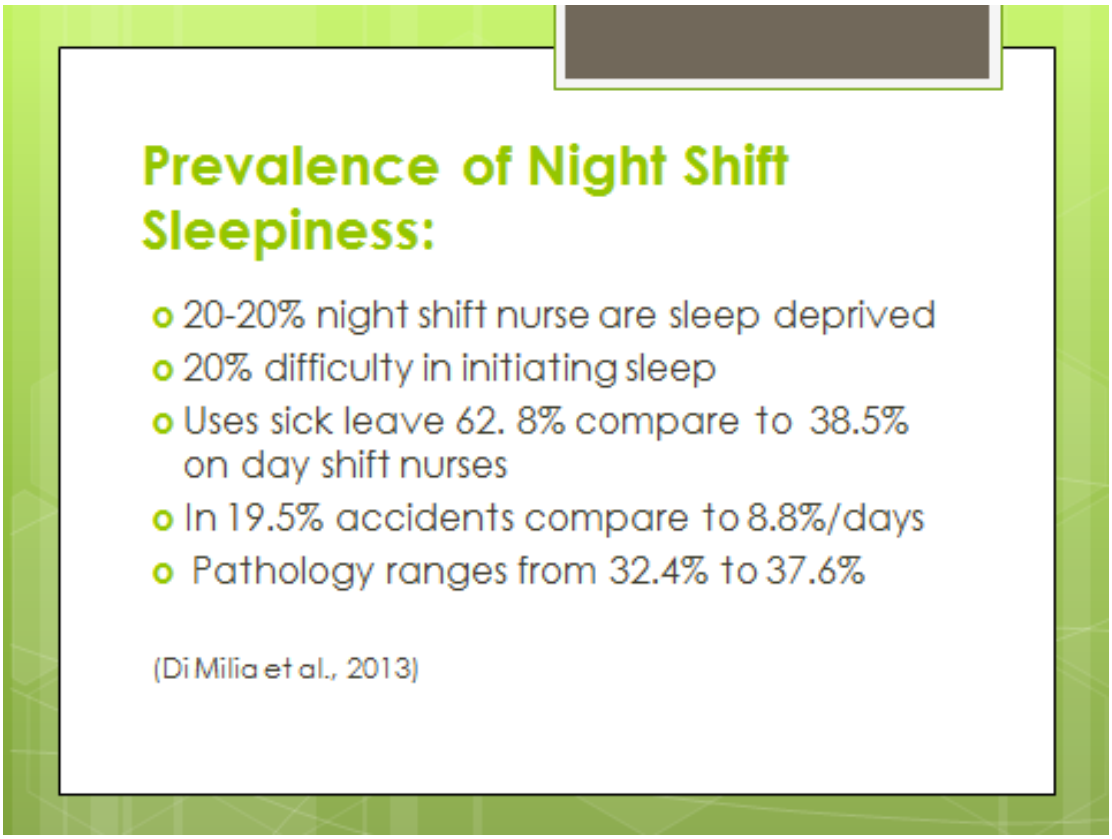

Background:
1. Sleepiness Misconception
2. Disciplinary actions against for nurses' sleepiness including termination
3. Staff knowledge deficit
4. Research indicates effective sleepiness countermeasure
5. Introduction of employee wellness paradigm


Learners Objectives:
Understand the problem of night shift nurses' sleepiness
Aware of the contributing factors
Knowledgeable about the consequences
Manage night shift sleepiness through EBP strategies
Collaborate with organizational leadership for systemic approach

