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Exploring The Sleeping Experiences Of Shiftwork Nurses

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EXPLORING THE SLEEPING EXPERIENCES OF SHIFTWORK NURSES

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by

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EXPLORING THE SLEEPING EXPERIENCES

OF SHIFTWORK NURSES

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Fort Hays State University, 2011

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ABSTRACT

Shiftwork scheduling in nursing can lead to diminished health status, quality of life and job dissatisfaction, and it can contribute significantly to decreases in the quality of patient care. In light of the current nursing shortage, and the increasing need for healthcare professionals and services in the coming years, it is imperative that nursing administrators focus on identifying and implementing interventions that counteract the deleterious effects of shiftwork now.

This investigation was conducted to explore the sleeping experiences of shiftwork nurses. A convenience sample of 69 ($N = 69$) licensed nurses working day shift, evenings, nights and rotating shifts at a Midwestern Community Hospital were studied using a structured sleep measurement tool developed by Dr. Daniel Buysse (1989). Statistical findings indicated a significant difference between the groups of nurses for sleep quality $F\,(3, 65) = 2.963, p\ .039$ and sleep duration $F\,(3, 65) = 4.658, p\ .005$. Evening shift nurses in this investigation were found to incur the poorest sleep quality and night shift nurses the poorest sleep duration.

The sleeping experience of shiftwork nurses remains an important issue, therefore further studies are needed that would explore larger and more diverse populations of shiftwork nurses.

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CHAPTER I - INTRODUCTION

Shiftwork in nursing has long been a perplexing issue. Working a shift or a combination of shifts outside of the usual daytime hours of 0800-1600 can wreak havoc on the body and the mind. Research has shown that the continual disruption of the body's circadian rhythms associated with shiftwork has caused nurses to obtain less than optimal sleep (Abdalkader & Hayajneh, 2008), and as the ability to obtain quality sleep, particularly during the daylight hours persists, a chronic state of sleep deprivation is realized coupled with declines in physical health, mental acuity and normal emotional states (Akerstedt, 2003; Perkins, 2001). Shiftwork can also have a negative impact on the nurse's time spent engaging in usual social activities.

Feelings of social isolation and a perceived decrease in quality of life are noted among shiftwork nurses. As usual social and family functions are interrupted a perceived decrease in quality of life can ensue and ultimately contribute to job dissatisfaction and increased rates in nursing turnover (Muecke, 2005). As dissatisfied nurses leave their positions throughout the healthcare industry, the ability to provide adequate healthcare services today and in the years to come declines and increased financial expenditures are realized by medical institutions across our nation.

Financial expenditures are increased by high nursing turnover as medical facilities attempt to replace existing nurses. Madhour (2009) explained the cost of recruiting and training a replacement for one registered nurse can be equivalent to one year's salary or $50,000. Contributing further to the decreasing ability to provide affordable, adequate healthcare is the declining interest among young men and women in pursuing a career in

nursing (Mangan, 1999; Costello, 2000; Anonymous, 2010). When considering these facts, nursing administration members must make issues surrounding nursing satisfaction and retention a top priority. One such issue is the reported poor sleeping experiences of shiftwork nurses.

Statement of the Problem

According to Nuttall (2009) the United States is currently experiencing a short term surplus of registered nurses. Budgetary issues surrounding the current recession have caused dramatic increases in unemployment and reductions in healthcare benefits resulting in decreased visits to the doctor for preventative healthcare and elective surgeries (Nuttall, 2009). This reduction in patients has caused hospitals and doctors' offices across our nation to reduce their nursing staff leaving existing unemployed nurses and new graduates with little opportunity for gainful employment. However, the nursing surplus of today is predicted to change dramatically in the near future.

Buerhaus, Auerbach, & Staiger (2009) explained that registered nurses over the age of 50 will soon represent the largest age group in the workforce, and as these nurses begin retirement the estimated shortage of registered nurses could reach 260,000 by the year 2025. Accompanying this shortage of registered nurses will be an increased need for healthcare services in the future. Atchison (2006) asserted that baby boomers, those born during the years 1946-1964, currently represent approximately 28% of the total population in the United States and as this group increases in age so does the need for healthcare services. The problems facing the nursing profession are three-fold. As the need for healthcare services in the United States increases due to the baby boomers

coming of age the number of registered nurses needed to supply those healthcare needs are decreasing due to:

- Decreased office visits and elective surgeries
- Decreased interest in pursuing nursing as a career
- Increased rate in nursing turnover

Each of these situations poses a threat to the ability to provide adequate healthcare services in the future.

Purpose of the Investigation

Research has shown the sleeping experience of the shiftwork nurse to be of poorer quality and quantity than the nighttime sleep of a day shift nurse, and this poor sleeping experience can lead to a state of chronic sleep deprivation (Fletcher & Dawson, 1997). Akerstedt (2003) proposed shiftwork nurses awaken feeling less physically and mentally rejuvenated because of a lighter, shorter and more fragmented sleeping experience, and Perkins (2001) reported shiftwork nurses suffering from chronic sleep deprivation incur a sleep debt that if not corrected could contribute to long-term physical, mental and emotional exhaustion. The purpose of this investigation is to explore the sleeping experiences of shiftwork nurses

Significance of the Investigation

Data collected from this investigation will potentially assist members of nursing administration in devising a plan that will improve the working conditions of shiftwork nurses. Early identification of those nurses in danger of succumbing to the deleterious effects of shiftwork will help nurses learn methods of managing themselves and will enable administrators to implement appropriate interventions early possibly avoiding

decreases in the quality of patient care and nurse satisfaction. Increases in nurse retention might also be noted coupled with decreased financial expenditures for nurse recruitment and training. Finally, this investigation could stimulate research that would further explore the physical, mental, and emotional side effects of shift work.

Theoretical Framework

Sister Callista Roy's Adaptation Model (RAM) was chosen as the theoretical framework that would guide this investigation. The RAM asserts humans are holistic adaptive systems that are in constant interaction with internal and external environmental stimuli. Changes in the environment fuel adaptive responses and enhance the person's ability to maintain personal integrity, dignity, health, quality of life and a sense of growth and accomplishment. The RAM categorized three types of environmental stimuli: 1) *focal stimuli* are the internal or external stimuli requiring the person's greatest adaptive response; 2) *contextual stimuli* are environmental factors that contribute to the effect of the focal stimuli; and 3) *residual stimuli* are any other phenomena that affect the focal stimuli but whose affects are not well understood (Meyers, 2010; Roy & Andrews, 1999). These three types of environmental stimuli when acting together can influence a person's ability to adapt to a situation and their ability to maintain a sense of personal integrity (Andrews & Roy, 1991). Examples of environmental stimuli in relationship to this investigation include sleep deprivation (*focal stimuli),* environmental noise which interrupts sleep such as barking dogs, emergency vehicles, trash trucks (*contextual stimuli),* and personal stressors such as babysitting issues, marital problems, and financial worries (*residual stimuli).*

The RAM asserts human systems are comprised of two interrelated subsystems

and four adaptive modes that assist with a person's ability to cope with changes in the environment (Phillips, 2006a), see figure 1 below.

