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Exploration of Fatigue in Second Year Nursing Students

By

Michelle Groundwater

A Thesis

Submitted to the Faculty of Graduate Studies
through the Faculty of Nursing
in Partial Fulfillment of the Requirements for
the Degree of Master of Science in Nursing
at the University of Windsor

Windsor, Ontario, Canada

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“Exploration of Fatigue in Second Year Nursing Students”

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May 7, 2014

DECLARATION OF ORIGINALITY

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ABSTRACT

The purpose of this descriptive study was to explore fatigue in second year nursing students at a university in southwestern Ontario. The study examined the perceptions of fatigue at the end of clinical consolidation in second year and the predictors of fatigue. A sample of 66 undergraduate nursing students completed a demographic questionnaire and the Occupational Fatigue Exhaustion Recovery (OFER) scale. Findings revealed that nursing students experienced moderate levels of fatigue with low inter-shift recovery. More than half of participants felt exhausted at work. The majority of participants reported having no energy left after a typical work period. Over half indicated they often felt fatigued from the end of one shift to the start of another. Student role demands and being a night person chronotype were predictors of fatigue. Further research is recommended to examine the impact of student nurse fatigue on patient safety, student nurse well-being and retention.

DEDICATION

To my family, friends and colleagues, thank you for supporting me in my educational endeavours. Your kind words, encouragement and willingness to help was very much appreciated.

To the students who participated in this study, thank-you for your interest in this study and your contribution to understanding fatigue in second year nursing students.

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CHAPTER 1

INTRODUCTION

Nurse fatigue is a growing concern in today's healthcare environment. This environment is a complex, dynamic system that encompasses long work hours, shiftwork, and increasing workload demands that contribute to nurse fatigue (Barker & Nussbaum, 2011; Winwood, Winefield & Lushington, 2006). These factors coupled with increased patient acuity, complexity of care, and high turnover rates are posing risks in the work environment that are jeopardizing patient safety and nurse well-being (Ellis, 2008).

An additional threat contributing to nurse fatigue is the occupational demands of unhealthy work environments and unsafe scheduling practices (Canadian Nurses Association [CNA] & Registered Nurses Association of Ontario [RNAO], 2010.,p. 5). Nurses who are fatigued and stressed are more likely to call in sick and express job dissatisfaction. Fatigue that persists without inter-shift recovery affects individual performance and can lead to sick leave and work disability (Leone et al., 2006). Physical and mental workload demands have been identified as affecting sleep quality and impairing recovery from overall work strain between shifts (Winwood & Lushington, 2006). Physical work demands can result in musculoskeletal injuries and mental work demands can contribute to cognitive and emotional impairments that result in increased fatigue by reducing sleep efficiency. Nurse fatigue can result in negative outcomes such as clinical errors, poor work performance, decreased mental acuity, social problems, and a personal lack of wellbeing (Dean et al., 2006; Scott et al., 2010; Kunert, King, & Kolkhorst, 2007). It can increase the risk of work related injuries (Olds & Clarke, 2010) and accidents while commuting home from work. In addition it threatens the ability to

perform required nursing interventions by decreasing concentration and alertness (Gaffney, 2007; McClelland, 2007), slowing reaction time (Gaffney, 2007; McClelland, 2007), decreasing accuracy on cognitive tasks (Baker & Nussbaum, 2011), and decreasing the ability to communicate effectively (Baker & Nussbaum, 2011; Schaffer, 2006).

Nurse fatigue has been discussed extensively in a myriad of literature sources and highlights the need for ongoing research to further understand the nature of fatigue and implications for clinical practice environments. Finding creative solutions to mitigate and manage fatigue that are adopted by nurses, educators, health administrators, and healthcare policy officials are of the utmost importance in promoting a healthy workplace environment (CNA &RNAO, 2010). One of these solutions involves exploring fatigue in nursing students, creating awareness and providing them with education prior to the start of their nursing career where exposure to fatigue is likely to occur.

There are many fatigue descriptions and definitions of fatigue in the scholarly literature. Fatigue has been described as multidimensional and influenced by physiological, psychological, behavioural and environmental factors (Campbell et al., 2011; CNA, 2010). A comprehensive definition of fatigue synthesized from the literature by CNA & RNAO (2010) defines nurse fatigue as:

A subjective feeling of tiredness (experienced by nurses) that is physically and mentally penetrative. It ranges from tiredness to exhaustion, creating an unrelenting overall condition that interferes with individuals' physical and cognitive ability to function to their normal capacity. It is multidimensional in both its causes and

manifestations. It is influenced by many factors: physiological (e.g. circadian rhythm), psychological (e.g. stress, alertness, sleepiness), behavioural (e.g. pattern of work, sleep habits) and environmental (e.g. work demand). Its experience involves some combination of features: physical (e.g. sleepiness) and psychological (e.g. compassion fatigue, emotional exhaustion). It may significantly interfere with function and may persist despite periods of rest (RNAO, 2010, p.1).

Background of Problem and Significance to Nursing

Several factors have been identified in the literature as impacting nurse fatigue. One factor is shift work. This factor has been associated with disturbed sleep patterns; poor sleep quality and sleep deprivation. According to Folkard and Tucker (2003), nurses working night shift and shift work in general experience alterations and disruptions in circadian rhythms which may exacerbate feelings of fatigue. Nurses working night shift often experience an overwhelming sense of fatigue at work and at home as they try to recover and reestablish a normal circadian rhythm (Akerstedt, 2003). Shiftwork has been associated with cognitive impairments and increases the risks of work-related injuries (Fransen et al., 2006).

Another factor placing nurses at risk of fatigue is long unpredictable shifts. Working long hours consecutively places a high physical and mental workload demand on the body and has been associated with increased fatigue, decreased performance, increased risk of work related injuries and increases in unhealthy behaviours (Trinkoff et al., 2006). There is an impact on the ability to critically think and make decisions which are imperative skills for practicing safely within the working environment (CNA&

RNAO, 2010). Nurses working overtime and unpredictable shift patterns are prone to getting caught up in an erratic cycle of nurse fatigue and exhaustion that is perpetuated by short staffing and increased absenteeism (Ellis, 2008). Staff nurses try to compensate, feeling strained to cover shifts when colleagues are absent in order to satisfy managers and help nursing colleagues when staff availability to work is limited; these work environments become hectic and unmanageable, and increase nurse fatigue (Ellis,2008). Common environmental factors that contribute to nurse fatigue are stress, increased workloads, understaffing, increased expectations from patients and families, high levels of patient acuity, unexpected emergencies, sensory overload, disorganization and change in the workplace (Campbell et al., 2011).

Patient safety is a topic of concern for all nurses who are dedicated to the provision of quality care in various practice settings. According to CNA& RNAO (2010),“patient safety is fundamental to nursing care and healthcare; it is not merely a mandate, it is a moral and ethical imperative in caring for others” (p.5). There is a strong link between nurse performance and patient safety (Geiger-Brown et al., 2004; Barker & Nussbaum, 2010). Nurse fatigue decreases motivation, vigilance and performance impacting the ability to safely provide quality patient care (Trinkoff, Geiger-Brown, Brady, Lipscombe & Muntaner, 2006). In the CNA and RNAO (2010) study (N=7000) , 55% of nurses reported they almost always felt tired at work, 80% always felt tired at the end of shift and nurses reported that fatigue interfered with the ability to make good judgments and sound decisions. Studies examining the relationship between fatigue and medical errors have determined that forgetfulness, slowed reaction time, diminished decision making, apathy, lethargy and impaired communication occur when nurses are

fatigued(Rogers, Hwang, Scott, Aiken & Dinges, 2004). Fatigue compromises patient safety and has been linked to medication errors in practice (Dorrian et al., 2008; Scott et al., 2010). The risk of medication errors is increased by three point four percent when nurses do not get six or more hours of sleep in the 24 hours preceding their shift (Agency for Healthcare Research and Quality, 2010). According to Statistics Canada (2005), one fifth of Canadian nurses acknowledge making mistakes in medicating patients occasionally or frequently.

The need to retain nurses has received attention in the recent literature as the predicted nursing shortage is a critical issue facing the future of healthcare delivery and fatigue has been known to impact retention. Known as the generation that “lives to work”, Baby Boomers are the largest generational cohort currently in practice (Wilson et al., 2008). Many experienced nurses of this generation plan to retire before the age of 65 adding to the stress of having adequate skilled staff in the clinical environment (Stephenson, 2004). Occupational turnover of nurses seems to be occurring much more frequently compared to other professions (Vander Heijden et al., 2007). The literature supports that a high turnover can have a significant impact on patient outcomes and nurse well-being (Hayes et al., 2006; Shields & Ward, 2001). Although stress and burnout have been identified as reasons for increased turnover rates, fatigue is an additional factor pushing nurses from the profession. In giving important consideration to high turnover and job dissatisfaction in nursing, it is imperative that organizations invest in a quality work environment that addresses fatigue to attract new recruits and retain experienced staff to prevent shortages that can be dangerous for patient care (Baumann et al., 2001). According to Murrells, Robinson, and Griffiths (2008), job satisfaction is an important

component of nurses' lives that can have an impact on patient safety, productivity and performance, quality of care, retention and turnover. In Australia, half of the nurses leaving the profession have reported the number one reason was due to stress and fatigue (Bachanan & Considine, 2002). Research looking at new graduate attrition has become more abundant given the predicted nursing shortage and increased turnover rates. A longitudinal study by Rudman et al. (2010), reported that 20% of newly graduated nurses in Sweden had intention to leave the profession and had taken measures to seek employment opportunities outside of the profession after one year of graduating. Reasons cited for leaving are poor working conditions, work-home life imbalances, and effort-reward imbalances leading to burnout. Younger nurses appear to be the largest group thinking about the intent to leave (Aiken et al., 2001; Rudman et al., 2010).

Student Nurse Fatigue Concerns

The education for Registered Nurses in Canada is currently a four year Bachelor of Science in Nursing degree program with a combination of theoretical and clinical practicum components. The second year of the program consists of a full time workload with theoretical courses and clinical rotations in various settings throughout the semesters. At the end of second year, the students attend a four week clinical consolidation period. This can involve some shiftwork and is the time when high demands may be placed on students to demonstrate the ability to successfully meet nursing practice competencies in preparation for graduation. According to Yonge, Myrick, & Haase (2002), student nurses experience more stress and burnout during their academic preparation than they do during the first year of employment. Students may be susceptible to fatigue and exhaustion during this time as they prepare themselves to

acquire new competencies for clinical mastery and continue to meet other academic requirements and life demands such as family/children, health maintenance, financial and social obligations (Goff, 2011). Student nurses overwhelmed by program expectations can experience anxiety that predisposes them to learning impediments and poor clinical performance (Melo, William, & Ross, 2010). Sleep patterns can change in attempts to meet social and academic demands, impacting sleep quality and quantity that affects health and well-being (Melo, Williams, & Ross, 2010). According to Lo (2002), maladaptive fatigue and poor recovery in nursing students became greater as they progressed through the nursing program. High levels of fatigue and low recovery were reported to be 12 to 15% among first year students and 19 to 22% among third year students respectively (Lo, 2002). Although there are research studies examining stress and retention in student nurses, there is a gap in the literature exploring student nurse fatigue.