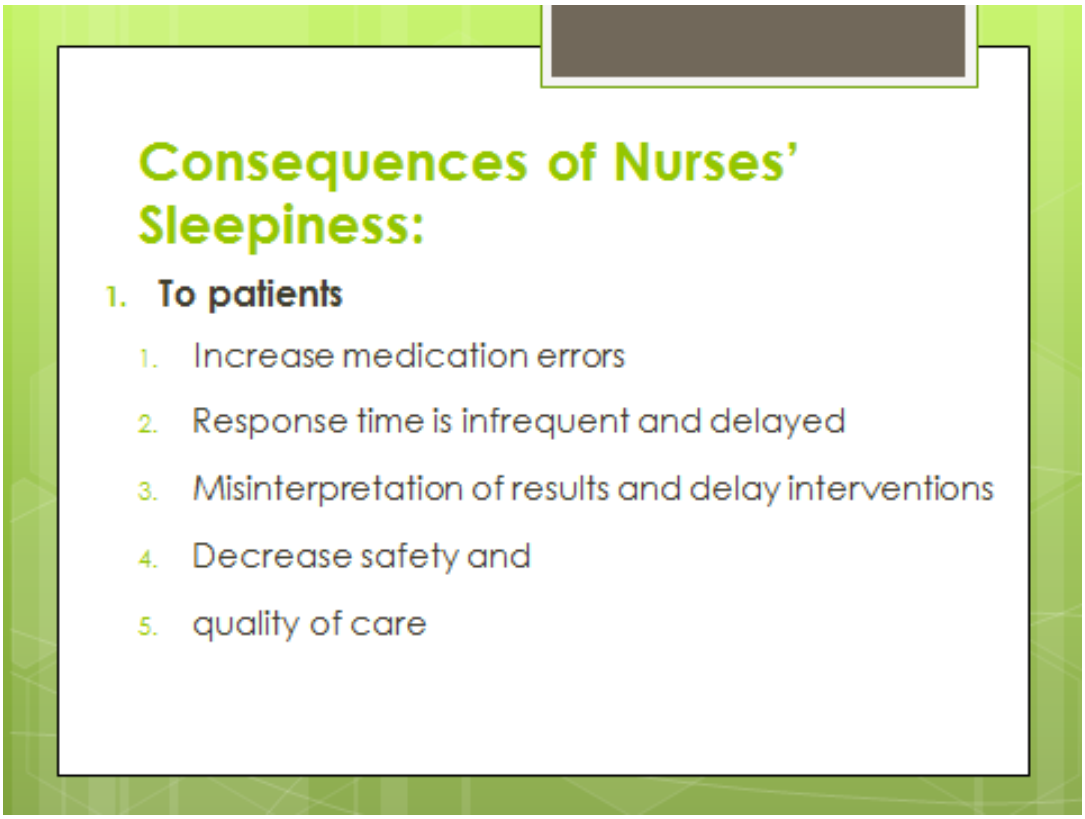

The causes of night shift nurses sleepiness:
Tautology of sleepiness
Sleep propensity
Circadian rhythms (intrinsic/neuronal drive)
Sleepiness & wakefulness dyad
Sleep deprivation