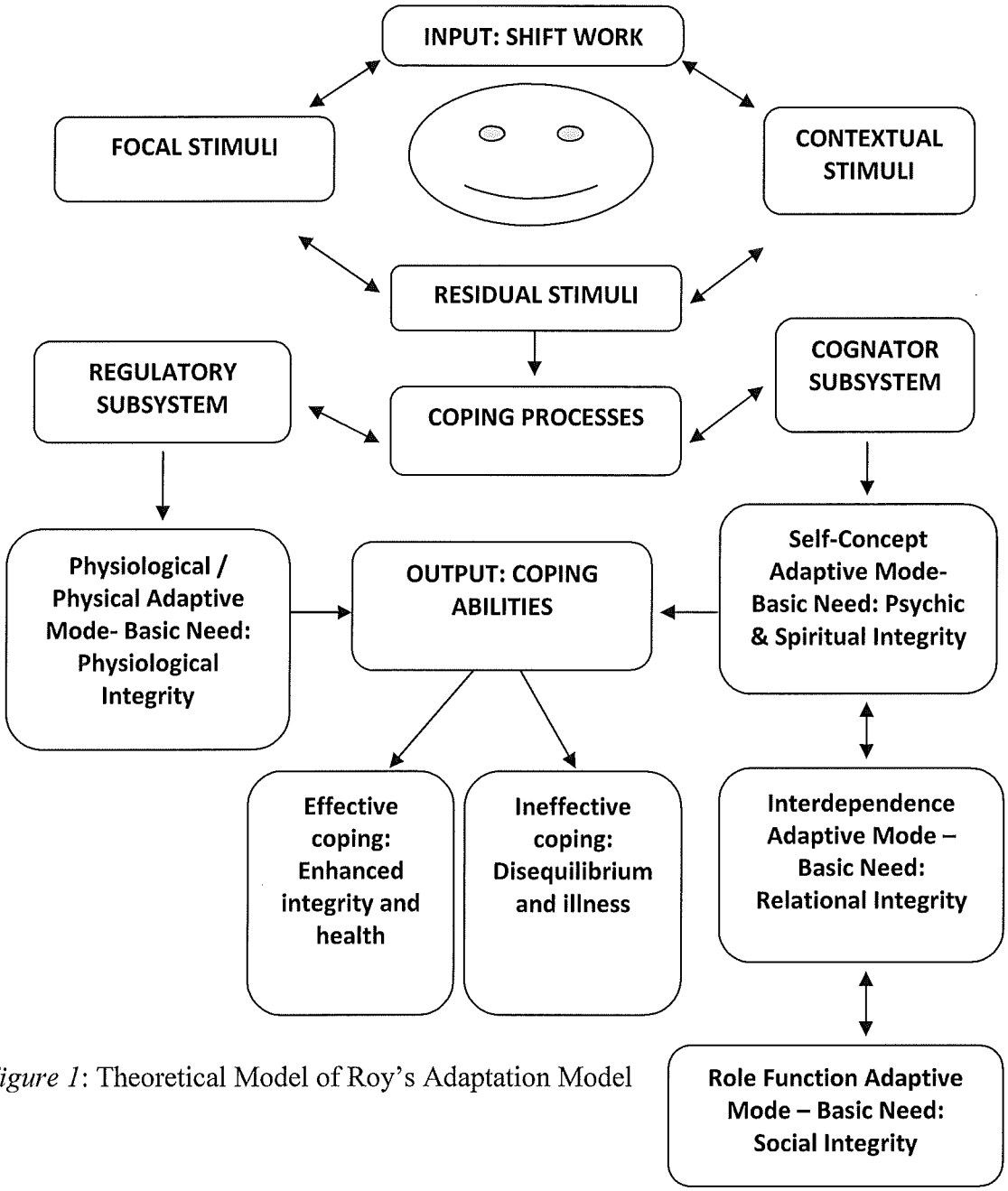

Figure 1: Theoretical Model of Roy's Adaptation Model

The *regulatory subsystem* assists automatically via the physiological adaptive mode which refers to the manner in which "a person, as a physical being, responds to and

interacts with the internal and external environment" (Phillips, 2006a, p. 375). The basic needs of physiological integrity are realized through the senses, fluid, electrolyte, and acid-base balance and neurological and endocrine function (Phillips, 2006a). The *cognator subsystem* assists via the self-concept, interdependence and role function modes. The basic needs of psychic, spiritual, relational, and social integrity are met through both innate and learned cognitive and emotional processes which include "perceptual information processing, learning, judgment and emotion" (Andrews & Roy, 1991, p. 14). The self-concept mode refers to the person's psychological and spiritual characteristics (Phillips, 2006a) and includes positive feelings about one's physical and personal self that are derived from within and from the perceptions of others. The interdependence mode emphasizes the building and maintenance of loving, nurturing relationships and the ability to "give and receive love, respect, and value from significant others and social support systems" (Phillips, 2006a, p. 375). The role function mode focuses on the acquisition of societal behavioral norms and the ability to function well in the various roles played in society (Phillips, 2006a).

Roy created a new model for the nursing process which includes six "simultaneous, ongoing and dynamic steps" (Phillips, 2006b, p. 311). The new model addresses patient behavior and environmental stimuli in addition to nursing diagnosis, goal setting, intervention and evaluation. Nursing's goal is now to promote adaptive responses in each of the four adaptive modes (Roy & Andrews, 1999). Positive adaptation would promote integrity and health, whereas negative adaptation would lead to disequilibrium and illness. Nursing interventions, according to

Roy and Andrews (1999) should focus on managing environmental stimuli by "altering, increasing, decreasing or maintaining them" (p. 86) rather than through manipulation of the patient. Sister Callista Roy's Adaptation Model served as an ideal framework to guide this investigation and can assist nursing administrators as they help nurses through the process of achieving positive adaptive responses to shiftwork.

Definition of Variables

For the purpose of this investigation the following definitions were identified:

Independent variable

Shiftwork: Shifts are typically created around a 24-hour period of time, and the usual shift consists of an 8-hour increment of time. Typical shifts are either day, evening, night or those that rotate between any of the shifts for a predetermined length of time. Theoretically, shiftwork consists of a schedule that incorporates those who work outside of the regular daytime hours of 0800-1600, and shift workers include those people who work eight hour day, evening, night or rotating shifts or those who work extended 12-hour day or night shifts…

(Institute for Work & Health, n.d.). Operationally, a shiftworker can be identified by their response on the researcher-created demographic tool (see p. 66).

Dependent variables

Sleep quality: Theoretically, sleep quality has been defined as an individual's perception of the "depth" or restfulness" of sleep (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989, p. 194). Operationally, sleep quality is measured by a participant's response to question number six on the Pittsburgh Sleep Quality

Index (PSQI) measurement tool (see p. 65).

Sleep duration: Theoretically, sleep duration is the amount of time a person spends sleeping. Operationally, sleep duration is measured by a participant's response to question number four on the PSQI measurement tool (see p. 64).

Research Question

The following research question guided this investigation:

1. Is there a statistically significant difference between working the day shift, evening shift, night shift or a rotating shift in nursing and sleep quality and sleep duration?

Assumptions

For the purpose of this investigation the following assumptions were identified:

1. All participants responded truthfully and to the best of their ability.
2. All participants were aware of their sleeping problem.
3. All participants were licensed nurses working within the Midwestern Community Hospital.

Delimitations

For the purpose of this investigation the following delimitations were identified:

1. Only licensed nurses working at the Midwestern Community Hospital participated in this investigation.
2. All participants were employed in medical facilities that utilized shiftwork scheduling.

Limitations

For the purpose of this investigation the following limitations were identified:

1. Licensed nurses from the Midwestern Community Hospital were chosen to participate; therefore the results of this investigation cannot be generalized to nurses working in other hospitals.
2. Results derived from this investigation cannot be generalized to non-shiftwork nurses.
3. Although it was assumed that all participants responded truthfully, the possibility of dishonest responses still existed. Dishonest responses in this investigation would skew results and therefore would not accurately represent the population.

Summary

Shiftwork scheduling in nursing leads to decreases in health, quality of life, job satisfaction, and contributes to increased nursing turnover and to decreases in the quality of patient care. In light of the current nursing shortage, and the increasing need for healthcare professionals and services in the coming years it is imperative that nursing administrators focus on identifying and implementing interventions that counteract the deleterious effects of shiftwork. The purpose of this investigation was to explore the various aspects of shiftwork and how they related to the sleeping experiences of nurses.

CHAPTER II – REVIEW OF THE LITERATURE

Introduction

The review of literature examined evidence related to shiftwork, sleep quality and sleep duration and how they related to nursing, health, safety, and job satisfaction. Previous research proposed the daytime sleeping experience of the shiftwork nurse is of poorer quality and quantity than the day shift nurse and this difference resulted in long lasting physical, mental and emotional distress as well as feelings of social isolation and a perceived decrease in quality of life (Fletcher & Dawson, 1997; Akerstedt, 2003; Perkins, 2001; Harrington, 2001; Mealer, Shelton, Berg, Rothbaum, & Moss, 2007). A thorough literature review in CINAHL, the Cochrane Library, EbscoHost, Medline, Proquest, and PubMed Central using the key search terms nursing, sleep, sleep function, sleep benefits, sleep deprivation, shiftwork, circadian rhythms, and rotating shifts revealed a wealth of information related to the body's need for a quality sleeping experience and how working a shiftwork schedule can create havoc in that experience. The disruption of the circadian rhythms and the resultant poor sleeping experience was implicated as the primary negative factors related to shiftwork in nursing (Abdalkader & Hayajneh, 2008; Hughes & Rogers, 2004; Crofts, 1999; Pheasant, 1991).

Sleep and the Circadian Rhythms

The body's circadian rhythms are the primary stimulus for the sleep/wake cycle. Controlled by the hypothalamus, the circadian rhythms are responsible for controlling hormone secretion, regulating body temperature and maintaining mood and performance capabilities (Akerstedt, 2003). Pheasant (1991) proposed the body's internal clock, or

circadian rhythms are synchronized with external cues such as time of day, routine social activities, light and dark cycles, and meal times and proposed that it's these external cues that drives the inward circadian rhythms to allow increased activity (wakefulness) during the day and decreased activity (sleep) during the night. Hughes and Rogers (2004) further explained the optimal time for sleep is between midnight and 0700 when the body is secreting the maximum amount of the sleep-producing chemical melatonin. Disruption of the circadian rhythms interrupts the basic function of sleep and can result in an overall state of poor physical, mental and emotional health.