Purpose of Study

The critical nature of nurse fatigue in the workplace environment has been well documented in the literature. Very little is known about fatigue experiences in student nurses. The purpose of this study was to explore student nurse fatigue in second year nursing students at a university in southwestern Ontario.

Research Questions

The purpose of this study was to answer to the following research questions:

1. What is the perception of levels of acute fatigue, chronic fatigue and fatigue recovery in second year nursing students at the end of second year?

2. What are the predictors of fatigue in second year nursing students?
3. Is there a difference between fatigue levels of second year nursing students attending hospital and community clinical placements by gender, age, number of children, family responsibilities, partner status, living arrangements, employment hours, student role demands, clinical placement setting, shift length and type?

Conceptual Framework

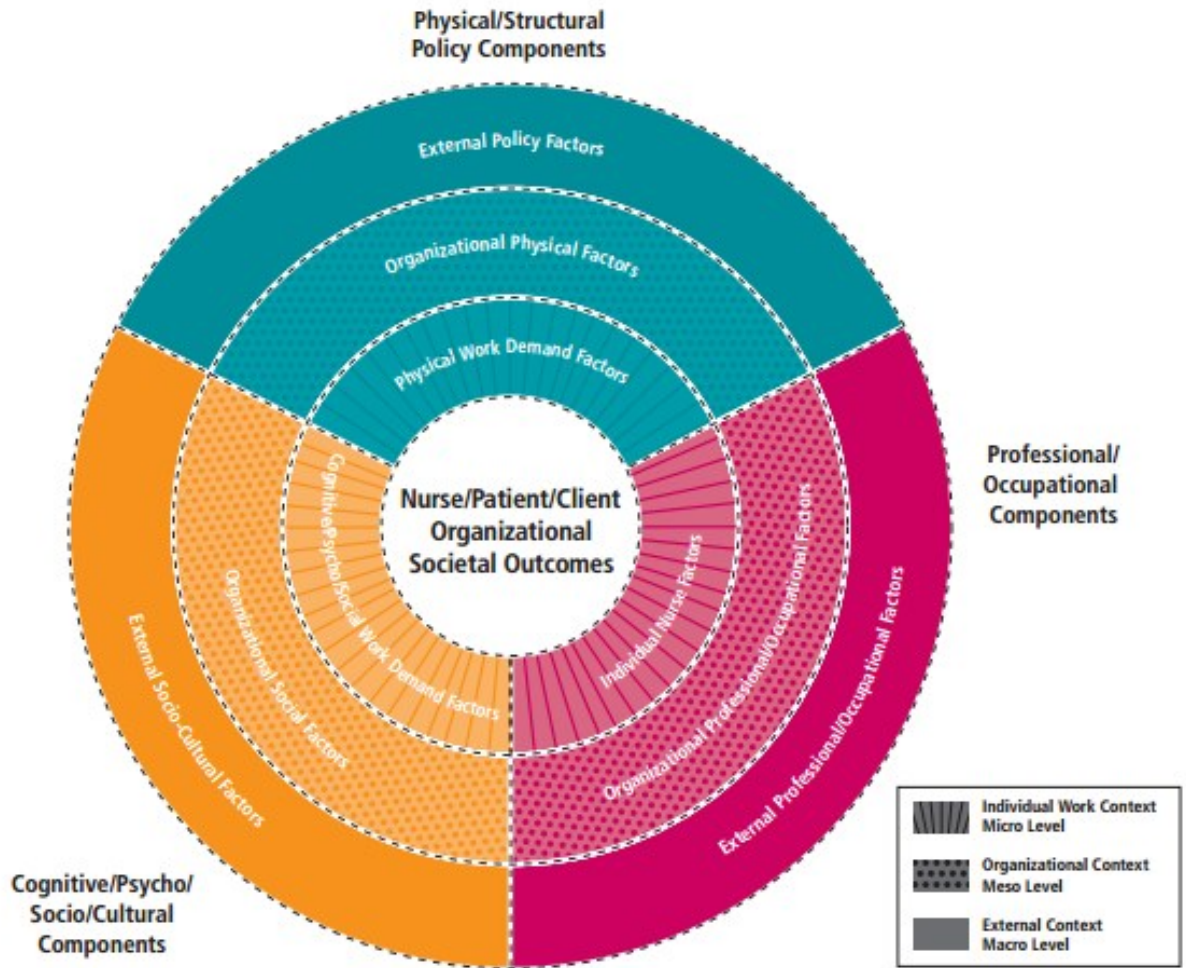
The Conceptual Model for Healthy Work Environment for Nurses (HWEN) was selected as the framework for this study. The HWEN was started in 2003 by the RNAO, with funding from the Ontario Ministry of Health and Long-Term Care (MOHLTC) to promote healthy workplaces for nurses and support patient safety. A healthy work environment was defined as “a practice setting that maximizes the health and well-being of nurses, quality client outcomes, organizational performance, and societal outcomes” (RNAO, 2006.p.15). The RNAO (2006) found a number of studies that have shown strong links between nurse staffing and adverse client outcomes and identified that the creation of HWEN would require transformational change. Six foundational evidence-based guidelines were developed to create healthy work environments for nurses. A more recent HWEN guideline was developed specifically focusing on fatigue (RNAO, 2011).

The conceptual model HWEN (see figure 1) depicts the relationship that exists between the nurse and healthy work environments and encompasses all practice settings (RNAO, 2006). It is comprehensive and multidimensional to guide the development, implementation and evaluation of a systems approach to enhancing the work environments of nurses (RNAO, 2006, p.12). Healthy work environments for nurses are considered to be practice settings that maximize the health and well-being of the nurse

and ensure quality outcomes for its beneficiaries. The model suggests that an individual's functioning is mediated and influenced by interactions between the individual and his or her environment (RNAO, 2006. p.13).

The physical/structural components, cognitive/psycho-social/cultural components, and professional/occupational components are the three dimensions within the model that illustrate the interactions between the nurse and the environment.

Figure 1. Conceptual Model for Healthy Work Environments for Nurses



(Registered Nurses Association of Ontario, 2006)

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In the conceptual model, a healthy workplace is the product of interdependence among the individual (micro level), the organization (meso level), and the external (macro level) system determinants (RNAO, 2006, p.13) and is depicted in the three outer circles of the model. The core of the circles represents the beneficiaries of healthy work environments for nurses and includes nurses, patients/clients, organizations and systems, and society at large with the inclusion of healthier communities. Dotted lines within the circles indicate the synergistic interactions among all levels and components of the model (RNAO, 2006, p.13).

For the purposes of this study, only the individual (micro) level of the model that includes physical work demands and individual nurse factors were utilized to guide the exploration of student nurse fatigue in the work environments. Specific fatigue states that were explored include acute fatigue, chronic fatigue and inter-shift recovery (Winwood, Winefield, Dawson & Lushington, 2005).

Physical work demands are requirements that necessitate physical capabilities and effort on the part of the nurse and include workload, changing schedules and shifts, heavy lifting, exposure to hazardous and infectious substances and threats to personal safety (RNAO, 2006. p.14). Individual nurse factors are the personal attributes and acquired skills and knowledge of the nurse that determine how he or she responds to physical, cognitive and psychosocial demands of work. These factors include commitment to patient care, the organization and the profession, personal values and ethics, psychosocial demands, adaptability and self-confidence, reflective practice and family work life balance (RNAO, 2006. p. 16). As identified in the literature, physical work demands and

individual nurse factors impact nurse fatigue and are antecedents of fatigue (Lasseter, 2009).

The work environments for nursing students are similar to nurses because they both experience the same work demands in the clinical area including heavy workloads, demanding work schedules, limited resources, and exposure to heavy physical tasks and infectious agents that put them at risk for fatigue. Individual factors that impact student nurse fatigue include competing demands with family, work and school responsibilities (Cavanagh & Snape, 1997; Timmins & Kaliszer, 2002), individual personality traits and ineffective coping (Deary, Watson, & Hogston, 2003).

In addition, nursing students are responsible for meeting academic requirements. Increased workloads from theoretical course requirements such as complex assignments and tests and the amount of class contact hours enhance the overall environmental demands placed on them. Furthermore, academic pressures, clinical expectations and caring for patients that are suffering or dying have been identified as additional mental demands for student nurses (Rhead, 1995). Academic preparation and workload that includes theory, assignments and examinations were considerable stressors for students as were financial constraints and the need for paid work (Cavanagh & Snape, 1997; Timmins & Kaliszer, 2002).

CHAPTER 2

LITERATURE REVIEW

Search Strategy

A review of the literature was completed by searching databases including Cumulative Index to Nursing and Allied Health Literature (CINAHL), Pub Med, Medline and Pro Quest Nursing and Allied Health Source. A combination of key search terms “student nurse”, “student”, “nurse”, “fatigue”, “safety”, “retention”, “stressors” and “environmental demands” were used when reviewing electronic literature indexes and journals. A Google search was also performed using the terms student nurse fatigue, student fatigue, and nurse fatigue. Ancestral searching was used to review relevant references for this study.

To be eligible for inclusion, the studies had to be written in the English language and published after 1995. Studies were included if they focused on fatigue in nursing students or fatigue in nurses and included the following: factors relating to nurse fatigue (work/school schedules, work/school demands, sleep quality and deprivation) and significance or impact of fatigue on others (patient safety concerns, well-being of nurses’ and nursing students, and job satisfaction/turnover issues). Studies were excluded if they focused on compassion fatigue or fatigue in patients.

The searching of multiple databases produced various results. Initial searches yielded (N= 3378) a large number of studies including peer-reviewed journal articles, dissertations, professional reports and websites. After giving consideration to inclusion and exclusion criteria, abstracts were reviewed for applicable studies and duplication. A

total of 125 literature sources were reviewed and considered applicable for this study. Studies focusing on stress-related factors in nursing students were reviewed as fatigue and stress were frequently discussed together in the literature.