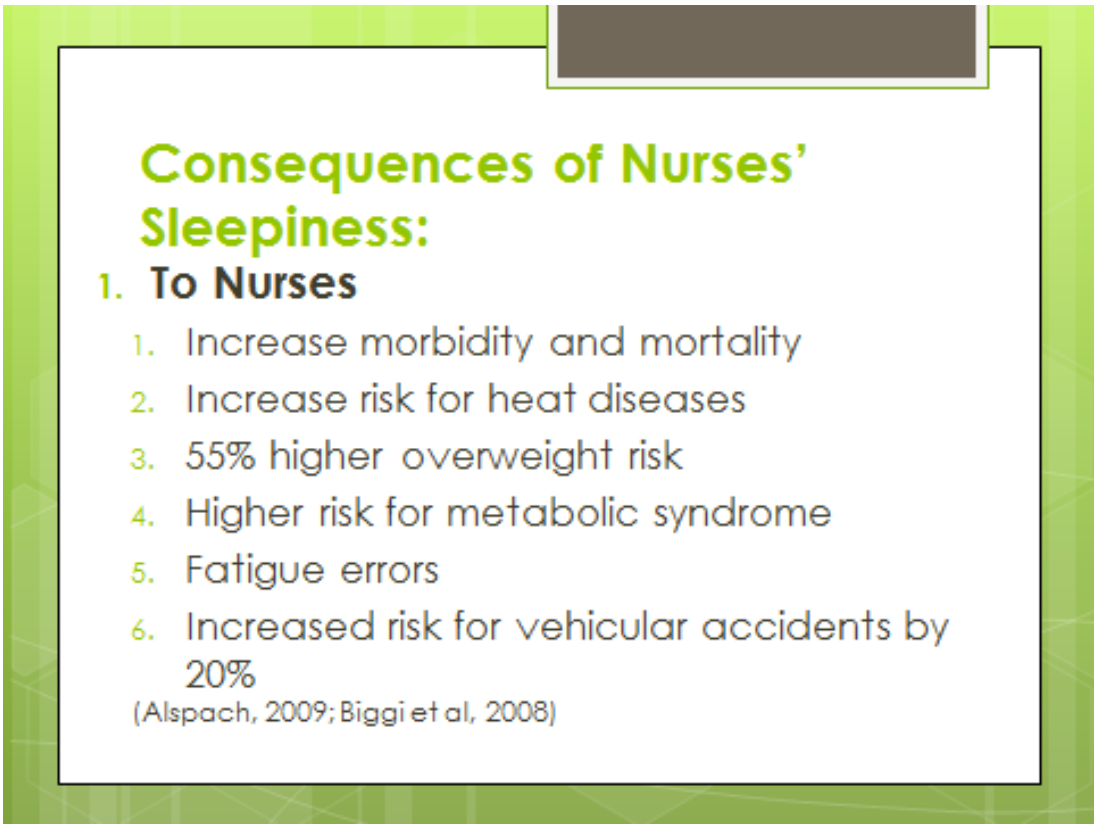

Purpose of this education program:
The purpose of this education program is to advance awareness of sleepiness problem and management strategies to mitigate night shift nurses sleepiness.

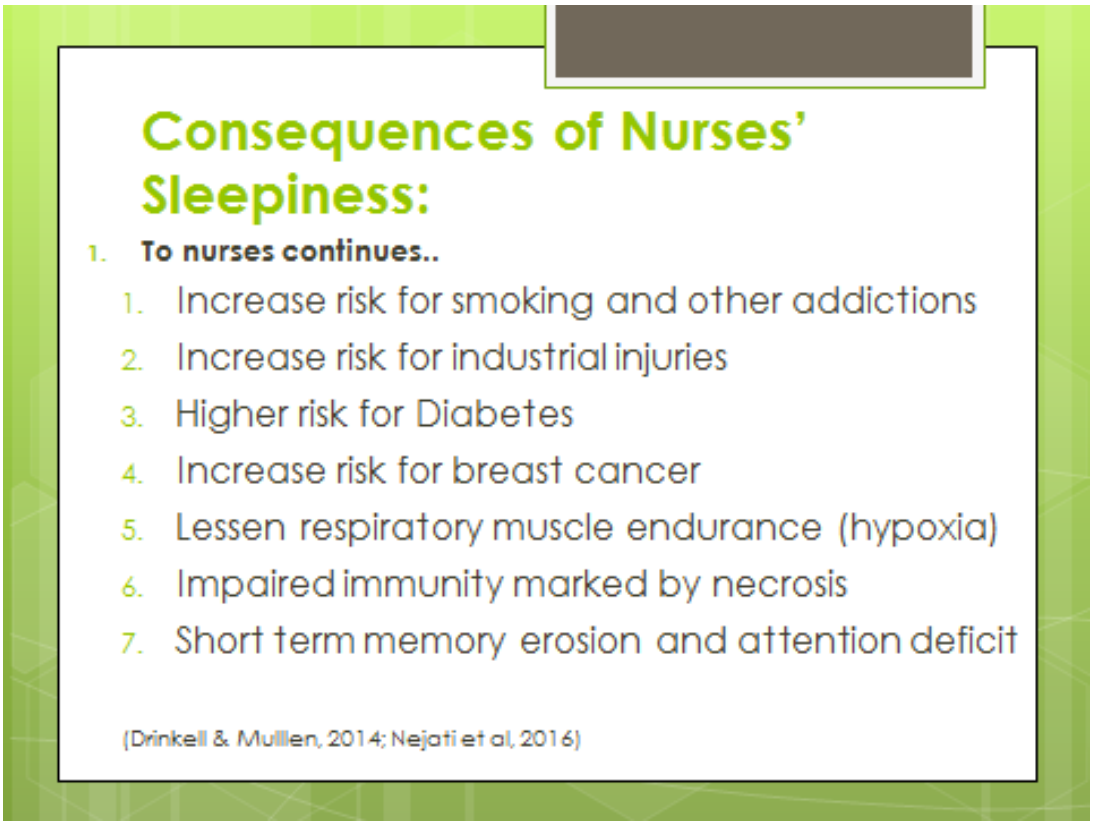

Definition of Night Shift Nurses Sleepiness:
Increase propensity to fall asleep or having difficulty staying awake during the night shift working hours (Ribiero et al, 2016).
Another definition is sleepiness and wakefulness disharmony (Geiger-Brown et al, 2016).