The Function of Sleep

A quality sleeping experience is necessary for optimal physical, mental and emotional health. During sleep the metabolic rate decreases allowing the body to rest grow and rejuvenate itself in preparation for the next waking cycle. The cardiovascular, nervous and musculoskeletal systems are revitalized during sleep, and physiological functions such as the immune system's ability to fight off infections and disease are reestablished resulting in an increased capability for tissue growth and tissue repair (Opp, 2009). Those individuals experiencing poor sleep suffer increased instances of cardiac, gastrointestinal and reproductive disease as well as endocrine disorders such as diabetes, and various forms of cancer and other opportunistic infections (Harrington, 2001; Boggild & Knutsson, 1999; Karlsson, Knutsson, & Lindahl, 2001; Costa, 2001; Learhart, 2000; Monk & Carrier, 1997).

Cognitive functions are also reestablished during sleep. Crucial skills necessary for job performance are revitalized during sleep and include the ability of learning and

remembering new concepts or procedures, the ability to focus on and interpret specific details and directions, and the rejuvenation of memory and memory recall (Harvard Medical School Division of Sleep Medicine, 2008; Turner, Drummond, Salamat, & Brown, 2007). The rejuvenation of cognitive functions results in increased attention span and reactivity time, a greater degree of higher level cognitive processes such as the ability to think and reason critically, the ability to multitask and the ability to perform simple mathematical problems. According to Stokowski (2004) those incurring a less than optimal sleeping experience would be at greater risk for work-related accidents and errors.

Emotional health is also rejuvenated during sleep. According to Thase (2006) a general sense of emotional well-being is realized with a quality sleeping experience and decreased emotional disturbances such as depression exists. Conversely, emotional fatigue resulting from extended periods of sleep deprivation has been shown to culminate in adverse physical conditions, depression, anxiety and increased neuroticism (Harrington, 2001). These negative emotional states have been further linked to an increase in social isolation and a dramatic decrease in quality of life and job satisfaction (Harrington, 2001; Perkins, 2001; Mealer et al., 2007). Literature holds an abundance of information related to adverse health issues related to shiftwork.

Shiftwork and Health

Research indicates shiftwork wreaks havoc on a nurse's physical, mental and emotional health (Abdakader & Hayajney, 2008), and as the lack of quality sleep continues over an extended period of time the resultant state of sleep deprivation can be

one of physical, mental and emotional exhaustion (Fletcher & Dawson, 1997; Akerstedt, 2003; Perkins, 2001). Harrington (2001) explained one of the most significant changes associated with shiftwork, particularly night shift work, is that eating and sleeping patterns are changed. Multiple studies have addressed issues surrounding decreases in health among shiftwork nurses such as those conducted by Coffee, Skipper, & Jung (1988) and Skipper, Jung, & Coffee (1990).

Addressing issues surrounding shiftwork and its effects on sleep, physical health, mental depression, job-related stress and perceived levels of job performance were studies by Coffee et al. (1988) and Skipper et al. (1990). These exploratory studies examined differences between the sleeping experiences of 463 day, night and rotating shift nurses to determine if these differences posed a threat to physical and mental health and job performance. Findings indicated the night shift nurses had the poorest sleeping experiences, rotating shift nurses had the highest levels of job-related stress and the day shift nurses had the highest perceptions of job performance; however these findings were not associated with decreases in physical health or mental depression. These results were consistent with past research that identified night nurses as having the poorest sleeping experiences and day shift nurses as having the highest perceptions of job performance (Colquhoun, Blake, & Edwards, 1968a; Colquhoun, et al., 1968b; Colquhoun, et al., 1969; Jamal & Jamal, 1982; Ruggiero, 2003; Kunert, King, & Kolkhorst, 2007). Coffee et al. (1988) and Skipper et al. (1990) proposed a possible reason for the unexpected results of this study might be the nurse's positive attitudes towards shiftwork and their ability to adapt over extended periods of time. Recommendations for future research

included in depth studies examining how the disruption of the circadian rhythms affects nurses by shift and how the division of labor by shift impacts job-related stress and job performance. Further addressing the issues of sleep and shiftwork was a study by Ruggiero (2003) that specifically examined Critical Care Nurses (CCN).

Past research explained how nurses working permanent night shifts tend to have poorer sleeping experiences and more instances of anxiety, depression, and chronic fatigue than do those working permanent day shifts (Gold, et. al, 1992; Lee, 1992; Tasto, Colligan, Skjei, & Polly, 1978). Ruggiero's study sought to determine if possible differences in the sleeping experiences of 142 day and night shift CCNs was most closely associated with chronic fatigue. Final results revealed the perceived differences in sleep among the day and night shift nurses was not associated with increased levels of chronic fatigue. These findings are unlike the results of a study by Tasto et al. (1978) which indicated night nurses suffer more instances of chronic fatigue than day nurses due to poor sleeping experiences. These conflicting results identify the need for further research that would explore the differing levels of chronic fatigue among day and night shift nurses. Ruggiero (2003) suggested the results of this study identify the need for interventions that address the physical and psychological issues surrounding inadequate sleep and chronic fatigue, particularly in night shift nurses. While the results of this study are pertinent to critical care nurses they cannot be generalized to other nursing populations, therefore further studies are needed that would include members of the general nursing population and other specialty areas such as the emergency room and surgery. Continuing the exploration of possible relationships between sleep and chronic

fatigue among nurses was a descriptive study by Kunert et al. (2007). This particular study included the independent variable sleeping medication.

According to Akerstedt (1990) sleep loss is associated with shiftwork, and the poor sleeping experience of the shiftwork nurse is particularly noticeable after working a night shift when the nurse often experiences excessive daytime sleepiness and chronic fatigue. Harrington (2001) explained the shiftwork nurse can lose up to two hours of sleep daily resulting in a chronic state of sleep deprivation which if not corrected can result in chronic physical, mental and emotional exhaustion. Kunert et al. (2007) proposed past research indicated night shift nurses have a poorer quality sleeping experience than day shift nurses and because of this night nurses have twice the odds of using sleeping medications as compared to day shift nurses. Kunert et al. (2007) conducted an exploratory study to examine the sleeping experiences of 190 day and night shift nurses and to determine if the continual use of sleeping medication resulted in greater daytime dysfunction and the development of chronic fatigue. Final results revealed the night shift nurses, as compared to the day shift nurses, reported having poorer sleeping experiences, greater degrees of chronic fatigue and daytime dysfunction due to an increased use of sleeping medications. Kunert et al. (2007) suggested future studies address to what degree the use of sleeping medication impacts daytime dysfunction and how the poor sleeping experiences of nurses' impacts job performance, patient safety, and quality of life. Considering the increasing shortage of nurses and the ramifications of poor patient outcomes, Kunert et al. (2007) recommended the development of specific interventions that decrease the instances of chronic fatigue and

poor sleep among nurses. Multiple studies in nursing literature addressed the issues of shiftwork and its negative effects on the physical body.

The ill effects of shiftwork on the body have been well documented in nursing literature. Cardiovascular, gastrointestinal, endocrine and reproductive disorders have been identified and attributed largely to the continual disruption of the circadian rhythms that frequently accompanies shiftwork (Spiegel, Knutsson, Leproult, Tasali, & VanCauter, 2005; Boggild & Knutsson, 1999; Labyak, Lava, Turek, & Zee, 2002). A 40% increase in cardiovascular disorders was noted, particularly among those nurses working the night shift, and these disorders were attributed to poor sleep, job-related stress, smoking, poor diet and lack of exercise (Boggild & Knutsson, 1999; Harrington, 2001). Shiftwork frequently requires that nurses make drastic changes in their normal diet and according to a study by Costa (2003) night shift nurses frequently consume diets consisting primarily of pre-packaged foods and caffeinated drinks which can be high in carbohydrates, fat, and sugar and salt. Cumulative results of this type of diet over a period of time can be weight gain, high blood pressure, high blood glucose, and high cholesterol and lipid levels, and as these poor dietary habits continue and body weight increases so does the risk of obesity and cardiovascular related diseases (Knutsson, Akerstedt, & Jonson, 1988; Romon et al. (1992).