Fatigue Descriptions in the Literature

A concept analysis of fatigue (Ream & Richardson, 1996) identified a multitude of descriptions, causes and consequences related to the multidimensional concept of fatigue. Lasseter (2009) describes fatigue as a universal experience that is unique to the individual who experiences the phenomenon. Ream and Richardson (1996) describe four critical elements from the medical and nursing literature that are evident in defining fatigue. “Fatigue is: a total body feeling and experience, encompassing physical, cognitive and emotional dimensions; an odious and unpleasant experience which causes distress; a chronic unrelenting phenomenon and a subjective experience dependent upon an individual’s perceptions” (p. 524). Fatigue is also defined in the context of a noun and a verb using terms such as tiredness, weariness, weakness, exhaustion, debilitating, no energy, to wilt and to lag are synonymous with fatigue (Ream & Richardson, 1996). Antecedents of fatigue included poor or inadequate sleep, prolonged stress, anxiety, depression, pain, lack of nutrients, anemia, fever, underlying disease, medications, female gender, advanced age, environmental factors and life events (Lasseter, 2009).

The relationship between fatigue and stress was discussed in terms of their common causes, presentation and impact on individual function. Both terms are considered multidimensional, subjective, and are impacted by environmental demands or stressors; “anything that causes wear and tear on the body’s physical or mental resources”

(Mosby's, 2009. p.1767). Fatigue is considered to be a subjective response to internal or external demands that exceeds personal resources for coping with those demands (Lee, Lentz, Taylor, Mitchell, & Woods, 1994). According to Rella, Winwood, and Lushington (2008) p. 887, “ we regard fatigue and stress to be closely related as fatigue and the requirement to continue working when fatigued is stressful and exposure to enduring stress is fatiguing”.

According to Tiesinga, Dassen, Halfens and van den Heuvel (2001), the intensity of fatigue is reflected on a continuum and begins with a normal experience of tiredness leading to fatigue then to exhaustion. Distinctions between acute and chronic fatigue suggest that acute fatigue is short lived and relieved by adequate sleep, rest and relaxation (Lasseter, 2009). Chronic fatigue is long term, not easily relieved and has a profound negative effect on the individual's quality of life (Lasseter, 2009).). Ruggiero (2003) suggests fatigue serves as an indicator of an individual's response to physical and psychological demands and is a protective measure when an individual has decreased capacity to maintain function.

Causes of Fatigue

Shiftwork.

The effect of shiftwork contributing to fatigue is discussed extensively throughout the literature of various work industries. A study conducted by Winwood, Winefield and Lushington (2006) in two South Australian hospitals examined the relationship between age, domestic responsibilities, recovery from shiftwork-related fatigue and the evolution of maladaptive health outcomes among full time working female nurses. The sample was

composed of female hospital nurses (N=846) working full time. The Occupational Fatigue Exhaustion Recovery (OFER) Scale was used to measure fatigue. Results indicated that nurses regularly working a rotation of shifts including night duty had the highest level of shiftwork stress which was associated with higher acute work-related fatigue, poorer inter-shift recovery and higher maladaptive health outcomes. Chronic fatigue tended to be higher in unpartnered nurses with dependents. Younger nurses reported the highest acute and chronic fatigue scores and the lowest recovery in comparison to nurses in the older age group.

According to Muecke (2005), insufficient restorative daytime sleep and inadequate recovery time from night work contributes to sleep deprivation and may have a significant impact on the nurses' ability to provide quality patient care and maintain optimal health states for themselves. The effects of rotating night shifts are substantial when addressing the issues of patient and nurse safety. Physiological effects of sleep deprivation were noted when there is a disruption in circadian rhythms or the sleep wake cycle, normal body rhythms are interrupted and the need for sleep is extremely desired. Perkin (2001) reports cardiovascular, hemodynamic, digestive and reproductive functions are negatively impacted with the accumulation of sleep debt found in rotational shift workers. Nurses working permanent night shift are less prone to these effects. Nurses working a rotational night shift pattern have psychological effects with the potential to experience irritability and strain that can disrupt family and social life, thereby impacting job satisfaction and intent to leave (Lushington, Lushington, & Dawson, 1997). The disruption of circadian rhythms associated with shiftwork has been shown to affect performance and can result in slowed reaction time, delayed responses, giving false

responses and causing slowed thinking with diminished memory (Reid, Roberts & Dawson, 1997). Dawson and Reid (1997) report that fatigue associated with 24 hour sleep deprivation can result in performance comparable to individuals with blood alcohol levels of 0.10%. In a study by Scott et al., (2007) involving 895 US nurses, two-thirds reported at least one drowsy driving episode and 30 nurses reported drowsy driving after every shift. Nurses are likely to be drowsy when driving if they have reduced sleep, work nights, or have struggles to remain awake at work (Scott et al., 2007). Scientific evidence clearly identifies that shiftwork is a workplace hazard (Dawson & Reid, 1997; Baker, Roberts & Dawson, 1997).

Using the Maastricht Cohort Study data, Swaen and colleagues (2003) sought to determine if prolonged fatigue and inadequate recovery were precursors to occupational accidents. Results demonstrated that shift workers including those working night duty experienced an increase in workplace accidents and participants working night shift were three times more likely to be injured in a work-related accident compared to day shift workers (Swaen, et al., 2003).

Overtime hours.

Fatigue is evident in nurses working overtime and long hours consecutively. A study by Estry-Behar, Van der Heijden, and the NEXT Study Group (2012) examined the effects of extended work shifts on employee fatigue, health, satisfaction and patient safety using a secondary analysis. The sample (N= 25,924) involved nurses from hospitals, nursing homes and home care agencies. Results suggested that nurses working alternating shifts and 10 hour shifts at night report more difficulty with their private and

family life. Nurses working 12 hour alternating day and night shifts report they often do not know what a patient or family ought to be told, they worry about making mistakes, report low quality teamwork with high physical demands and experience more job interruptions and disturbances (Estry-Behar, Van der Heijden & NEXT Study Group, 2012). Nurses report dissatisfaction with working time in relation to their well-being when working 12 hour shifts during the day, 10 hour shifts at night or alternating shifts. Nurses working 10 or 12 hour shifts during the day, 12 hour shifts at night and alternating shifts often feel more tired and have frequently a higher burnout score. The work ability index score is more frequently lower in nurses working 12 hour shifts during the day and alternating shifts < 6 nights and during periods of work, have poorer quality and quantity of sleep (Estry-Behar, VanderHeijden, Next Study Group, 2012). Other results suggest that working extended shifts decreases the ability to work and is the greatest risk factor for fatigue and burnout (Estry-Behar, Van der Heijden, & the NEXT Study Group, 2012).

Another recent study by Dorrian et al. (2008) consisting of (N= 41) Australian hospital nurses, investigated the relationship between work hours, sleep, safety at work and while travelling home. Daily log recordings over a one month period of their scheduled and actual work hours sleep length and quality, sleepiness and fatigue levels were obtained. Participants completed a demographic questionnaire and general health/sleepiness questionnaire. Nurses in the sample worked between 32 to 46 hours per week with an average of 8.4 minutes per shift longer than scheduled hours and minimal overtime. Results found that participating nurses reported disrupted sleep on 25.9% of days including work days and days off and 14.8% of these sleep disruptions were due to

work-related concerns. Problems falling asleep and waking too early were reported on approximately one-third of workdays. Moderate to high levels of stress, physical exhaustion and mental exhaustion were reported. Participants reported 70 occasions of extreme drowsiness when driving or cycling home with seven near accidents. Overall 38 errors, 38 near errors and 65 observed errors were recorded. The authors noted that although the majority of errors were perceived to have minor consequences, one-third was perceived to be moderate or severe (Dorrian et al., 2008).

Outcomes of Fatigue

Patient Safety.

A key study looking at the impact of fatigue on patient safety was completed by Scott, Rogers, Hwang, and Zhang (2006) who aimed to describe work patterns of critical care nurses and determine if there was an association between the occurrence of errors and the hours worked by nurses and explore whether these work hours had adverse effects on vigilance. A total of (N=502) nurses provided data for the study by using logbooks to collect information about hours worked, the time of day worked, overtime hours, day off and sleep wake patterns during a 28 day period. Participants answered work-related questions on the days worked and were instructed to document any errors or near errors that occurred. On days off, participants completed questions on the sleep wake patterns, mood, and caffeine intake. Significant findings indicate that study participants left work at the end of their scheduled work period just 13% of the time. Almost two thirds of the participants struggled to stay awake at least once during their shift. More than one quarter of nurses made at least one near error during the study period

and the risk of making an error almost doubled when nurses worked 12.5 hours or more consecutive hours. Working more than 40 hours per week increased both errors and near errors. Extended work shifts are associated with decreased levels of alertness (vigilance). Contrary to expectations, no association between decreased vigilance and increased risk of errors were found (Scott et al., 2006).

A survey of 19,000 Canadian nurses by Statistics Canada (2005) indicated that 22% of nurses working overtime reported making a medication error compared to 14% of nurses who did not work overtime. Further, Canadian nurses working overtime and where staffing or resources were stretched were more likely to report that a patient had received the wrong medication or dose and these nurses acknowledged making mistakes in medicating patients occasionally or frequently (Statistics Canada, 2005).

Alarming results were found in a study by Rogers, Hwang, Scott, Aiken and Dinges (2004) who examined the work patterns of hospital staff nurses to determine the relationship between hours worked and the frequency of errors. They found that nurses worked longer hours than scheduled on a daily basis and generally worked more than forty hours per week. During the study period, nurses reported leaving work at the end of their scheduled shift less than 20% of the time. Nurses reported 199 errors and 213 near errors with medication administration practices involving 58% of the errors and 56% of the near errors. The chance for making an error increased with long working hours and was three times higher when nurses worked shifts lasting 12.5 hours or more (Rogers et al., 2004).

According to Olds and Clarke (2010), nurses' working an additional three hour period per week past 40 hours was associated with an average increase of three percent for reported wrong medication administration errors and needle stick injuries. A systematic review by Wagstaff and Sigstad (2011) concluded that working greater than 8 hours places an individual at increased risk of accidents and that with a cumulative effect, working greater than 12 hours is twice the risk. Trinkoff and colleagues (2007) reported in their study that many schedule variables including hours worked per day, weekends worked per month, working shifts, and working more than 13 hours per day were significantly associated with the occurrence of both incident needlestick injuries and needlestick injuries in the past year.

Nurse Well-being.