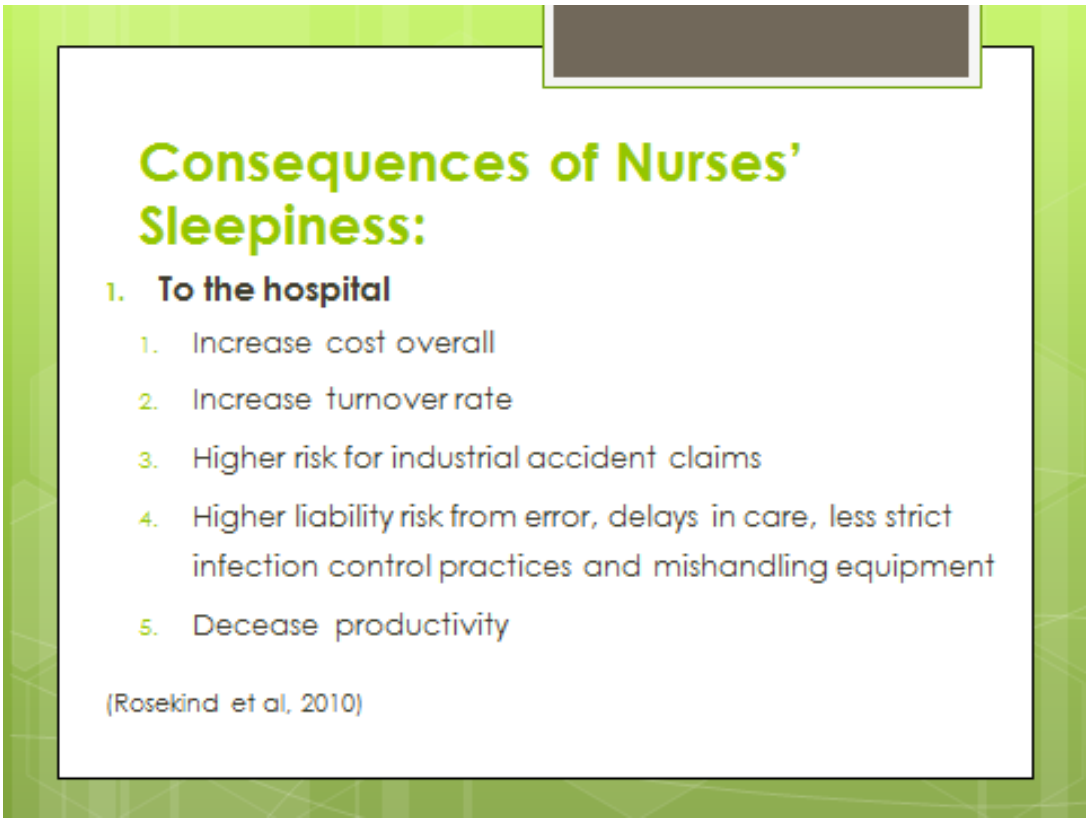

Prevalence of Night Shift Sleepiness:
20-20% night shift nurse are sleep deprived
20% difficulty in initiating sleep
Uses sick leave 62. 8% compare to 38.5% on day shift nurses
In 19.5% accidents compare to 8.8%/days
Pathology ranges from 32.4% to 37.6%
(Di Milia et al., 2013)