Two separate studies explored the issues of shiftwork and weight gain among nurses (Niedhammer, Lert, & Marne, 1996; vanAmelsvoort, Schouten, & Kok, 1999). A large study of 469 nurses was conducted by Niedhammer et al. (1996) to explore the effect of continual light exposure at night and weight gain. Body mass index and weight

were monitored in this ten year longitudinal study. Final results indicated a significant association between continual exposure to light during the nighttime hours and increases in BMI and body weight. According to Niedhammer et al. (1996) the average weight gain among the night shift nurses was 15.4 pounds and this weight gain was attributed to disruptions in the circadian rhythms and the stifling of metabolic hormones that assist with the maintenance of body weight. Another study, conducted by vanAmelsvoort et al. (1999) explored shiftwork and weight gain in nursing, but this study included the variables waist circumference and waist-to-hip ratio which if elevated increases the risk of cardiovascular disease (deKoning, Merchant, Pogue, & Anand, 2007). Final results revealed a positive association between night shift work and increases in weight, waist circumference and waist to hip ratios indicating this group of nurses had a greater risk of cardiovascular disease than those nurses working other shifts. These results were similar to those found in the Niedhammer et al. (1996) study as they identified positive associations between shiftwork and weight gain in nursing. Increases in gastrointestinal and endocrine disorders were also noted in the literature review.

According to a large study by Rutenfranz (1982) gastrointestinal disturbances are 20-75% more common in night shift workers as compared to 10-25% of day shift workers. Frequent complaints include disturbances in appetite, indigestion, nausea, diarrhea, constipation, abdominal pain and flatulence (Rutenfranz, 1982; Reid, Roberts, & Dawson, 1997). The disruption of the circadian rhythm cycle, changes in normal mealtimes, the unavailability of nutritious food from the cafeteria, particularly during the evening and night shifts, and hurried breaks to grab food from the cafeteria by day shift

nurses are all contributing factors to the poor diets of nurses (Costa, 2003; LaDou, 1982). More serious disorders such as colitis, gastroduodenitis and peptic ulcer disease were also associated with shiftwork (Harrington, 1978; Costa, 2003), and these disorders were attributed to increased alcohol and caffeine consumption, tobacco use and the disruption of the normal gastric acidity of the stomach (Waterhouse, Folkard, & Minors, 1992; Scott & LaDou, 1994; Reid et al. (1997). Endocrine disturbances among shiftworkers addressed in nursing literature included increased occurrences of impaired immunity, certain types of cancer, insulin resistance and diabetes (Alspach, 2008; Stokowski, 2004).

Increased occurrences of breast cancer were noted among night and rotating shift nurses (Davis, Mirick, & Stevens, 2001; Schernhammer, Laden, Willet, Hunter, Kawachi, et al. 2001), and this increase was attributed to increased light exposure at night which stifles the production of melatonin and reproductive hormones. Extended periods of night shift work have been noted to increase the chance of developing breast cancer by 60%, intestinal cancer by 35%, and a 22-51% chance of developing colorectal cancer (Abdalkader & Hayajneh, 2008; Schernhammer et al., 2003). A study by Labyak et al. (2002) explored the effects of shiftwork on the female reproductive system and childbirth experiences and outcomes.

Research to date has indicated the disruption of the body's 23 hour sleep/wake cycle can result in a chronic state of sleep deprivation which if not corrected can significantly disrupt the female nurses usual patterns of menstruation and reproductive health increasing the risk of adverse childbirth outcomes such as spontaneous abortions, preterm births and low birth weight babies (Costa, 2001; Harrington, 2001;

Axelsson, Rylander, & Molin, 1989; McDonald et al., 1988). According to Labyak et al. (2002) little research has been conducted thus far to explore possible associations between shiftwork and sleep and how this association might affect menstruation, reproductive health and childbirth experiences, so the researchers conducted a descriptive study to explore these variables further. Sixty-eight nurses of child-bearing age and with no significant histories of female reproductive disorders participated in the study. Final results indicated 53% of the nurses reported increased menstrual pain and flow while working a shiftwork schedule and these symptoms were noted to greater among those nurses working 12-hour night and rotating shifts. These nurses also reported greater instances of insufficient sleep indicating a positive association between poor sleep and changes in usual menstrual patterns among shiftwork nurses. Insignificant findings indicated no increases in miscarriage, preterm births or low birth weight babies indicating a need for further research. Labyak et al. (2002) explained these findings were similar to those found in a study by Lee (1991) who also identified disruptions in usual menstrual patterns among night and rotating shift nurses, and the researchers concluded there is a need for more flexible scheduling policies that allow for greater periods of time for rest and recuperation for shiftwork nurses particularly for those who have shown an intolerance for shiftwork.

Shiftwork and Safety

Shiftwork associated sleep deprivation suffered by man nurses can lead to physical, cognitive, and emotional exhaustion, and as cognitive abilities decline increases in medical errors and diminished responses to subtle changes in patient condition increase

(Owens, 2007; Kunert, et al., 2007; Braithwaite, 2008). Stokowski (2004) explained shiftwork can interfere with the nurses' ability to process thoughts, react, and multitask resulting in possible increases in work-related accidents and errors. Akerstedt (2005) reported as many as 50% of night shift workers experience decreased alertness while at work, and Folkard, Lombardi and Tucker (2005) explained job-related fatigue and subsequent decreased job performance increases with consecutive nights worked to include an error rate of six percent on the second night, 17% on the third, and 35% on the fourth night worked. Berger and Hobbs (2006) further explained those nurses suffering from work-related fatigue will experience impaired judgment, diminished decision making abilities and reaction times, decreased attentiveness, and altered coordination. A study by Swaen, vanAmelsvoort, Bultmann and Kant (2003) proposed nurses working the night shift are three times more likely to make medical errors or have a work-related accident. These altered states of being negatively affect both patient and staff safety as was illustrated in the following studies.

Gold et al. (1992) conducted a cross-sectional study to examine the sleeping experiences and accident rates of 635 shiftwork nurses according to particular shift worked. Nurses were asked to record their sleeping experiences and the use of sleep aids such as medication or alcohol during the previous month, any instances nodding off at work or while driving to and from work and accidents, errors or near accidents and errors at the workplace during the past year. Rotating shift nurses consistently reported more difficulty with sleep, increased use of sleeping medications, more incidences of nodding off at work and while driving to and from work and more accidents and errors while at

work and while driving to and from work. Gold et al. (1992) concluded the results of this study were consistent with past research that identified rotating shiftwork as contributing to disturbances in attention span and reaction time which lead to increases in accidents and errors and decreases in the quality and safety of patient care (Dinges et al.1987; Hamilton et al. 1972; Williams et al. 1959). Work schedule modifications were recommended among rotating shift nurses that would result in improved health and safety for nurses and patients alike. Addressing the issue of sleepiness and its relationship to drowsy driving was a study by Scott, Hwang, Rogers, Nysse, Dean and Dinges (2007).

Sleep deprivation and drowsy driving is a deadly combination. Sosnowitz & Hriceniak (1988) declared drowsy driving accounts for at least 100,000 automobile accidents yearly resulting in a total 40,000 injuries and 1,500 deaths. Among the nursing population statistics have shown that night nurses are six times more likely to be involved in a sleep-related crash than their day shift counterparts (Monk & Carrier, 1997). A study by Novak & Auvil-Novak (1996) reported 95% of the participating nurses reported motor vehicle accidents or near misses while driving home after a night shift and Lee and Lipscomb (2003) explained night shift nurses in general reported more driving off the road accidents than actual automobile crashes. Sleepy, drowsy night nurses pose a real threat to themselves and to members of the general public. According to the National Highway Traffic Safety Administration (2006) drowsy driving is quite common and its results can more than quadruple the risk of a near or actual motor vehicle accident. Scott et al. (2007) conducted an exploratory study to identify possible differences between shifts worked, sleep duration, duration of work hours, and alertness while on duty and

motor vehicle crashes or near crashes while driving to and from work. Eight hundred ninety-five nurses participated in the study. The nurses were asked to record responses related to work hours, sleep duration, drowsy and sleep episodes at work, and drowsy driving occurrences in personal logbooks for a period of four weeks. The final outcome of this study revealed night nurses consistently reported more difficulties sleeping and staying awake at work, and they were four times more likely to report incidences nodding off while driving to and from work especially if they had worked more than 12 continuous hours. These findings were similar to the study by Barger, Cade, Ayas, Najib, Cronin, Rosner, et al. (2005) that also identified extended work hours as increasing the risk of an accident while driving. Based upon the results of this study and previous studies, Scott et al. (2007) concluded that working an extended shift, particularly at night increases the risk of a near or actual motor vehicle accident on the way home from work and recommended members of nursing administration revisit scheduling options for night nurses and implement strategies that make them more aware of the risks of driving drowsy. Continuing the exploration of shift related sleepiness and job performance among nurses was a study by Admi, Tzischinsky, Epstein, Herer, and Lavie (2008).