Considering the nature of current work environments of nurses, fatigue and its impact on performance affecting nurses' health has been well documented in the literature. Barker and Nussbaum (2011) conducted a study of (N=745) registered nurses to quantify the perceived states of fatigue present and to investigate the relationship between perceived fatigue and perceived performance and to identify differences in perceived fatigue levels and dimensions across demographic and environmental variables. Five survey instruments were compiled to form a Fatigue in Nursing Survey Set (FNSS). More than one-third (38%) of the participants reported working greater than 40 hours per week at their nursing job, with over half (57.7%) working greater than 11 hours per shift on average. Results indicated that nurses reported high levels of mental and physical fatigue with total fatigue levels being the highest. Participants perceived mental fatigue to be higher than physical fatigue and reported higher levels of mental

fatigue over the course of an 8 hour shift in comparison to physical fatigue. Fatigue levels were significantly different between levels of demographic and environment variables. Nurses who reported higher physical exertion levels also reported higher levels of physical discomfort. This can be considered an important finding since occupational injuries and overexertion are frequently reported in this group. Participants who worked greater than 60 hours per week had higher physical exertion and physical discomfort levels than those working greater than 40 hours per week. Mental fatigue measures were strongly correlated with nurse performance instruments relating to changes in concentration, mood and mental energy and also for implications regarding patient monitoring, medication administration and documentation tasks. Longer shift lengths and increased hours worked per week were associated with increases in physical and total fatigue levels (Barker & Nussbaum, 2011).

Another concern impacting the well-being of nurses is the need to be absent from work as a result of stress and fatigue from work overload. In a quantitative study by Zboril-Benson (2002), Canadian nurses in the province of Saskatchewan were asked about reasons for work absence. A total of 450 respondents indicated that they had seriously considered leaving the nursing profession, with 50.4% citing fatigue, stress and overwork as the primary reasons. Higher rates of absenteeism were found to be associated with lower job satisfaction, longer shifts, working in acute care and working full-time (Zboril-Benson, 2002).

Retention of Registered Nurses.

Job satisfaction and the desire to remain in the nursing profession or one's current position can be determined by a multitude of factors related to the work environment of nurses such as staffing levels, work schedules, working conditions, voice in decision making, salary and benefits, advancement and educational opportunities and relationships with colleagues and managers. Ruggiero (2005) explored relationships and the relative contributions of selected work, shift work and demographic variables on job satisfaction in a nationwide sample of (N=247) critical care nurses. Results suggested that factors related to job satisfaction are global sleep quality, depression, emotional stress and scheduling practices including the number of weekends off per month were important.

Lavoie-Tremblay, O'Brien-Pallas, Gelinas, Desforjes and Marchionni (2008) aimed to investigate the relationship between dimensions of the psychosocial work environment and the intent to quit among a new generation of nurses. A convenience sample of (N=309) nurses under the age of 24 years completed a self-administered questionnaire designed to measure the social and psychosocial characteristics of the job. The results revealed that 61.5% of nurses intended to quit their present job for another job in nursing and 12.9% intended to pursue other career options outside of the nursing profession. Reasons for quitting their current position included difficult and exhausting working conditions. Half of the participants reported a high psychological demand and more than half reported low decision latitude and an effort/reward imbalance.

According to Aiken et al. (2001), hospitals are facing serious challenges to providing care that is of consistent high quality in a rapidly changing and uncertain

environment (p.43). Their paper presented reports from (N= 43,000) nurses from more than 700 hospitals in the United States, Canada, England, Scotland, and Germany in 1998 to 1999. Results indicated that high proportions of registered nurses in all countries studied except Germany were dissatisfied with their jobs. The majority of U.S. and Canadian nurses reported that the numbers of patients assigned to them had increased in the past year and that nurse manager positions had been eliminated. Findings from this study imply that increased workloads can limit necessary time spent on direct patient care (Aiken et al., 2001). In United States and Canada, only one-third of nurses rated quality of care as excellent and felt confident that their patients were adequately prepared to go home upon discharge, and nearly half of them believed that the quality of care in their institutions had deteriorated in the past year. Nurses from the United States and Canada were considerably more likely to report that medication errors and patient falls had occurred within the preceding year. Occurrences of patient and family complaints and verbal abuse directed towards them were also reported (Aiken et al., 2001). Nursing fatigue, burnout and threats to patient safety in current practice environments can negatively impact nurses' job satisfaction and the desire to remain in their nursing positions and the nursing profession.

Fatigue and Nursing Students

Although studies pertaining to student nurse fatigue are limited, a study by Rella, Winwood and Lushington (2008), measuring fatigue in nursing students, demonstrates that it is likely an issue for them as well. The study aimed to investigate the chronic maladaptive fatigue evolution among a large (N=431) group of Australian Bachelor of Nursing (BN) degree students. The study consisted of a cross-sectional questionnaire

design and the OFER scale was used to measure acute and chronic fatigue experiences and recovery between work shifts. The Nottingham Health Profile (NHP) consisted of six “standalone” subscales. The “Emotional Health and Sleep” subscales were included for reporting associations of experiences of fatigue and recovery. Participants were asked to answer 14 questions from the Experience and Evaluation of Work Questionnaire to determine to what extent participants perceived certain factors in their clinical placements contributed to stress/tiredness/fatigue. Results indicated that 38% of participants indicated they seriously considered abandoning the course before completion and 35% indicated that fatigue was a very significant/complete reason for considering quitting (Rella, Winwood, & Lushington, 2008). There was a significant difference in the chronic fatigue scores for the three student year groups with third year students reporting higher chronic fatigue scores than first year students. Students who reported the need to have paid work during their student years had a greater report of high fatigue and poor recovery. Overall, this study indicated that a significant portion of nursing graduates leave the end of university training in a dangerously fatigued state.

CHAPTER 3

METHODOLOGY

Research design

Quantitative research was conducted using a non-experimental descriptive research design. The study explored second year nursing students' fatigue during their final clinical consolidation course in either hospital or community settings. The purpose of a descriptive research design is to provide a picture of situations as they naturally happen and to provide information about the characteristics within a particular field of study (Burns & Grove, 2009).

Sample and setting.

The target population was Bachelor of Science in Nursing (BScN) students attending a university in southwestern Ontario; currently enrolled as a full time student and attending their second year clinical consolidation in hospital or community settings. Students were included if they were in their second year of the program and if they were a full time student. Second year Nursing Students from collaborative partner sites (e.g., Colleges) were excluded. All full time second year BScN students were considered potential applicants and were asked if they wished to participate.

Participants were recruited by having the investigator attend various clinical placement settings of the 105 nursing students enrolled in the clinical consolidation and requested their voluntary participation in this study. The investigator requested permission from the clinical instructors in advance to attend the clinical placement settings for 10 to 15 minutes to explain the study and have participants complete the

survey at the end of the clinical day during post conference. The survey took approximately 10 to 15 minutes to complete.

A convenience sample was used in this study to obtain information about the nature of student nurse fatigue during second year including the clinical consolidation period. According to Burns & Grove (2009. p. 354), convenience sampling enables the researcher to acquire information in unexplored areas and allows studies to be conducted on topics that could not be examined through the use of probability samples.

Ethical Considerations

Approval for the study was granted from the Research Ethics Board at the University of Windsor. Verbal permission was obtained from the clinical instructors to attend clinical placement settings for data collection. Written consent was obtained from students who wished to participate in the study.

Participants were informed that there would be no risks or direct benefits to them associated with their participation. Participants were advised that responses to the survey would be anonymous and confidential and that they would be free to withdraw at any point during the survey. As a token of appreciation for participation, all participants' names with email address were entered into a draw for one of four fifty dollar gift cards to a local restaurant. The students filled out a ballot with their name and email address that was placed in a separate brown envelope. The draw took place one week after the surveys had been completed. Students were notified by email that their name was drawn and that they could pick up their gift card at the University of Windsor nursing office. Data was coded and stored for analysis in a locked cupboard, accessible to only the

investigator and research committee. Files for performing data analysis were stored on a password protected computer.

Data Collection

Collection of the data for this study took place in May 2013 during the final week of clinical consolidation. The instruments used in this study consisted of a demographic survey that captured personal characteristics and fatigue-related data and the Occupational Fatigue Exhaustion Recovery (OFER) Scale that measured work-related fatigue (Winwood, Winefield, Dawson, & Lushington, 2005). This scale has been used to study work-related fatigue in shift workers (nurses) from healthcare sectors and is suggested to be a valuable screening instrument in primary care (Winwood, Lushington, & Winefield, 2006).

Instruments.

The demographic questionnaire used in this study was developed by the author to gather personal information about age (in years), gender (male or female), dependents (children and aging parents), partner status (partnered or unpartnered) and living arrangements (alone or with others).

Other fatigue-related variables that were studied included: work hours outside of school, shift length (hours), the type of clinical setting where students completed clinical hours. Students were asked to identify whether they were more alert and less tired during specific times of the day (morning, evening, night). Students were asked to rate their role demands on a scale of 0 to 10 with 0 being no demands and 10 being very high demands. The responses were then categorized into low (1 to 3), moderate (4 to 6), and high (7 to

10). A question was asked about the measures used to alleviate fatigue (e.g., exercise, caffeine, energy drinks, rest breaks). Students were asked to check all that apply and list others applicable to them. The survey provided a comment section, allowing for qualitative open ended feedback about student nurse fatigue.

In keeping consistent with the fatigue definitions used in the Occupational Fatigue Exhaustion Recovery Scale measurement tool (Winwood, Winefield, Dawson, Lushington et al., 2005), this study will refer to these definitions to describe study variables of fatigue, chronic fatigue, acute fatigue, and inter-shift recovery. Fatigue is defined as “a subjective paradigm with measurable effects, even if the underlying psycho/physiological processes remain to be fully described” (Winwood et al., 2005. p.595). Chronic fatigue is defined as “an enduring trait characterized by inefficient action patterns; declining interest, involvement and commitment; reduced concentration and motivation; and negative emotions” (Winwood et al., 2005. p.596). Acute fatigue is defined as “the depletion of available energy by work activity that produces consistent changes in the ability to engage self-chosen nonessential tasks in non-work time” (Windwood et al., 2005. p.596). Inter-shift recovery is defined as “the non-work period between works shifts where the majority of recovery from work-related fatigue occurs” (Windwood et al., 2005. p.595).

Permission to use the Occupational Fatigue Exhaustion Recovery (OFER) Scale (Winwood, Lushington, & Winefield, 2006) was obtained from the author. This 15 item scale was used to determine and distinguish between levels of fatigue and recovery through subscale questions measuring acute fatigue (OFER-AF), chronic fatigue (OFER-CF) and recovery between shifts (OFER-IR). Each item consisted of a six-point Likert

scale from 0 to 6 that measured responses with 0 indicating strongly disagree and 6 strongly agree.

The OFER scale is considered to possess robust, gender-bias free psychometric characteristics and has been developed and validated in three study populations specifically measuring work-related fatigue (Winwood, Winefield, Dawson, & Lushington, 2005. p. 594). The reliability coefficients for each of the three subscales range are OFER-CF.89, OFER-AF .84 and OFER-IR .84 respectively, indicating satisfactory internal reliability. According to Burns & Grove (2009), a reliability coefficient for a well-developed psychosocial measurement tool should be above .80 to be considered acceptable. In development and validation of the OFER scale, a 0-6 scale was chosen to expedite the computation of subscale scores as a comparable quotient between 0 and 100 by the formula $[\text{sum (scale scores)} / (\text{n items in scale} \times 6)] \times 100$ (Windwood, et al, 2005. p. 596).