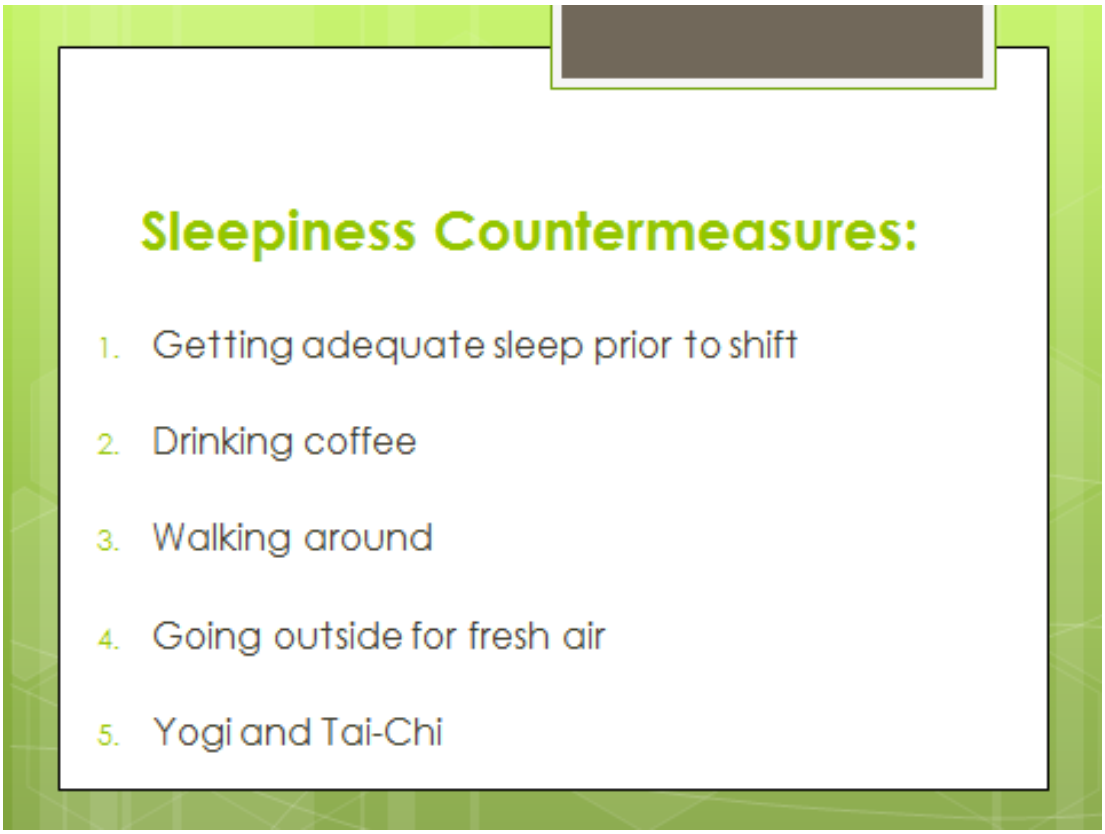

Relevance:
Improving nursing-sensitive performance measure like self-perceived efficacy in management of sleepiness promotes nurses practice environment, improve quality of care, engagement, retention and hospital harm by events (ANA, 2011; IOM, 2010; NDNQI, 2011)

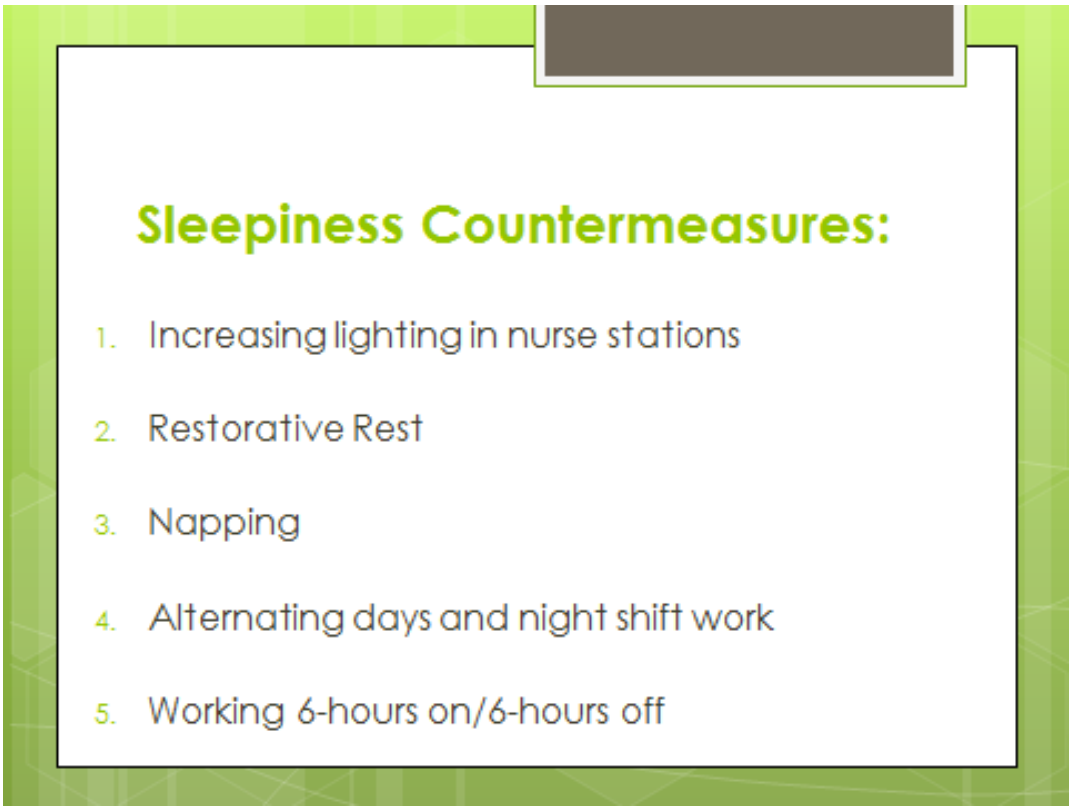

Consequences of Nurses' Sleepiness:
1. To patients
1. Increase medication errors
2. Response time is infrequent and delayed
3. Misinterpretation of results and delay interventions
4. Decrease safety and
5. quality of care