Admi et al. (2008) conducted an exploratory longitudinal study to investigate the differences between 685 day and rotating shift "adaptive" and "nonadaptive" nurses in Issues surrounding sleep, health complaints, rates of absenteeism, and shift-related accidents and errors. According to Admi et al. (2008) the adaptive nurse was one who had adapted to shiftwork and the non-adaptive nurse was one who had not. Female day shift nurses were found to report more health issues; however the day shift nurses were

older, had greater body mass indexes (BMI) and had greater seniority than the shiftwork nurses. After adjustments were made for age, BMI and gender no differences remained between the two groups indicating the demographic variables were responsible for the health issues rather than particular shift worked. Pertinent results related to the adapted and the non-adapted shiftwork nurses indicated that while the non-adapted nurses complained of more difficulty sleeping and greater degrees of excessive daytime sleepiness than the adapted nurses there were no increases in health complaints or absences, and no deficiencies were noted in job performance. Based on these findings, Admi et al. (2008) concluded that gender, age and weight were more responsible for intolerance for shiftwork rather than the shift itself. Age and BMI were also identified in previous studies as contributing to intolerance for shiftwork (Learhart, 2000; Reid & Dawson, 2001; Reilly, Waterhouse, & Atkinson, 1997). Based upon the results of these studies, Admi et al. (2008) suggested maintaining nurse and patient safety requires policymakers to consider more flexible scheduling for the aging female nurse. Examining the subjective sleeping experiences, excessive daytime sleepiness (EDS) and job performance of shiftwork nurses was a study by Suzuki, Ohida, Kanetia, Yokoyama, and Uchiyama (2005).

Suzuki et al. (2005) conducted a cross-sectional study to assess the subjective sleeping experiences and EDS of a large cohort of 4407 shiftwork nurses to determine if there was a relationship between sleep habits, excessive daytime sleepiness and various medical accidents and errors. Previous studies have shown that EDS that result from inadequate sleep has been associated with low productivity and increased work-related

accidents (Dinges, 1995; Redline et al., 1997; Melamed & Oksenberg, 2002). Results in this study revealed 34.5% of the nurses reported shortened sleep durations of six hours or less, and 26% of the nurses reported EDS. Furthermore, significant relationships were found between EDS and increased drug administration errors, incorrect operation of medical equipment and needlestick injuries. According to Suzuki et al. (2005) these instances of increased accidents and errors were attributed to either age or working the night or a rotating shift. The ramifications of this study indicated decreases in staff and patient safety related to sleep deprivation and EDS, therefore Suzuki et al. (2005) suggested occupational policies that address sleep hygiene and social support be instituted which would be beneficial in reducing the number of accidents and errors in the workplace.

Shiftwork and Job Satisfaction

Nursing satisfaction and nursing burnout have been addressed in several studies, and job satisfaction was identified as being of utmost importance in relationship to nurse burnout and nurse retention (Kotzer, Koepping, & LeDuc, 2006; Garrett, 2008; Maslach & Jackson, 1981; Morrison, Haas, Shaffner, Garrett, & Fackler, 2003; Muecke, 2005; Westfall-Lake, 1997; Shubin, 1978; Storlie, 1979). Increased job turnover increases financial expenditures for medical institutions and threatens the ability to provide adequate healthcare now and in the future. Previous studies have identified declines in the physical and mental health of nurses suffering from burnout, and these negative health states have been associated with less than optimal patient care and patient satisfaction (Ruggiero, 2005; Eriksson, Starrin, & Janson, 2008; Meadors & Lamson,

2008; Garrett, 2008; Vahey, Aiken, Sloane, Clarke, & Vargas, 2004; Bakker, Schaufeli, Sixma, & VanDirendorick, 2000).

Aiken, Clarke, Sloan, Sochalski, & Silber (2002) conducted a large study of 10,184 Pennsylvania registered nurses to examine issues surrounding job dissatisfaction and nurse burnout. Greater than 41% of the nurses participating reported being dissatisfied with their jobs. According to Aiken et al. (2002) job dissatisfaction was a primary predictor of a nurse's intent to leave their job oftentimes within the first year. Adequate numbers of professional nurses are essential if optimal patient outcomes are to be achieved. Aiken et al. (2002) explained as the number of registered nurses decrease in the patient care setting the number of patient deaths increase (Aiken et al., 2002). These results identified the increasing need to address issues surrounding job dissatisfaction and job burnout both now and in the future. Various contributing factors to job dissatisfaction among nurses have been identified in literature. Ruggiero (2005) conducted a study that explored some of those factors and how they contributed to job dissatisfaction among among CCNs.

Ruggiero's (2005) study examined how selected work, shift worker health, demographic variables, and individuals requiring care after work affects job satisfaction. A random sample of 247day shift, nights, and rotating CCNs participated in the study. The nurses reported no significant differences according to shift worked; however the nurses indicated less emotional stress, depression and more weekends off per month were most closely aligned with job satisfaction. Identified in this study was the need for scheduling improvements and the development of specific interventions designed to

reduce depression and emotional stress among nurses which would improve job satisfaction and aid in nurse recruitment and retention. Causes and consequences of nursing burnout and job dissatisfaction were also explored in nursing literature.

Sleep deprivation was identified as a contributor to both fatigue and job dissatisfaction among nurses, and as nurses became increasingly fatigued and dissatisfied increased absences were noted (Braithwaite, 2008). Increased absences reduce the number of nurses available to provide optimal patient care frequently resulting in poorer patient outcomes and decreased patient satisfaction. Garrett (2008) declared job-related stress, increasing age, poor staffing, work schedules, mandatory overtime, forced time off and lack of adequate supplies for patient care were all contributing factors to nurse burnout. Nurses experiencing burnout often lose the personal sense of accomplishment they once felt in their work and may begin to feel separated from their peers (Espeland, 2006; Halbesleben, Wakefield, Wakefield, & Cooper, 2008). Feelings of alienation may result in personal withdrawal from others causing both personal and professional relationships to suffer (Braithwaite, 2008). Dissatisfied nurses might also develop feelings of anger, guilt and frustration that culminate in negative attitudes towards patients and staff members alike (Garrett, 2008; Vahey et al., 2004). Nurses suffering from burnout might also develop feelings of social marginalization as they are continually separated from usual social activities with family and friends (Harrington, 2001). Scheduled activities such as attending church services or sporting events, for example, are frequently disrupted when nurses work a shiftwork schedule leading to feelings of social isolation. Normal family responsibilities such as household chores and

shopping frequently goes undone for a period of time and the acquisition of appropriate childcare services can be difficult to obtain (Skipper, Jung, & Coffee, 1990). Previous studies have indicated both male and female shiftworkers reported personal relationships with spouse and children suffered when working a shiftwork schedule (Banks, 1956; Mann & Hoffman, 1960; Mott et al., 1965; Sergean, 1971; Yelagotes, 1973; Mott, 1976; Tasto et al. (1978). Resultant feelings from these experiences were depression, anger, frustration and guilt as social activities and personal relationships are continually interrupted or become less satisfying because of work-related fatigue (Rose, 1984). Considering the importance of nursing job satisfaction as it relates to patient care and nurse retention, it would behoove nursing administrators and managers to focus on issues surrounding job satisfaction among nursing staff. The impact of the escalating nurse shortage will only increase in the future, therefore a continual assessment of the negative aspects of the patient care environment and the development of appropriate tools to decrease those negative aspects is needed now (Lin & Lang, 2007; Morrison et al. (2003).

Summary

Results of these studies indicated shiftwork nurses have poorer sleeping experiences, take more sleeping medication, and nod off more while driving to and from work, and suffer greater degrees of depression, daytime sleepiness and chronic fatigue than day shift nurses. Shiftwork nurses also have more work-related accidents and make more errors than non-shiftwork nurses and have a greater risk of acquiring cardiac, gastrointestinal and endocrine disorders such as obesity, metabolic syndrome and diabetes. Cumulative results of this literature review indicated a significant relationship

exists between shiftwork in nursing and a poor sleeping experience. Further studies are needed that would identify appropriate interventions to decrease the ill effects of shiftwork, improve the general well-being of nurses and assist in the reduction of accidents and errors in nursing.

CHAPTER III – METHODOLOGY

Research Design

This was an exploratory investigation with Level III evidence collected in a cross-sectional manner. This design was appropriate because the intent of this investigation was to explore possible differences between variables and groups with no researcher intervention.

Selection of Sample

The culturally diverse nursing population for this investigation was a combined total of 69 female and male Licensed Practical and Registered Nurses between the ages of 19-64 years of age. Nurses less than 18 years old or greater than 64 were excluded from this investigation as were any nurses who were pregnant. These nurses were excluded because he/she represented a part of what was considered to be a vulnerable population, and members of a vulnerable population might have a greater risk of harm from their participation in this investigation.