Data Analysis

Quantitative analysis was performed using the Statistical Package for the Social Sciences (SPSS) 22 software program (Burns & Grove, 2009). Data analysis procedures for this study began with data preparation including data cleaning, identifying missing data and data transformation (Burns & Grove, 2009).

Descriptive statistics were used to analyze sample characteristics such as the distribution and frequencies of nominal and ordinal variables which included gender, age, having children, responsibilities at home, relationship status, and living arrangements. Frequencies of other fatigue-related variables were analyzed which included work hours

outside of school, clinical placement setting and unit, shift length and type, demands in student role, type of person chronotype and measures used to alleviate fatigue.

Qualitative open ended comments were analyzed and grouped into themes (Burns & Grove, 2009).

Individual fatigue-related items in the OFER scale were analyzed for the frequency of responses. The likert scale was collapsed into three categories (disagree, neither, agree) for an alternative way of displaying the data simplistically and providing clarity about the perception of fatigue. The frequency of responses for each category in the OFER scale are presented in Table 2 and illustrates the perception of fatigue according to how each item is specifically reported.

The means and standard deviations for continuous variables in the OFER scale were analyzed. Standard multiple regression analysis was used to perform an exploration of the relationship between the continuous dependent variable fatigue and a number of independent variables or predictors such as gender, age, relationship status, responsibilities, work hours outside of school, clinical setting, shift length, type of person and student role demands (Pallant, 2010).

In preparation for analysis, fatigue-related variables with more than two categories were dummy coded for inclusion into the regression model (Fox-Wasylyshyn & El-Masri, 2005). The recoded independent variables included clinical setting, work hours outside of school, and type of person. Variables that had a response rate variability of less than 10% were excluded from the analysis in an effort to prevent inflation of the variable

during analysis. According to Tabachnick and Fidell (2007), dichotomous variables with uneven splits (e.g. greater than 90:10) should be removed from the analysis.

CHAPTER 4

FINDINGS

Data Screening

Prior to the analysis, all data were explored for missingness. The missing data were imputed; a technique that involves replacing missing data with estimates that are based on the values of other variables in the data set to retain sample size and minimizing attenuation of statistical power (Fox-Wasylyshyn & El-Masri, 2005). For categorical variables, the missing data were replaced by the most frequently reported sample value known as the mode (Fox-Wasylyshyn & El-Masri, 2005). Data missing for continuous variables were imputed as substitution of the mean (Fox-Wasylyshyn & El-Masri, 2005).

The mean OFER scores were explored for normality of distribution. A histogram was constructed and demonstrated normal distribution. The construction of a box-plot revealed three outliers as these scores were more than three inter-quartile ranges from the edges of the box (Tabachnick & Fidell, 2007). These three outliers were brought to the nearest acceptable case which resulted in a normal distribution of all data with no evidence of skewness or kurtosis statistics (Tabachnick & Fidell, 2007). The assumptions of normality, linearity and homoscedasticity were examined as part of the multiple regression analysis process (Pallant, 2010). G*Power 3.1 analysis was used to calculate the required sample size for this study (Faul, Erdfelder, Buchner, & Lang, 2009). The output revealed that the recommended sample size should consist of 61 participants for the provision of optimal analysis results (Faul, Erdfelder, Buchner & Lang, 2009).

Sample Characteristics and Demographics

This study had a response rate of 63% (N=66). Table 1 provides an overview of the sample characteristics and demographic results. The study sample consisted of 66 (100%) second year BScN student participants, with 85% (n=56) being female. The age of participants varied, with the majority being 19 to 20 years of age (76%; n=50). Most participants had no children (96%; n=63); four percent (n=3) had children with one or two children reported. Only 11% (n=7) of participants indicated that they had other responsibilities for caring for an ill or aging relative. Sixty-two percent of participants were unpartnered (n=41) and thirty-eight percent were partnered (n=25). The majority of participants (97%; n=64) reported living with others, while only three percent (n=2) lived alone. Almost three quarters (71%; n=47) reported that they worked outside of school. The number of hours worked per week was closely split with 26% (n=17) working 4-15 hours, 26% (n=17) working 16-24 hours and 20% (n=13) working 25-40 hours. All participants (100%; n=66) worked day shift during their scheduled clinical hours with two thirds (70%; n=46) working 12 hour shifts while the remainder (30%; n=20) worked 8 hour shifts. Almost half did their clinical shift hours on the hospital obstetrics unit (47%; n=31), followed by hospital medical-surgical unit (24%; n=16) and the hospital pediatrics unit (20%; n=13). Only nine percent (n=6) of the participants did their clinical hours in a community setting. Half of the participants identified themselves as being a morning person (50%; n=33), a third an evening person (35%; n=23) and 15% a night person (n=10). The majority (89.4%; n=59) rated the demands of their student role as high, with nine percent identifying the demands as moderate demands (n=6) and one student reporting low demands.

Each participant reported that they used multiple measures to alleviate fatigue including rest breaks (79%; n=52), caffeine (70%; n=46), exercise (38%; n=25), energy drinks or energy pills (14%; n=9) and other (26%; n=17). Other measures identified in the other category were: listening to music, watching television, pet therapy, massage, pedicure, socializing with friends, eating healthy foods, getting more hours of sleep, taking days off from work, nicotine, drinking, and working more hours.

Research Question # 1: Perception of Fatigue

Frequencies of participant responses for each of the 15 items in the OFER scale are presented in Table 2. More than half of participants (62%; n= 41) felt at the end of their rope with their work and dreaded waking up to another day of work (64%; n=42). Similarly, 67% (n=44) felt exhausted at work. Approximately one third (33%; n=22) often wondered how long they could keep going at their work. The majority of participants (82%; n=54) reported having no energy left after a typical work period and two thirds (64%; n=42) indicated that their work life takes all their energy from them. Over half (65%; n=43) indicated they often felt fatigued from the end of one shift to the start of another and that they never have enough time between work shifts to recover their energy completely (53%; n= 35). Fifty-six percent of participants (n=37) disagreed that recovering from a shift wasn't a problem for them.

Acute Fatigue (AF), Chronic Fatigue (CF), and Inter-shift Recovery (IR) were measured using the five-item subscales in the OFER scale that consisted of 15 items in total. According to Winwood et al. (2005), each of the three subscales produces comparable values between 0 and 100. The higher the score on each computed subscale

indicates the ‘more’ of what each subscale construct is measuring. Cut points are computed to quartiles of scale score distribution where 0 to 25 is low, 26 to 50 is low moderate, 51 to 75 is moderate high, and 76 to 100 is high (Winwood et al., 2005). The findings revealed that the participants acute fatigue scores ranged from 11 to 34 ($M=21.8$, $SD \pm 5.41$, $MDN 20.6$) indicating low to moderate acute fatigue. Similar to the acute fatigue scores, chronic fatigue scores ranged from 0 to 41 ($M=23.8$, $SD \pm 10.01$, $MDN 25.6$) suggesting low to moderate chronic fatigue. Participants reported low to moderate recovery between clinical shifts with inter-shift recovery scores that ranged from 12 to 32 ($M=21.2$, $SD \pm 4.11$, $MDN 20.6$) Total fatigue which was measured by the overall 15 item scale ranged from 22 to 66 ($M= 46.2$, $SD \pm 9.63$, $MDN 47$). These results indicated that most participants in the study reported experiencing moderate levels of overall fatigue with low recovery between shifts.

Table 1

Sample Demographic and Characteristics

Variable	N= 66; (100%)
Gender	
Female	56 (84.8%)
Male	10 (15.2%)
Age (years)	
19-20	50 (75.8%)
21-35	16 (24.2 %)
Children and Number	
No	63 (95.5%)
Yes (1-2 children)	3 (4.5%)
Responsibility for Others- Ill or Aging	
No	59 (89.4%)
Yes	7 (10.6%)
Relationship Status	
Partnered (married/common law/dating)	25 (37.8%)
Unpartnered (single/divorced/widowed)	41 (62.2%)
Living Arrangements	
Living with others	64 (97%)
Living alone	2 (3.0%)
Work Outside of School	
No	19 (28.8%)
Yes	47 (71.2%)
Work Hours Outside of School	
0	19 (28.8%)
4-15	17 (25.7%)
16-24	17 (25.7%)
25-40	13 (19.7%)
Type of Clinical Setting	
No Hospital (Community)	6 (9.1%)
Medical/Surgical (Hospital)	16 (24.2%)
Obstetrics (Hospital)	31 (47.0%)
Pediatrics (Hospital)	13 (19.7%)
Shift Length	
12 hours	46 (69.7%)
8 hours	20 (30.3%)
Shift Type	
Day	66 (100%)
Evening	0 (0%)
Night	0 (0%)
Self –Reported Alertness “Type of Person”	
Morning person	33 (50.0%)
Evening person	23 (34.8%)
Night person	10 (15.2%)
Self-Rating of Demands in Student Role (Scale1-10)	
Scale 1-3 low	1 (1.5%)
Scale 4-6 medium	6 (9.1%)
Scale 7-10 high	59 (89.4%)

Table 2

OFER Scale 15-Items Frequency of Participant Responses

OFER Scale 15-items	Disagree n (%)	Neither n (%)	Agree n (%)
I often feel at the end of my rope with work (CF)	14(21%)	11(17%)	41(62%)
I often dread waking up to another day of my work (CF)	20(30%)	4(6%)	42(64%)
I often wonder how long I can keep going at my work (CF)	35(53%)	9(14%)	22(33%)
I feel that most of the time I'm just "living to work" (CF)	28(42%)	6(9%)	32 (49%)
I often feel exhausted at work (CF)	19 (29%)	3 (4%)	44 (67%)
Too much is expected of me at my work (AF)	28 (43%)	14 (22%)	24 (35%)
My working life takes all my energy from me (AF)	19 (29%)	5 (8%)	42 (64%)
After a typical work period I have little energy left (AF)	10 (15%)	2 (3%)	54 (82%)
I usually have lots of energy to give my family or friends (AF)	39 (59%)	6 (9%)	21 (32%)
I have energy for my hobbies and other activities in my spare time (AF)	35 (53%)	5 (8%)	26 (39%)
I never have enough time between work shifts to recover my energy completely (IR)	22 (33%)	9 (14%)	35 (53%)
I rarely recover my energy fully between work shifts (IR)	23 (35%)	11 (17%)	32 (48%)
Recovering from work fatigue isn't a problem for me (IR)	37 (56%)	12 (18%)	17 (26%)
I'm often still feeling fatigued from one shift by the time I start another (IR)	14 (21%)	9 (14%)	43 (65%)
Even if I'm tired from one shift, I am usually refreshed by the start of the next shift (IR)	39 (59%)	9 (14%)	18 (27%)

CF= chronic fatigue; AF=acute fatigue; IR= inter-shift recovery

Table 3

Normality Statistics and Frequencies

Variable	M±SD	Range	Skewness	Kurtosis
Acute Fatigue	21.8 ± 5.41	11-34	.324	-.610
Chronic Fatigue	23.8 ± 10.01	0-41	-.567	-.523
Inter-shift Recovery	21.2 ± 4.11	12-32	.242	.341
Total Fatigue	46.2 ± 9.63	22-26	.392	.504

Note. M=mean; SD=standard deviation

Research Question #2: Predictors of Fatigue

A multiple regression analysis was used to examine the predictors of total fatigue.