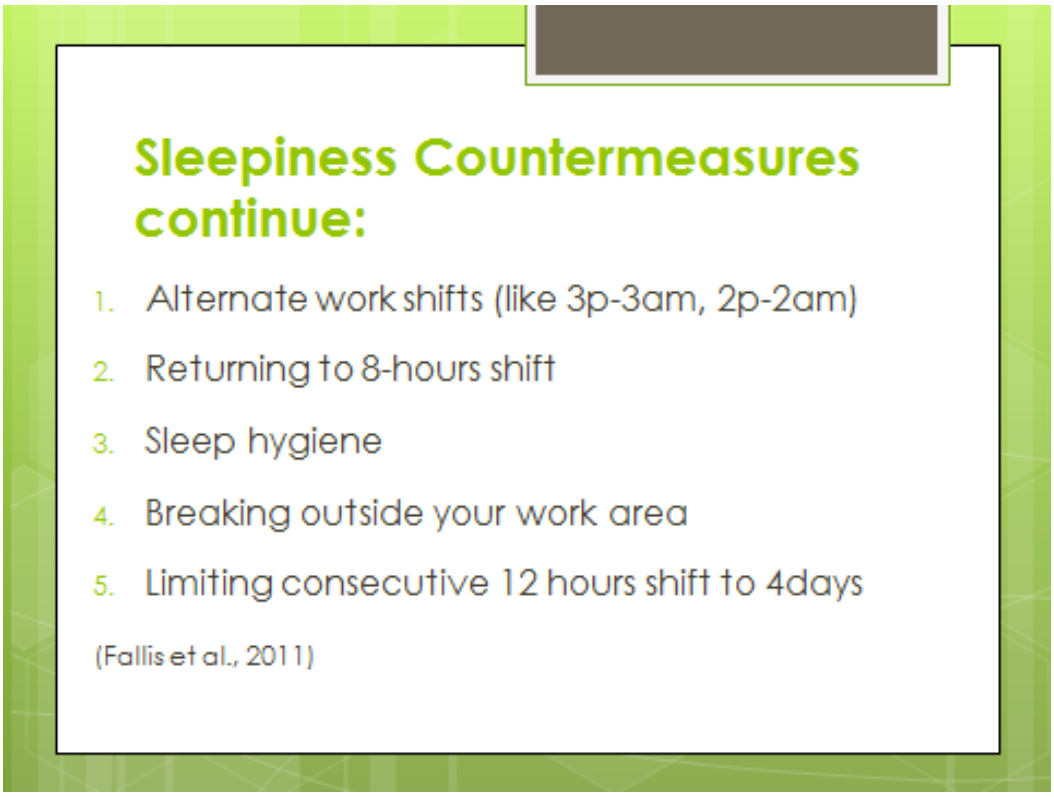

Consequences of Nurses' Sleepiness:
1. To Nurses
1. Increase morbidity and mortality
2. Increase risk for heat diseases
3. 55% higher overweight risk
4. Higher risk for metabolic syndrome
5. Fatigue errors
6. Increased risk for vehicular accidents by 20%
(Alspach, 2009; Biggi et al, 2008)