Nurses included in this investigation were representative of various departments within a Midwestern Community Hospital, and they represented the day shift, evenings, nights, or rotating shifts. Represented were nurses from the Emergency Room, Intensive Care Unit, Operating Room and Post Anesthesia Care Unit, Primary Care Clinics I & II, the Community Living Center (the nursing home), the Domiciliary, and various clinics throughout the hospital such as the Eye Clinic and the Wound Clinic.

After receiving approval from the Fort Hays State University (FHSU) Ethics Review Board and the Midwestern Community Hospital's Ethics Review Board, the

researcher contacted each nurse manager throughout the hospital via email or by telephone to provide a thorough explanation of the investigation and to discuss how the research packets would be delivered to the nurses. To eliminate a burden on the nurse manager, and to eliminate his/her involvement in the investigation, the researcher suggested the appropriate number of research packets (based upon the total number of nurses working on the unit) be delivered to each unit by the researcher and placed in a centralized location that would facilitate nurse accessibility. An example of an accessible place for the nurses to pick up a research packet was in the employee lounge. In an effort to protect each nurse's anonymity neither the researcher nor the nurse manager were involved in distributing the research packets or collecting the research materials upon completion. To further ensure anonymity the nurses were not required to place any personal information such as his/her name on the research documents.

Protection of Human Subjects

For this investigation human rights were protected in the following ways:

1. Before the investigation began a risk/benefit assessment was conducted by the FHSU Nursing Research Ethics Committee (NREC) to determine if any benefits derived from the investigation outweigh any risks. Once this determination was made NREC either granted the researcher permission to proceed with the investigation or sent the research proposal to the FHSU Institutional Review Board for further consideration.
2. Permission to pursue this investigation was also obtained from the Ethics Review Board at the Midwestern Community Hospital.

3. Informed consent in this investigation was implied by the voluntary return of the research material.
4. To ensure confidentiality all research materials were identified by a code rather than a name.
5. Any information acquired from the participants was kept by the researcher in a secure place known only to him/her for the duration of the investigation.
6. When the investigation was complete any information acquired by the researcher from the respondents was destroyed.

Informed Consent Procedure

Informed consent in this investigation was implied. Cover letters were placed inside the research packets that explained: (1) purpose of the investigation; (2) risks and benefits involved in participation; (3) the voluntary nature of participating and the possibility of dropping out at any time without fear of repercussions; (4) assurance of anonymity and confidentiality; (5) contact information for researcher and researcher's major professor; (6) instructions to notify either the researcher or the researchers major professor if any adverse effects occurred related to participation in the investigation; (7) date to return research materials; (8) brief description of the researcher-created demographic tool and the Pittsburgh Sleep Quality Index (PSQI); and (9) an explanation that result of this investigation would be shared in aggregate manner only. Included in the cover letter was a statement that the return of the research material to the researcher implied voluntary consent to participate by the participant.

Data Collection Procedure

After consent was granted by both ethics review boards the researcher began the data collection process. In accordance with the predetermined plans between the researcher and the individual nurse managers as to where the research packets would be placed on the unit, the researcher placed the research packets accordingly. Inside each research packet was a cover letter and copies of the researcher created demographic tool and the PSQI. Upon completion of the questionnaires, the nurses placed the documents into self-addressed, stamped envelopes that have been provided by the researcher and then dropped the envelope into the mail. Upon arrival at the researcher's home, the researcher placed all acquired research material into a locked box in a secure location within his/her home known only to him/her. During the data collection process and during the data computation phase of the investigation the research material was returned to the locked box after use. Once the investigation has been completed all research material were shred.

Data Collection Instruments

Personal and professional information such as gender, whether or not the participant was pregnant if a female, age, and shift worked and shift preferred were collected with a researcher-created demographic tool. The demographic tool took no more than five minutes to complete. Perception of sleep during the previous month was measured utilizing a modified version of the PSQI. The PSQI was a self-administered questionnaire designed by Dr. Daniel Buysse, Professor of Psychiatry and Clinical and Translational Science, University of Pittsburgh School of Medicine. The tool was written

in an easy to understand manner, was designed for use in the general public, and took approximately 15 minutes to complete. Containing seven subscales, the PSQI addressed sleep duration, quality, efficiency, latency, sleep disturbance, the use of sleeping medications and daytime dysfunction. According to Dr. Buysse, the PSQI has been shown to be a reliable and valid measurement tool for assessing sleep quality.

Data Analysis

A Statistical Package for the Social Sciences (SPSS) was used to analyze data in this investigation and an *alpha* level of .05 was set as the level of significance. Statistical measures included an ANOVA statistical procedure which determined mean differences between the day, evening, night, and rotating shift nurses by comparing variability between the groups.

Summary

The participants in this investigation were currently licensed registered and practical nurses working at a Midwestern Community Hospital. Permission to proceed with this investigation was obtained from the IRB at FHSU and the Ethics Review Board at the Midwestern Community Hospital. There were no personal interactions between the researcher and the participants at any time during the investigation ensuring confidentiality, and once returned to the researcher the research materials were kept in a secured location known only to him/her. Results of this investigation were shared only in an aggregate manner further ensuring participant confidentiality and anonymity. Demographic responses from members of vulnerable populations were excluded from the investigation to prevent possible participant harm. An SPSS statistical package was used

to analyze data in this investigation, and ANOVA statistical procedures were used to determine the variability between groups of nurses. Results of this investigation yielded Level III evidence.

CHAPTER IV – PRESENTATION OF FINDINGS

This chapter will present the findings of the data collected and analyzed in this investigation.

Sample Characteristics

One hundred sixty-five research packets were dispersed in this investigation which took place at a Midwestern Community Hospital. Sixty-nine ($N = 69$) Licensed Practical Nurses (LPN) and Registered Nurses (RN) responded. According to the demographic tool results the largest groups of nurses were female ($n = 59$) day shift nurses ($n = 36$) ranging in age between 51-60 years old ($n = 32$). The most desired shift to work among both male and female participants ($n = 52$) was day shift. Additional demographics for these nursing populations were presented in Table 2.

Descriptive Data

Descriptive data derived from this investigation was representative of the participants mean scores on the PSQI. According to the author of the PSQI, Dr. Daniel Buysse, a reported score of zero indicated the participant had no difficulties with sleep, a score of one indicated only minimal difficulties, a score of two indicated moderate difficulties and a score of three indicated severe difficulties with sleep. While these guidelines addressed all seven subscales of the PSQI this investigation concentrated on sleep quality and sleep duration only.

Descriptive data derived from this investigation addressed the effect shift worked had on sleep quality and sleep duration. Data indicated that day shift nurses ($n = 37$) reported the best sleep quality ($M = 1.14$, $SD = .713$) and the best sleep duration

(M = .81, SD = .995). Evening shift (n = 7) and rotating shift nurses (n = 15) reported mild to moderate difficulties with sleep quality (M = 1.86, SD = .690; M = 1.40, SD = .632) and sleep duration (M = 1.29, SD = 1.380; M = 1.53, SD = 1.187), and night shift nurses (n = 10) reported mild to moderate difficulties with quality of sleep (M = 1.70, SD = .949) and severe difficulties with sleep duration (M = 2.10, SD = .738). As can be noted in table 1 below these nursing populations overall reported only mild to moderate difficulties with sleep quality (M = 1.35, SD = .764) and sleep duration (M = 1.20, SD = 1.132).

Table 1

Descriptive Statistics Sleep Quality and Sleep Duration (N = 69)

		Sleep Quality		Sleep Duration	
Shift Worked	*n*	Mean	Standard Deviation	Mean	Standard Deviation
Days	37	1.14	.713	.81	.995
Evenings	7	1.86	.690	1.29	1.380
Nights	10	1.70	.949	2.10	.738
Rotating	15	1.40	.632	1.53	1.187
Total	69	1.35	.764	1.20	1.132

Research Question

The research questions findings will be presented according to the PSQI subscales sleep quality and sleep duration which according to LaDou (1982) would be most greatly affected when sleeping time is switched from day to night or night to day. The research question asked:

Is there a statistically significant difference between working a day shift, evening shift, night shift, or a rotating shift and sleep quality and sleep duration?

A one-way analysis between participants ANOVA was conducted to compare the effect of shift worked on sleep quality and sleep duration. Significant results were found between shift worked and sleep quality F (3, 65) = 2.963, p .039 and between shift worked and sleep duration F (3, 65) = 4.658, p .005. A post hoc analysis revealed additional significant results.

Post Hoc Analysis

According to a post hoc Fisher's Least Significant Difference Test (LSD) additional significant findings were identified between day and evening shift nurses (p .020) and between day and night shift nurses (p .034) according to sleep quality. According to sleep duration significant differences were found between the day and night shift nurses (p .001) and between the day and rotating shift nurses (p .028).These findings indicated evening shift nurses had the poorest sleep quality compared to day shift nurses and night shift nurses the poorest sleep duration as compared to day shift nurses. (See Table 3).