Statistical analysis for collinearity revealed tolerance values above 0.10 and variance inflation factor values below 10 indicating that there is no evidence of multicollinearity (Pallant, 2010). The independent variables in the regression model explained 26.1% of the variance of total fatigue ($R^2=.261$, $F=3.091$, $p=.003$). Table 2 illustrates that only two independent variables were significant predictors of fatigue and together accounted for 18% of the variance of total fatigue. The two significant predictors of fatigue were student role demands ($\beta=.239$; $p=.041$) and being a night person ($\beta=.409$; $p=.001$). The remaining study variables including age ($\beta=-.150$; $p=.197$), gender ($\beta=.151$; $p=.179$), relationship status ($\beta=-.047$; $p=.713$), shift length ($\beta=-.187$; $p=.114$), working 4-15 hours ($\beta=-.247$; $p=.065$), working 25-40 hours ($\beta=.106$; $p=.437$), having responsibilities ($\beta=.008$; $p=.947$), and being an evening person ($\beta=.227$; $p=.065$) were not considered predictors of fatigue in this study.

Table 4

Multiple Regression Analysis

Variable	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>p</i>	R^2	<i>Adjusted</i> R^2
						.386	.261
Age	-.412	.315	-.150	-1.307	.197		
Gender	4.025	2.959	.151	1.360	.179		
Relationship	-.938	2.533	-.047	-.370	.713		
Status	1.533	.732	.239	2.093	.041*		
Student Demands	-3.893	2.426	-.187	-1.604	.114		
Shift Length	-2.145	2.891	-.103	-.742	.461		
No work Hours	-5.636	2.989	-.247	-1.886	.065		
4-15 Work Hours	2.545	3.247	.106	.784	.437		
25-40 Work	.235	3.539	.008	.066	.947		
Hours	4.476	2.379	.227	1.882	.065		
Responsibility	10.901	3.229	.409	3.376	.001*		
Evening Person							
Night Person							

Note. Significance * $p < 0.05$. *B*= unstandardized coefficient; *SE*= standard error; β = beta; *t*= statistic; *p*= probability of accepting the null hypothesis at an alpha of 0.05. R^2 = variance in the dependent variable that is explained by the model.

Qualitative Open Comments

In response to the open ended survey question on comments related to student nurse fatigue, 30 (45%) out of the 66 participants offered their perceptions. The main issues raised included: the demands of the student role specifically assignments, the feelings of fatigue and the long hours of work. Other less frequently mentioned comments, was the need to work (outside of school) contributing to their overall workload and the perception that feelings of fatigue were reduced because of the positive impact of obstetric clinical placements. The following comments illustrate these points:

“While working in the clinical setting the workload is high but manageable. However, after a 12 hour shift going home to complete clinical worksheets on top of journals and CPEs takes away from much needed rest after one shift and before the next 12 hour shift. The paperwork and assignments takes away from feeling refreshed and performing optimally the next day at clinical”.

“Too many extra assignments during the school year results in increased fatigue. Placement is good but three 12 hour shifts in a row is tiring. It is very demanding, especially with the never ending load of work”.

“It’s so common! It’s ridiculous the amount of students who come to work on zero sleep and expect to provide adequate care to patients”.

“Having assignments on top of full time clinical and working to pay bills makes it very difficult. I really enjoyed this obstetrics clinical experience. I had a lot more energy at the start of this placement”.

“Consolidation hours are more irregular than the hours of registered nurses. For example, they work 3 shifts on 3 shifts off or 2 shifts on 2 shifts off. Ours were more like 3 shifts on 1 shift off”.

“I look forward to this placement in obstetrics, therefore it is less tiring. Other placements have been different”.

CHAPTER 5

DISCUSSION

Nurse fatigue in clinical practice work environments is a concern that has received attention in recent research studies (Winwood, Winefield, & Lushington, 2006; RNAO, 2010, Barker & Nussbaum, 2011). Although there is an abundance of literature addressing the issue of nurse fatigue, a gap in the literature exists when it comes to understanding fatigue in student nurses. Factors contributing to nurse fatigue are shiftwork, working long hours, increased workload demands and individual characteristics (Winwood, Winefield & Lushington, 2006; Barker & Nussbaum, 2011). The outcomes of fatigue are negative impacts with patient safety, nurse well-being and nurse retention (Dean et al., 2006; Scott et al., 2010). This research provides insights into the perception of fatigue in student nurses at the end of second year and about the predictors of fatigue.

This study explored fatigue in 66 second year nursing students at the end of their clinical consolidation period. Participants completed an anonymous demographic survey and the Occupational Fatigue Recovery Scale. The following discussion addresses the study findings in relation to previous literature on fatigue in student nurses and nurses. Implications, recommendations and limitations are discussed.

Interesting results from demographic frequencies suggested that many students (89%; n=59) perceived the demands in their student role to be high and contributing to their fatigue. Qualitative open ended comments supported this finding. Participants reported coping and attempting to alleviate fatigue using various measures. Many used

healthy measures such as taking breaks, exercising, and other relaxation activities. A large number of students reported taking caffeine (n=53; 84%) to alleviate fatigue. This included caffeine from energy drinks and pills as well as caffeine from foods and fluids. A lower number reported other unhealthy measures such as using nicotine, drinking and working more hours. Although the amount of caffeine intake was not determined in this study, more than two thirds of participants reported taking caffeine to alleviate fatigue. Caffeine is known as a central nervous stimulant (Papadelis et al., 2003) and in high doses can cause nervousness, jitteriness and fidgeting (Huges & Hale, 1998). Weekly doses in adolescents have been associated with depression (Luebbe & Bell, 2009). Along with caffeine intake from foods and fluids, the increased use of energy drinks can pose problems with sleep and working effectively. There were a limited number of students that reported using other unhealthy measures to alleviate fatigue; however the relevance of this finding warrants consideration for research, education and practice environments.

An interesting finding from the student's qualitative comments suggests that the positive impact of certain clinical placement units (e.g. obstetrics) may serve to off-set their fatigue. Further research looking at the positive impact of clinical placement environments and fatigue would provide insight into possible buffering effects of fatigue in clinical practice.

Research Question # 1: Perception of Fatigue

What is the perception of levels of acute fatigue, chronic fatigue and fatigue recovery in second year nursing students at the end of second year?

The results in this study showed that of the 66 participants, 26% (n=17) reported moderate acute fatigue levels and 50% (n=33) reported chronic fatigue levels. This suggests that students are experiencing fatigue at the end of second year which could be putting them at risk for dangerous outcomes of fatigue. Inter-shift recovery scores were low (83%; n=55), indicating that participants did not feel that they were recovering from moderate levels of fatigue between shifts. These findings are similar to study findings by Rella, Winwood and Lushington (2008) that reported nursing students had maladaptive fatigue and poor recovery across 3 years of a BN program and by its completion, 20% of graduates were reporting signs of serious maladaptive fatigue and stress.

The frequency of participant responses for each of the 15-items in the OFER scale highlights the concerning issue of fatigue. Almost two thirds reported feeling at the end of their rope with work and dreaded waking up to another day of work. More than half reported feeling exhausted at work. The verbiage of these individual items really portrays their perceptions of chronic fatigue levels. Interestingly, even though most of the item responses suggested chronic fatigue, more than half of participants felt that they could keep going. This suggests that they perceived that in spite of their fatigue, it was the expectation that they continue this pace of work. The detrimental effects of working with sleep loss and fatigue include jeopardizing patient health and safety, poor performance in job-related tasks, job dissatisfaction, negative impacts on personal health and well-being, and professionalism (Owens, 2007).

The presence of acute fatigue was reflected in the frequency of their responses. Many nursing students agreed that after a typical work period there is little energy left. More than half disagreed with the statements about having enough energy for family,

friends, hobbies and other activities. More than fifty percent of the student participants agreed that they never have enough time between shifts to recover energy completely and that they are often feeling fatigued from one shift to another. These findings suggest that recovery is poor and that student nurses are already experiencing fatigue levels similar to practicing nurses. The CNA & RNAO (2010), reported that 55% of nurses almost always felt tired at work and 80% always felt tired at the end of shift. Fatigue interfered with the ability to make good judgments and sound decisions. These similar findings lead one to wonder how fatigue is impacting the students' cognitive processes and if patients are at risk while under their care. Although students report acute and chronic fatigue, qualitative findings suggest that it may be from different causes within the student role. Overall the frequency of responses table provides an alternative way to analyze the data for acute and chronic fatigue levels. Notable to the detailed items in the OFER scale measuring fatigue levels, is the percentage of students that responded with the "neither" category, conveying that there was some degree of uncertainty about their perception of fatigue.

Research findings in relation to fatigue and stress in students attending post-secondary education have been discussed in the literature. Although this study did not specifically focus on student stress, fatigue associated with stress was a significant factor that was reflected in student comments about fatigue. One student commented "This program is very demanding. You must always be attentive to what you are doing, taking care of people. Most of my personal fatigue comes from the stress of school, not the actual physical work. If the school portion was less stressful and clinical was a bigger portion of schooling, it would be fine". The literature describes that some of the most common stressors associated with stress and fatigue in students are lack of free time, long

hours of study, fear of failing, finances and lack of educational institutions' responses to student need (Jones & Johnson, 1997). Another student in this study reflected on the stress and fatigue in relation to these factors. "I think that it is extremely tiring and demanding being a nursing student. I have to balance living without my parents, paying bills, working and a social life". In contrast, some studies have suggested that student nurse stress stems from other factors such as poor interpersonal relationships, clinical placements, finances and coursework (Kirkland, 1998; Cavanagh & Snape, 1997). This study did not specifically explore these variables but qualitative comments by students revealed that finances and coursework were stressors contributing to fatigue in this study. The findings of a study by Timmins and Kaliszer (2002) report that theory, exams, assignments, workload and contact hours were top academic stressors for students.