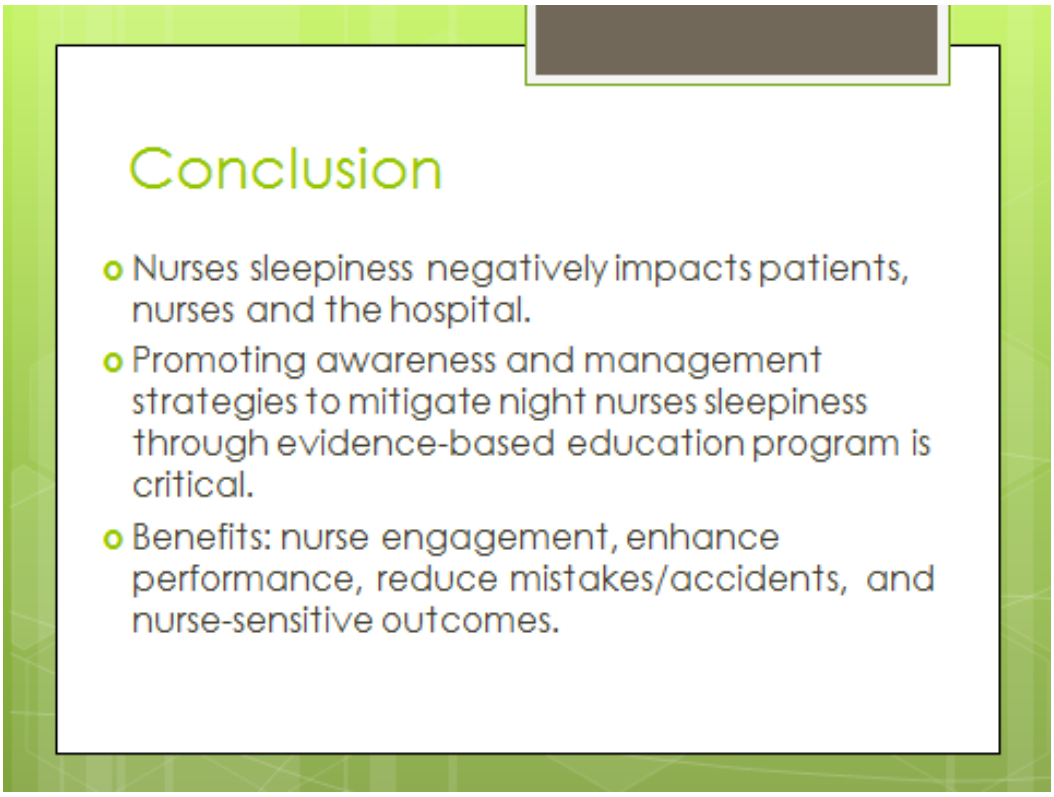

Consequences of Nurses' Sleepiness:
1. To nurses continues..
1. Increase risk for smoking and other addictions
2. Increase risk for industrial injuries
3. Higher risk for Diabetes
4. Increase risk for breast cancer
5. Lessen respiratory muscle endurance (hypoxia)
6. Impaired immunity marked by necrosis
7. Short term memory erosion and attention deficit
(Drinkell & Mullen, 2014; Nejati et al, 2016)


Consequences of Nurses' Sleepiness:
1. To the hospital
1. Increase cost overall
2. Increase turnover rate
3. Higher risk for industrial accident claims
4. Higher liability risk from error, delays in care, less strict infection control practices and mishandling equipment
5. Decease productivity
(Rosekind et al, 2010)