Table 2

Demographic Characteristics of Nursing Population ($N = 69$)

Variable	Characteristic	*n*	%
Gender	Female	59	85.5
	Male	10	14.5
Age	19-29	2	2.9
	30-40	11	15.9
	41-50	19	27.5
	51-60	32	46.4
	61-64	5	7.2
Shift Worked	Days	36	52.2
	Evenings	7	10.1
	Nights	10	14.5
	Rotating	16	23.2
Shift Desired	Days	52	75.4
	Evenings	6	8.7
	Nights	8	11.6
	Rotating	3	4.3

Table 3

Post Hoc LSD Results Comparing Sleep Quality and Sleep Duration According to Shift Worked

Shift Worked	Alternate Shift	Sleep Quality (Sig.)	Sleep Duration (Sig.)
Days	Evenings	.020	.277
	Nights	.034	.001
	Rotating	.242	.028
Evenings	Days	.020	.277
	Nights	.665	.121
	Rotating	.177	.608
Nights	Days	.034	.001
	Evenings	.665	.121
	Rotating	.320	.191
Rotating	Days	.242	.028
	Evenings	.177	.608
	Nights	.320	.191

Note. Level of significance = 0.05.

Summary

The null hypothesis in this investigation indicated there would be no differences in the sleeping experiences of nurses according to shift worked. Results of the investigation as calculated by an ANOVA statistical analysis revealed the null hypothesis should be rejected. There were differences found between the groups of nurses for sleep quality $F\,(3, 65) = 2.963, p\ .039$ and sleep duration $F\,(3, 65) = 4.658, p\ .005$. A further post hoc LSD analysis identified those differences to lie particularly among the evening shift nurses who reported greater difficulties with sleep quality and the night shift nurses who reported the poorest sleep duration.

CHAPTER V – SUMMARY AND CONCLUSIONS

This chapter will provide a succinct summary of the investigation. Findings will be presented and limitations will be identified. Implications for nursing administration, education, practice, research and theory will be discussed briefly.

Summary of the Investigation

According to previous studies shiftwork wreaks havoc in an individual's body frequently resulting in chronic states of physical, mental and emotional distress Abdalkader and Hayajneh (2008). The purpose of this investigation was to explore the sleeping experiences of shiftwork nurses. Sixty-nine licensed practical and registered nurses from a Midwestern Community Hospital participated. Self-report questionnaires were used to collect demographic information and subjective responses related to the seven subscales of the PSQI sleep measurement tool. An ANOVA statistical analysis revealed significant differences among the nurses for sleep quality $F(3, 65) = 2.963, p$ .039 and sleep duration $F(3, 65) = 4.658, p$ .005, and a post hoc LSD analysis indicated those differences to lie within the evening shift nurses who reported the poorest sleep quality and the night shift nurses who reported the poorest sleep duration.

Limitations

The following limitations were identified in this investigation:

1. This investigation used a convenience sample which is the weakest form of sampling. A random sample would have added rigor to its results and eliminated possible bias on the part of the researcher.

2. The participating nursing population was not representative of all licensed LPNs or RNs working at the Midwestern Community Hospital.
3. The participating nursing population in this investigation worked within the Midwestern Community Hospital; therefore the results of this investigation cannot be generalized to nurses working in other states and other hospitals.
4. The participating nurses were not equally represented according to gender, age, shift worked, or current Licensure status, e.g., LPN and RN, therefore the results of the investigation could not be generalized to other nurses working within the hospital.

Nursing Administration

Nursing administrators must focus on providing excellent patient care, but they must also serve as steadfast advocates for their nursing staff. Findings identified in this investigation, particularly among shiftwork nurses, revolved around poor sleeping experiences that led to decreases in physical, mental and emotional health, perceived decreases in quality of life and job satisfaction and increased rates in nursing turnover. Nurse administrators must continually assess the nursing environment for factors that could contribute to these issues and develop and implement specific interventions that would counteract the ill effects of working a shiftwork schedule. Scheduling options, breaks and mealtimes, availability of proper nutrition, opportunities for exercise, free yearly health screenings, in-house personal counseling services, and educational opportunities related to sleep hygiene are but a few of the issues that nursing administrators must address to ensure nursing health, safety and job satisfaction.

Nursing Education

Education related to the possible perils of working a shiftwork schedule should be included in the basic curriculum of nursing schools as a large number of new graduate nurses are hired specifically to work during the evening and nighttime hours. Possible issues surrounding decreases in physical, mental and emotional health must be identified and discussed early allowing the new graduate nurse ample opportunity to develop personal coping skills. Education related to sleep hygiene and chronic fatigue must also be provided. Finally, a basic nursing education curriculum must emphasize that proper rest, nutrition and exercise are necessary to provide quality patient care and to ensure personal health and safety.

Nursing Practice

The results of this investigation contributed positively to nursing practice. Identified were a host of possible negative consequences for patients and nurses alike when working a shiftwork schedule. Shiftwork nurses, for example were shown to incur less than optimal sleeping experiences that could ultimately contribute to increased work-related accidents and errors. Inadequate sleep was also identified as a contributing factor to motor vehicle accidents and near accidents as nurses drove to and from work. Finally, the poor sleeping experiences of shiftwork nurses was identified as a contributing factor to decreases in job satisfaction and nurse retention. In order to provide adequate healthcare services now and in the future these issues surrounding inefficient sleep and shiftwork scheduling in nursing must be addressed now.

Nursing Research

Results of this investigation also contributed positively to the existing knowledge base of nursing research. Results identified a significant association between shiftwork and poor sleeping experiences particularly among evening and night shift nurses; however additional research is needed that would explore these variables further using larger and more homogenous nursing populations. Further studies are also needed that would identify which aspects of the nursing environment contributed most significantly to decreased states of health and job satisfaction among shiftwork nurses. Finally, studies are needed that would identify shift specific interventions that are designed to counteract the possible consequences surrounding shiftwork in nursing. Results of this investigation have contributed positively to nursing research and to the optimization of the patient care environment thus enhancing the quality and safety of patient care.

Nursing Theory

Sister Callista Roy's Adaptation Model (RAM) provided the theoretical framework for this investigation. The RAM was an ideal nursing framework for this investigation as it explained and illustrated how individuals could effectively navigate their way through changes in their internal and external environments. Shiftwork in nursing was said to require a great deal of personal adaptation. For example, shiftwork nurses are said to have overall poorer sleeping experiences than day shift nurses. Sleeping during the daylight hours (*focal stimuli*), environmental noises that interfere with sleep (*contextual stimuli*), and waking to worries about financial matters (*residual stimuli*), for example, all posed threats to the nurse's sense of personal integrity. According to the

RAM individuals are comprised of two interrelate subsystems and four adaptive modes that assist with a person's ability to cope with changes in their environment (Phillips, 2006a).

It's through the regulatory subsystem and the physiological adaptive mode that the sleep deprived and possibly chronically fatigued shiftwork nurse would achieve physiological integrity. Through the cognator subsystem and the self-concept, interdependence and the role functions adaptive modes the nurse would find assistance through possible periods of depression and perceived feelings of a decreased quality of life, feelings of social isolation from family members, friends and professional colleagues, and personal feelings of worthlessness. The RAM provided the ideal framework to guide the sleep deprived and chronically fatigued shiftwork nurse to physiological, psychological, relational and social integrity.

Conclusion

This investigation sought to identify differences in the sleeping experiences of shiftwork nurses. The significance of poor sleep and shiftwork lies in past studies that identified substantial disturbances in the physical, mental and emotional health of shiftwork nurses.

According to past research, shiftwork nurses had a greater risk of adverse physical, mental and emotional outcomes that led to decreases in nurse and patient safety and to decreases in the quality of patient care. Past literature also indicated shiftwork nurses frequently felt socially isolated from family and friends leading to job dissatisfaction. All of these negative outcomes of shiftwork were linked to increased

nursing turnover rates and decreases in the ability to provide adequate healthcare services both now and in the future.

Results of this investigation revealed there were significant differences in this nursing population between shift worked and poor sleeping experiences. Evening shift nurses were identified as having the poorest sleep quality and night shift nurses the poorest sleep duration. While this investigation's results added positively to nursing research the issue of nursing health, safety, and job satisfaction still exists indicating a need for further research related to these variables. This concern must remain a top priority for nursing administrators, managers and educators in our country. With a looming shortage of nurses predicted in the near future we must make issues surrounding nursing health and job satisfaction a top priority now. Further studies are indicated that would continue the exploration of shiftwork in nursing and sleep concentrating not only on these variables but addressing the possible physical, mental and emotional consequences as well.