Research Question # 2: Predictors of Fatigue

What are the predictors of fatigue in second year nursing students?

Student role demands. Student role demands were found to be a significant predictor of fatigue in this study. Student participants were asked to rate their student role demands on a scale from 1 to 10 with 1 being very low demands and 10 being very high demands. Demands were grouped into categories of low (1 to 3), medium (4 to 6) and high (7 to 10) for analysis. Findings revealed that 59 of the participants reported having high demands within their student role. One student reported "I know that there are many students that are fatigued from school and I think it has to do with the expectations of the program. I myself am an out of town student so I must do everything for myself and because of the demands of school, I can usually never eat right to build my energy

because I do not have the time”. Another student commented “I feel that I do get fatigued with all the demands. I do occasionally nap because I am too exhausted to complete my work and pick it up later”.

Demands in the student role can be considered a measure of student workload (Law, 2007). The findings by Law (2007) examining the severity of exhaustion in business students and the relationship between personal/environmental variables of coursework involvement and exhaustion in university students revealed that exhaustion in business students was extreme and that a positive correlation between student workload and exhaustion ($r=.34$; $p=.001$) was significant.

Research on fatigue and workload demands in nurses shows similar results. Findings from a study examining factors influencing fatigue in Chinese nurses reported that job demands ($\beta= 0.22$) was a significant predictor of acute fatigue and chronic fatigue ($\beta= -0.08$).

Occupational studies in healthcare suggest that greater exhaustion and burnout from workload demands leads to poor work performance. For nursing students, fatigue and exhaustion may lead to poor performance academic work and clinical work.

Another study reported that psychological demand was a predictor of fatigue and accounted for 3% of the variance of acute fatigue and 33% of variance for chronic fatigue. Psychological demand was the most powerful predictor of sleep quality and inter-shift recovery (Winwood & Lushington, 2006).

Being a night person. The findings of this study suggested that being a night person was a predictor of total fatigue. The concept of a person’s “biological clock” is

discussed within the fatigue literature as controlling circadian rhythm from physiological processes that occurs repeatedly within a 24 hour sleep cycle. The processes that occur are related to alertness, body temperature, production of stress hormone cortisol, and cognition; mental alertness, memory and intelligence (Whitbourne, 2012). Each individual person has a slight variation on this pattern leading some people to be morning types known as larks and evening types known as owls.

The findings from a study examining chronotypes reported that evening types were more likely to report sleep problems for working during the day shift. There were no effects in the chronotype for the night shift and later chronotypes (owls) had intermediate adaptation levels for day and night shifts (Gamble et al., 2011). In this study, being a night person was found to be a predictor of fatigue. This finding could be explained by a lack of fit with daytime shifts since all of the participants in this study worked day shift. It is possible that the findings may have been reversed if more participants worked night shifts.

In contrast, study findings exploring sleep quality found that the strongest predictor of sleep quality was morningness-eveningness types of people (Chung, Chang, Yang, Kuo & Hsu, 2008).

Gender. Even though there were a larger number of females (n=56) in this study, gender was not found to be a significant predictor in this study. There are limited research studies looking at predictors of fatigue in students. Research study findings by Winwood and Lushington (2006) found no correlation between gender and acute fatigue, chronic fatigue or inter-shift recovery. Tsai and Li (2003) study results indicated that there were

correlations between gender and sleep variables. Females went to bed earlier, rose earlier, and had longer sleep latency, more awakenings and poor sleep quality than males.

Age. The study findings suggest that age also was not found to be a predictor of fatigue in this study. Most of the participants were between 19 to 20 years of age. In a study by Goff (2011), age of students was found to be a predictor of student performance. Similarly, another study found that age of students was highly correlated with academic performance (Trochl, Barnes & Egget, 2000). Further, findings in a study by Fang, Kunaviktikul, Olson and Chontawan (2008) suggested that nurses between the ages of 30 to 40 experienced more acute fatigue ($F=4.63$, $p=.001$) but there was no differences in chronic fatigue ($F=1.34$, $p=.26$). The opposite was found by Winwood, Winefeild and Lushington (2006) who reported that nurses greater than 55 years of age had lower acute fatigue and chronic fatigue in comparison to other age groups with the exception of nurses age 35 to 44 with the lowest fatigue ($F=3.79$, $p=.005$). Nurses greater than 55 years of age had higher inter-shift recovery than other groups.

Responsibilities. Participants who had other responsibilities at home caring for an ill relative was not a predictor of fatigue in this study. No other studies have been found looking at student responsibilities as a predictor of fatigue.

Relationship status. In this study, relationship status of partnered and unpartnered was not found to be a predictor of fatigue. Contrary to this finding, a study by Winwood, Winefield and Lushington (2006) found that increased levels of fatigue and poor recovery were found in unpartnered nurses with dependents. Unexpectedly however, this study found that lower maladaptive fatigue was associated with better recovery among

partnered women with dependents and that fatigue-recovery scores in partnered women were not notably better (Winwood, Winefield & Lushington). There was a difference in acute fatigue ($F= 6.95, p= .00$) in marital status, however no difference in chronic fatigue ($F= 1.72, p= .16$).

Work outside of school. Although 71% of participants reported working outside of school, it was surprising that work outside of school was not found to be a predictor of fatigue. This was a similar finding to another study in which the number of hours worked weekly was neither associated with acute nor chronic fatigue. These findings are somewhat different from studies that suggest the need for paid work contributes to higher fatigue and low recovery (Rella, Winwood, & Lushington, 2009).

Shift length. Participants in this study either worked 8 hour shifts ($n=20$) or 12 hour shifts ($n=46$) during the day. Shift length was not found to be a significant predictor of fatigue. This is similar to the finding by Fang et al. (2008) that found shift work was not a predictor of acute fatigue or chronic fatigue. Nurses working more evenings and nights were found to have more acute ($F= 3.94, p= .01$) and chronic ($F=7.92, p= .00$) fatigue. Winwood, Winefield and Lushington (2006) found that maladaptive chronic fatigue levels were higher and inter-shift recovery low when shiftwork patterns were rotational and for those nurses who worked night shift in comparison to day shift.

Different result findings were revealed in a study by Barker and Nassbaum (2011) who reported that nurses working 10 to 12 hours a day had higher fatigue scores than those working 8 to 10 hours. Lower fatigue scores were reported with nurses working

less than 20 hours per week in comparison to those working 41 to 80 hours per week. This would be an expected finding.

Research Question 3: Differences in Fatigue by Setting

Is there a difference between fatigue levels of second year nursing students attending hospital and community placements by gender, age, number of children, family responsibilities, partner status, living arrangements, employment hours, student role demands, clinical placement setting, shift length and shift type?

This research question could not be answered with data analysis as there were only six participants in a community clinical placement setting. Variables with uneven splits (e.g. 90:10) should be removed from the analysis (Tabachnick & Fidell, 2007). Since fatigue is discussed in the literature as a significant issue in nursing, it would be important to understand if there are differences in student nurse fatigue in various types of clinical work settings.

Implications and Recommendations

Implications. The findings of this study indicated that second year nursing students were moderately fatigued with low recovery and the end of second year. This could have a significant impact on safe quality patient care, student health and well-being and student retention. Although data supporting these implications were not measured in this study, other studies have reported the impact of fatigue on patient safety, individual well-being and retention (Dean et al., 2006; Kunert, King & Kolhurst, 2007; Scott et al., 2010). It leads one to consider that these implications of fatigue would be a concerning issue for student nurses as well. Qualitative open comments provided insight as to the

perception of fatigue for participants in this study regarding these important fatigue-related issues. Some participants made comments reflecting on their ability to care for patients when fatigued and about how fatigue impacts their individual health. Studies examining student fatigue have indicated that fatigued students tend to have poor academic performance (Law, 2007; Goff, 2011).

Research studies involving practicing nurses have examined the outcomes of fatigue in the work environment. Findings have shown that reduced performance, clinical errors, work-related injuries and accidents have occurred as a result of nurse fatigue (RNAO, 2006; Dean et al., 2006; Scott et al., 2010). No studies have been found examining the outcomes of fatigue in student nurses.

Recommendations. Considering the serious nature of fatigue and its impact on clinical and academic performance, future studies should examine the outcomes of fatigue in student nurses. Research studies examining student nurse fatigue are limited. It would be beneficial to have future research studies examine fatigue in a larger student population and in fourth year students during their preceptorship period prior to entry into the workforce. Qualitative research studies exploring fatigue would provide a more rich insight into the perception of fatigue in student nurses while capturing greater detail about fatigue experiences.

It is important for nursing educators and administrators to recognize the prevalence of fatigue in student nurses and its negative impacts. Student nurses would benefit from educational opportunities that allow them to acquire more knowledge about fatigue including management strategies. Student nurses should also be aware of

professional practice expectations and institutional policies in clinical organizations that relate to safe patient care (RNAO, 2010).

Since stress in student nurses may lead to greater fatigue levels, providing opportunities for students to reduce stress would also be helpful. Stress relieving workshops, seminars or providing opportunities for student engagement could be desirable measures for reducing stress (Law, 2007; Gibbons, 2010). Nursing educators could play a role in reducing fatigue by considering alternative ways to scheduling students in clinical practice settings and assigning coursework that would allow for longer rest and sleep time. Offering part-time studies or reducing student contact hours within nursing programs may be other solutions to reducing fatigue in student nurses. Other recommendations for reducing the prevalence of fatigue are to develop policies that limit long work hours, provide time and space for rest periods, meals, and other health-promotion initiatives for sleep hygiene (RNAO, 2010, p.31)

Limitations

Although this study provided some new knowledge about the perceptions of fatigue in second year nursing students, it was not without limitations. Initially, plans for this research study involved exploring fatigue in fourth year nursing students during their final preceptorship experience. However, due to the timing of data collection procedures, this was not possible. Exploring fatigue in second year nursing students during their consolidation period was possible and allowed opportunity to collect data about fatigue during a time when clinical days were condensed with full time hours. Due to a specific number of students being enrolled in the consolidation period, the opportunity for having a larger sample did not exist. Therefore, a convenience sample of 66 second year nursing

students participated in the study. The timing of data collection was during the final week of the consolidation placement period where participants were more likely to be fatigued during that time.

One of the research questions for this study looked at the difference in fatigue levels between participants working in hospital settings and those working in community settings. Only 6 participants had their consolidation clinical placement in a community setting, resulting in no opportunity for analysis. All participants were scheduled to work day shifts during their consolidation period, providing less insight about the fatigue levels of student nurses working night shifts or rotating shifts.