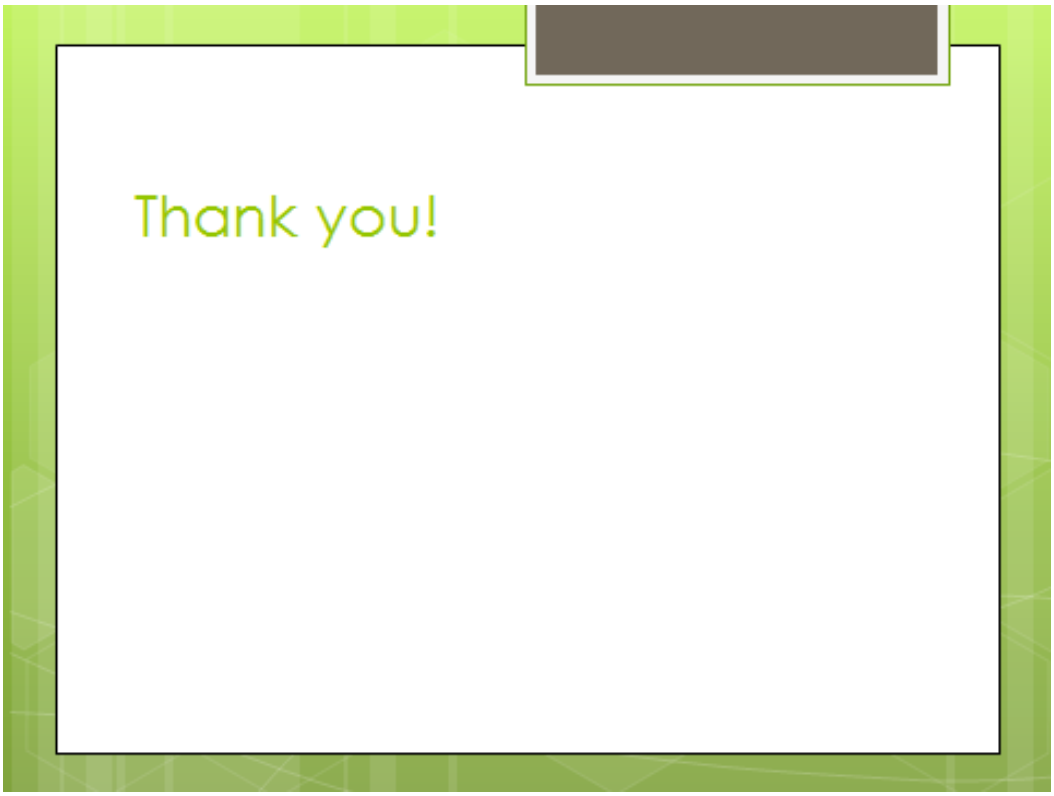

Sleepiness Countermeasures:
1. Getting adequate sleep prior to shift
2. Drinking coffee
3. Walking around
4. Going outside for fresh air
5. Yogi and Tai-Chi


Sleepiness Countermeasures:
1. Increasing lighting in nurse stations
2. Restorative Rest
3. Napping
4. Alternating days and night shift work
5. Working 6-hours on/6-hours off


Sleepiness Countermeasures continue:
1. Alternate work shifts (like 3p-3am, 2p-2am)
2. Returning to 8-hours shift
3. Sleep hygiene
4. Breaking outside your work area
5. Limiting consecutive 12 hours shift to 4days
(Fallis et al., 2011)


Conclusion
Nurses sleepiness negatively impacts patients, nurses and the hospital.
Promoting awareness and management strategies to mitigate night nurses sleepiness through evidence-based education program is critical.
Benefits: nurse engagement, enhance performance, reduce mistakes/accidents, and nurse-sensitive outcomes.


Questions….?


Thank you!

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Appendix F: Night Shift Nurses Self-Perceived Sleepiness Survey Questionnaire

Pre/Post Education Nurses' Sleepiness Survey

Please indicate your level of agreement with the following statements	**Strongly Disagree (1)**	**Disagree (2)**	**Neutral (3)**	**Agree (4)**	**Strongly Agree (5)**
I know about night shift nurses sleepiness problem	O	O	O	O	O
Working night shift can lead to heart diseases	O	O	O	O	O
Sleepiness on night shift decreases productivity	O	O	O	O	O
Sleepiness can lead to metabolic syndrome	O	O	O	O	O
Night shift work raises morbidity/mortality rate	O	O	O	O	O
I know strategies to manage night shift sleepiness	O	O	O	O	O
I can manage my sleeping during the night shift	O	O	O	O	O
I think it would be beneficial to have a sleep lounge for night shift staff napping	O	O	O	O	O
I will leave this hospital if I cannot leave night shift	O	O	O	O	O
I could benefit from sleepiness management education	O	O	O	O	O
I often fall asleep driving home after nightly shifts	O	O	O	O	O
I have been working night shift over 1-5 years	O	O	O	O	O
I have been working night shift 5-10years	O	O	O	O	O
I have been working night shift over 10years	O	O	O	O	O

List three methods of coping with sleepiness:

1. Least preferred: _____

2. _____

3. Most preferred: _____

Appendix G: Site Approval for Staff Education Doctoral Project

[redacted]

Site Approval Documentation for Staff Education Doctoral Project

Partner Site [redacted]
Contact Infonnation
Date [redacted]

The doctoral student, [redacted] involved in Staff Education that will be conducted under the ouspices of our organization. The student is approved to collect fonnative and summative evaluation data via anonymou.." staff que..c;tionnaires, and is also approved to analyze internal, de·identified site records that I deem appropriate to release for the student's doctoral project. This approval to use our organization 's data pertains only to this doctoral project and not to the student's future scholarly projects or research (which would need a separate l'equcst for approval).

I understand that, as per DNP program requirements, the scudent will publish a scholarly report of this Staff Development Project in ProQuest as a doctoral capstone (with site and individual identifiers withheld), as per the following ethical standards:

a. In all reports (including drafts shored wich peers and faculty members), the student is required to maintain confidentiality by removing numcs and key pieces of evidence/data that might disclose the organization's identity or an individual's identity or inappropriately divulge proprietary details. If the organization itself wishes to publicize the findings of this project, that will be the organization• s judgment call.
b. The student will be responsible for complying with our organization's policies and requirements regarding data collection (including the need for the site fRB review/approval, if applicable).
c. Via a Consent form for Anonymous Questionnaires, the student will describe to staff members how the data will be used in the doctoral project and how the stakeholders' autonomy and privacy will be protected.

I confinn that I am authorized to approve these activities in this setting.

Signed, [redacted]

Site's Authorization Ofr ial Name (to be determined by site)
Title ';
Name of Partner Site [redacted]