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APPENDIX A

Cover letter/Implied Consent

P. Doty

9 Emmy Lane

Platte City, MO. 64079

Date: January 25, 2011

Dear Licensed Nurse:

I am conducting an investigation to explore and compare the different sleeping experiences of licensed nurses working either the day shift, evenings, nights, or rotating shifts here at the VAMC in Leavenworth, Kansas. The purpose of this investigation is to identify which shift causes the greatest degree of sleep deprivation. Past research studies have implicated sleep deprivation as being a contributing factor to decreases in nurses' health, quality of life and job satisfaction. This investigation is also part of the requirements for the Master's degree in Nursing at Fort Hays State University Hays, KS. Would you please assist me with this investigation by completing the enclosed questionnaires? Your opinion and experience gained from you career as a licensed nurse is very important to me and to this investigation.

Participating in this investigation would be strictly voluntary on your part, and you could decide to withdraw at any time without fear of repercussions. The return of the research materials would imply your consent to participate. Discomforts caused by your participation, if any, would be minimal and might be related to a temporary accelerated emotional state possibly related to sleep deprivation. If you believe you have suffered any harm or adverse reactions by participating in this investigation, please call or write to the researcher or the researcher's major professor at the telephone numbers and/or web

addresses listed below.

In preparation for this investigation, approval was obtained to proceed through both the Fort Hays Ethics Review Board and the Veterans Administration Ethics Review Board. This process ensures that benefits of participation outweigh any risks. My hope is that you will feel comfortable filling out the questionnaires, but please note that any questions you feel uncomfortable answering simply omit. All research material acquired by the researcher during this investigation will be secured in a locked box at the researcher's home, and when the investigation concludes the material will be destroyed. The results of this investigation will be shared only in an aggregate manner. This process ensures your confidentiality. Please feel free to contact me at any time with questions or concerns related to participation in this investigation at (816) 431-5528 or by email padoty@scat.fhsu.edu. You may also contact my supervisory professor, Dr. Liane Connelly, Fort Hays State University (785) 628-4498 or by email lconnell@fhsu.edu.

The self-administered questionnaires used in this investigation are written in an easy to understand fashion and they are completely anonymous. You are not required to put your name or any other identifying information on either questionnaire. The researcher-created demographic tool should take less than five minutes to complete. The Pittsburgh Sleep Quality Index questionnaire, created by Dr. Daniel Buysse, Professor of Psychiatry and Clinical and Translational Science, University of Pittsburgh School of Medicine, is designed to measure sleeping experiences during the previous month. The measurement tool was created for use in the general public and takes approximately 15 minutes to complete. After completing the questionnaires please put them into the self-

addressed and stamped envelope provided in the research packets and drop them in the mail. All other research material may be discarded. This investigation will conclude on February 15th, 2011, so it is my hope that you will return your questionnaires to me by that time. Thank you in advance for your participation.

Sincerely,

Patricia A. Doty, BSN, RN, MSNc

APPENDIX B

Demographic Questionnaire & The Pittsburgh Sleep Quality Index

DEMOGRAPHIC QUESTIONNAIRE

(Omit any question you would rather not answer)

*Note: Per ethical considerations and for your comfort if you are less than 18 years old greater than 64 years old or are currently pregnant please refrain from participating in this investigation.

---

1. What is your gender? Male _____ Female _____
2. If female, are you pregnant? Yes _____ No _____
3. What is your age? Less than 18 years _____ 19-29 years _____
   30-40 years _____ 41-50 years _____ 51-60 years _____
   61-64 years _____ Greater than 65 years _____
4. What is your primary shift? Days only _____ Evenings only _____
   Nights only _____ Rotating Shifts _____
5. Which shift do you prefer to work? Days only _____ Evenings only _____
   Nights only _____ Rotating Shifts _____

PITTSBURGH SLEEP QUALITY INDEX

Instructions: Answers are based on your day or nighttime sleeping experiences during the previous month. Try to answer all questions, but any question that makes you uncomfortable simply omit.

---

1. During the past month, what time have you usually gone to bed? _____ Bed Time
2. During the past month, how long (in minutes) does it take for you to fall asleep each night? _____Number of Minutes

3. During the past month, what time have you usually gotten up in the morning?

   _____ Getting Up Time

4. During the past month, how many hours of actual sleep did you get each night? (This may be different than the number of hours you spent in bed).

   _____Hours of Sleep Each Night

(For each of the remaining questions, check the one best response)

5. During the past month, how often have you had trouble sleeping because you…

   (a) Cannot get to sleep within 30 minutes

   _____ Not during the past month _____ Less than once a week

   _____ Once or twice a week _____ Three or more times a week

   (b) Wake up in the middle of the night or early morning

   _____ Not during the past month _____ Less than once a week

   _____ Once or twice a week _____ Three or more times a week

   (c) Have to get up to use the bathroom

   _____ Not during the past month _____ Less than once a week

   _____ Once or twice a week _____ Three or more times a week

   (d) Cannot breathe comfortably

   _____Not during the past month _____ Less than once a week

   _____Once or twice a week _____ Three or more times a week

   (e) Cough or snore loudly

   _____ Not during the past month _____ Less than once a week

   _____ Once or twice a week _____ Three or more times a week

   (f) Feel too cold

   _____ Not during the past month _____Less than once a week

   _____ Once or twice a week _____ Three or more times a week

   (g) Feel too hot

   _____ Not during the past month _____ Less than once a week

   _____ Once or twice a week _____ Three or more times a week

(h) Had bad dreams

_____ Not during the past month _____ Less than once a week

_____ Once or twice a week _____ Three or more times a week

(i)Have pain

_____ Not during the past month _____ Less than once a week

_____ Once or twice a week _____ Three or more times a week

(j) Other reason(s), please describe _____

_____

How often during the past month have you had trouble sleeping because of this?

_____ Not during the past month _____ Less than once a week

_____ Once or twice a week _____ Three or more times a week

6. During the past month, how would you rate your sleep quality overall?

_____Very good _____Fairly good _____Fairly bed _____Very bad

7. During the past month, how often have you taken medicine to help you sleep (prescribed or over the counter)?

_____ Not during the past month _____ Less than once a week

_____ Once or twice a week _____ Three or more times a week

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

_____ Not during the past month _____ Less than once a week

_____ Once or twice a week _____ Three or more times a week

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

_____No problem at all _____ Only a very slight problem

_____Somewhat of a problem _____ A very big problem

APPENDIX C

Permission letter from Dr. Buysse (1989)

to use the Pittsburgh Sleep Quality Index Measurement Tool

Permission to use the PSQI

Dear Patricia,

You have my permission to use the PSQI for your research study. You can find the instrument, scoring instructions, the original article, and other useful information at www.sleep.pitt.edu<http://www.sleep.pitt.edu> under the Instruments tab. Please be sure to cite our 1989 paper in any publications that result. The bedpartner questions can be deleted without any problem.

Good luck with your research.

Sincerely,

Daniel J. Buysse, M.D.
Professor of Psychiatry and Clinical and Translational Science
University of Pittsburgh School of Medicine
E-1127 WPIC
3811 O'Hara St.
Pittsburgh, PA 15213
T: (412) 246-6413
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buyssedj@upmc.edu

APPENDIX D

Approval Letter from Fort Hays State University

Institutional Review Board to proceed with Investigation

FORT HAYS STATE UNIVERSITY

Forward thinking. World ready.

- Generated on IRBNet

OFFICE OF SCHOLARSHIP AND SPONSORED PROJECTS

DATE: November 5, 2010

TO: Patricia Doty, BSN

FROM: Fort Hays State University IRB

STUDY TITLE: [193685-1] Exploring the Sleeping Experiences of Shiftwork Nurses

IRB REFERENCE #: 11-023

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS

DECISION DATE: NOVEMBER 5, 2010

REVIEW CATEGORY: Exemption category # *2*

Thank you for your submission of New Project materials for this research study. The departmental human subjects research committee and/or the Fort Hays State University IRB/IRB Administrator has determined that this project is EXEMPT FROM IRB REVIEW according to federal regulations.

Please note that any changes to this study may result in a change in exempt status. Any changes must be submitted to the IRB for review prior to implementation. In the event of

a change, please follow the Instructions for Revisions at http://www.fhsu.edu/academic/gradschl/irb/.

The IRB administrator should be notified of adverse events or circumstances that meet the definition of unanticipated problems involving risks to subjects. See http://www.hhs.gov/ohrp/policy/AdvEvntGuid.htm.

We will put a copy of this correspondence on file in our office. Exempt studies are not subject to continuing review.

If you have any questions, please contact Leslie Paige at lpaige@fhsu.edu or 785-628-4349. Please include your study title and reference number in all correspondence with this office.