In regards to the measurement tools, some questions in the demographic questionnaire had less than a 90:10 split response rate and were unable to be included in the analysis for consideration of possible predictors of fatigue. The OFER Scale measures acute fatigue, chronic fatigue and inter-shift recovery. Although this scale was able to capture data about nursing student fatigue during at one point in time (end of clinical course), it did not specifically capture fatigue measurement within the overall nursing program.

Conclusion

This study has identified that fatigue is present in student nurses at moderate levels with low recovery. This is considered an important finding because moderate to high levels of maladaptive fatigue with insufficient recovery can pose serious threats to the well-being and safety of students and the patients that they care for in clinical settings. Qualitative open comments suggest the second year nursing students are feeling fatigued with all the demands within their student role. Student role demands (workload) was found to be a predictor of fatigue and is congruent with the literature surrounding nurse fatigue. A few studies have suggested that fatigue levels can become higher as students' progress through the nursing program resulting in exhaustion in new graduate nurses entering the workforce. The possibility of burnout and exhaustion in early career can deter graduate nurses from staying in the profession and result in poor retention. Being a night person chronotype was also found to be a predictor of fatigue. It is important for student nurses to understand individual characteristic responses to fatigue and to seek out strategies for prevention. Nursing educators could play a pivotal role in reducing fatigue by finding creative solutions for curriculum delivery and scheduling practices while reducing heavy workloads that are inherent in the student role.

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Appendix A

Occupational Fatigue Exhaustion Recovery (OFER 15) Scale

These statements are about your fatigue and inter-shift recovery at work and at home
Select a number from 0-6; Strongly Disagree to Strongly Agree which best indicates your
response

In this scale, work refers to your school demands such as theory classes, assignments, readings
and clinical hours/ preparation

	Strongly Disagree	Disagree	Slightly Disagree	Neither	Slightly Agree	Agree	Strongly Agree
1) I often feel at the end of my rope with my work	0	1	2	3	4	5	6
2) I often dread waking up to another day of my work	0	1	2	3	4	5	6
3) I often wonder how long I can keep going at my work	0	1	2	3	4	5	6
4) I feel that most of the time I'm just "living to work"	0	1	2	3	4	5	6
5) I often feel exhausted at work	0	1	2	3	4	5	6
6) Too much is expected of me at my work	0	1	2	3	4	5	6
7) My working life takes all my energy from me	0	1	2	3	4	5	6
8) After a typical work period I have little energy left	0	1	2	3	4	5	6
9) I usually have lots of energy to give my family or friends	0	1	2	3	4	5	6
10) I have energy for my hobbies and other activities in my spare time	0	1	2	3	4	5	6
11) I never have enough time between work shifts to recover my energy completely	0	1	2	3	4	5	6
12) I rarely recover my energy fully between work shifts	0	1	2	3	4	5	6
13) Recovering from work fatigue between work shifts isn't a problem for me	0	1	2	3	4	5	6
14) I'm often still feeling fatigued from one shift by the time I start another	0	1	2	3	4	5	6
15) Even if I'm tired from one shift, I am usually refreshed by the start of the next shift	0	1	2	3	4	5	6

Appendix B

Demographic Data Questionnaire

- 1) Gender Male female
- 2) Age _____
- 3) Do you have children at home? yes no
If yes, how many children? _____
If yes, please indicate the age(s) of the children
<2
2-6
7-12
13-18
- 4) Do you have other responsibilities such as caring for an ill or aging relative on a regular basis? yes no
- 5) What is your relationship status?
 Single
 Married/Common Law
 Divorced/Separated
 Other _____
- 6) What are your living arrangements?
 Live alone
 Live with parents
 Live with spouse/significant other
 Live with friend/roommate
 Other _____
- 7) Do you work outside of school? yes no
If yes, how many hours per week? _____

- 8) Are you currently in a clinical placement? yes no
 If yes, which setting are you in? Hospital Community (School Health)
 If hospital setting, which area are you in? Medical/Surgical Pediatrics Obstetrics
- 9) During your clinical placement in hospital or community settings, how long were the shifts that you usually worked?
 8 hours 12 hours other, please identify _____
- 10) During your clinical placement period, what shift did you usually work?
 Day Evening Night Rotating
- 11) Which one of the following do you consider yourself to be in relation to “types of people” being more alert and less tired?
 A morning person
 An evening person
 A night person
- 12) Rate the degree of demands in your student role on a scale from 0-10, with 0 having no demands and 10 having very high demands. Please circle on scale below.
 (No demands) 0 – 1 – 2 - 3 – 4 - 5 - 6 – 7 – 8 – 9 – 10 (Very high demands)
- 13) What measures do you use to alleviate fatigue? Check all that apply to you.
 Exercise/Fitness training
 Caffeine
 Energy drinks
 Rest breaks/Napping
 Other, please identify

- 14) Do you have any comments about student nurse fatigue? Please state below.

Appendix C



LETTER OF INFORMATION FOR CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: *Exploration of Fatigue in Second Year Nursing Students.*

You are asked to participate in a research study conducted by Michelle Groundwater, Dr Michelle Freeman, Dr Deborah Kane, from the Faculty of Nursing and Dr Katherine Lafreniere from the department of Psychology at the University of Windsor. Results of this study will contribute to a Masters in Science in Nursing thesis exploring fatigue in second year nursing students.

If you have any questions or concerns about the research, please feel to contact Michelle Groundwater at 519 980-8421, Dr Freeman at 519 253-3000 Ext. 4812, or Dr Kane at 519235-3000 Ext. 2268.

PURPOSE OF THE STUDY

The purpose of this study is to explore fatigue in second year nursing students at the University of Windsor by asking the following questions:

- 1) What is the perception of acute fatigue, chronic fatigue and inter-shift recovery levels in second year nursing students at the end of second year?
- 2) Is there a difference between fatigue levels (states) of second year nursing students attending hospital and community placements by gender, age, family responsibilities, relationship status, living arrangements, employment, student role demands, clinical placement setting, shift length and shift type, and measures to alleviate fatigue?

PROCEDURES

If you volunteer to participate in this study, you will be asked to do the following things:

- 1) During a post-conference period in your clinical placement, complete a short demographic questionnaire, consisting of 14 questions asking about gender, age, caring for children or aging parents, relationship status, living arrangements, employment, student role demands, clinical placement setting shift length and type, and measures to alleviate fatigue.
- 2) During a post-conference period in your clinical placement, complete an Occupational Fatigue

Exhaustion Recovery Scale composed of 15 statements about acute fatigue, chronic fatigue, and inter-shift recovery in which you will rate your response on a likert scale from 0-6 Strongly Agree to Strongly Disagree.

- 3) The demographic questionnaire and the OFER scale will take approximately 5 minutes each to complete for a total of 10 minutes. They will be completed once during a post-conference period in your clinical placement during the last two weeks of the consolidation placement period. There will be no further data collection after that time.

POTENTIAL RISKS AND DISCOMFORTS

There are no known physical, psychological, emotional or social risks of the proposed study.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

There will be no direct benefits for you as a participant of this study. Indirect benefits associated with this study involve contributing to nursing research in understanding fatigue in second year nursing students in order to make future educational or clinical placement changes that promote optimal health and safety in nursing practice.

COMPENSATION FOR PARTICIPATION

Participants will not receive payment for their participation in this study.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission.

No personal identification information will be asked on the data collection tools. All data collection tools will be coded with a study group label and participant number only.

All data collection tools will be placed, upon completion, in a brown sealed envelope that will be provided by the researcher. The researcher will collect the envelopes and transport them to a locked cabinet in the nursing research office at the University of Windsor. The research team will be the only individuals having access to the locked cabinet.

The data will be stored in the locked cabinet until analysis occurs and then stored on a secure computer file at the University of Windsor. Results will be posted on the University of Windsor's website by January 2014. The data will be submitted for publication in a summary format with no personal identification of participant responses.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw or discontinue participation at any time without consequences or penalty. You may also refuse to answer any questions that you do not want to answer and still remain in the study, if you wish. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

A summary of the study findings will be posted on the University of Windsor website under research findings.

Web address: www.uwindsor.ca

Date when results are available: January 2014

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications and in presentations.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Signature of Investigator

Date

Appendix D



CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: *Exploration of Fatigue in Second Year Nursing Students.*

You are asked to participate in a research study conducted by Michelle Groundwater, Dr Michelle Freeman, Dr Deborah Kane, from the Faculty of Nursing and Dr Katherine Lafreniere from the department of Psychology at the University of Windsor. Results of this study will contribute to a Masters in Science in Nursing thesis exploring fatigue in second year nursing students.

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PROCEDURES

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- 1) During a post-conference period in your clinical placement, complete a short demographic questionnaire, consisting of 14 questions asking about gender, age, caring for children or aging parents, relationship status, living arrangements, employment, student role demands, clinical placement setting shift length and shift type, and measures used to alleviate fatigue
- 2) During a post-conference period in your clinical placement, complete an Occupational Fatigue Exhaustion Recovery Scale composed of 15 statements about acute fatigue, chronic fatigue, and inter-shift recovery in which you will rate your response on a likert scale from 0-6 Strongly Agree to Strongly Disagree.
- 3) The demographic questionnaire and the OFER scale will take approximately 5 minutes each to complete for a total of 10 minutes. They will be completed once during a post-conference

period in your clinical placement during the last two weeks of the consolidation placement period. There will be no further data collection after that time.

POTENTIAL RISKS AND DISCOMFORTS

There are no known physical, psychological, emotional or social risks of the proposed study.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

There will be no direct benefits for you as a participant of this study. Indirect benefits associated with this study involve contributing to nursing research in understanding fatigue in second year nursing students in order to make future educational or clinical placement changes that promote optimal health and safety in nursing practice.

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The data will be stored in the locked cabinet until analysis occurs and then stored on a secure computer file at the University of Windsor. Results will be posted on the University of Windsor's website by January 2014. The data will be submitted for publication in a summary format with no personal identification of participant responses.

PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw or discontinue participation at any time without consequences or penalty. You may also refuse to answer any

questions that you do not want to answer and still remain in the study, if you wish. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

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A summary of the study findings will be posted on the University of Windsor website under research findings.

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SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study **Exploration of Fatigue in Second Year Nursing Students** as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. I have been given a copy of this form.

Name of Participant

Signature of Participant

Date

SIGNATURE OF INVESTIGATOR

These are the terms under which I will conduct research.

Signature of Investigator

VITA AUCTORIS

NAME: Michelle Groundwater

PLACE OF BIRTH: Saint John, NB

YEAR OF BIRTH: 1974

EDUCATION: St. Clair College, Nursing Diploma, Windsor, ON, 1999

University of Windsor, BScN., Windsor, ON, 2004

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