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Relationship of Weekly Rest to BSN Appraisal of Stress and Hardiness

Everly Batuik
Walden University

Walden University

College of Nursing

This is to certify that the doctoral dissertation by

Everly Batuik

has been found to be complete and satisfactory in all respects,
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the review committee have been made.

Review Committee
Dr. Leslie Hussey, Committee Chairperson, Nursing Faculty
Dr. Mary Martin, Committee Member, Nursing Faculty

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

Walden University
2023

Abstract

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MSN, Walden University2013, 2013

BSN, Walla Walla College, 1985

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Nursing education is stressful for students and may affect academic performance, which increases the risk of physical and mental health problems. The ability to adapt and cope decreases as stress increases. Internal resources such as hardiness and health-promoting lifestyle practices, such as weekly rest (an uninterrupted 24-hour period of rest each week) may reduce nursing students' stress. The purpose of this study, guided by Sawatsky's revised Nursing Adaptation Model, was to examine whether there is a difference in perceived stress and hardiness among Bachelor of Science in Nursing (BSN) students who practice weekly rest compared with those who do not. Fifty-six BSN students (30 practiced weekly rest, and 26 did not) from eight nursing programs completed the Cohen's Perceived Stress Scale and Bartone's Hardiness Resilience Gauge surveys. Data were analyzed using one-way MANOVA, which revealed no significant difference between the groups. Future research should focus on examining the relationship between the buffering effects of hardiness on perceived stress among BSN students comparing weekly rest practice groups and recruiting a larger sample size. The findings of the study provide information to nurse educators about the stress nursing students experience and what lifestyle practices decrease the stress of nursing education, which could increase nursing students' academic performance and affect positive social change.

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Dedication

I dedicate this work to all nursing students navigating the demands of nursing education.

Acknowledgments

There have been so many who have supported me throughout this endeavor. I cannot thank my committee enough for their constructive critique and guidance. I appreciate how Dr. Mary Martin and Dr. Leslie Hussey gave me prompt feedback. My chairperson, Dr. Hussey, is a wonderful mentor. I appreciate her support, direction, encouragement, and friendship. She has been extremely patient; I am in her debt.

I am grateful to the nursing students who participated in my study. The generosity of their time and experience was essential in this quest. Their participation is a valuable piece in the knowledge of addressing nursing student stress. I also want to acknowledge the support of the gatekeepers of each participating school of nursing.

Friends and family have been an integral part of my journey; they have been my cheerleaders. I especially thank my husband Troy, my children Teliesha, Paul, and Sarah, and my parents. Each of you encouraged me to press on. Thank you for being such great sounding boards. I appreciate your patience when this process has disrupted time together and family fun. Thank you.

Lastly, and most importantly, I thank God for being with me throughout this journey. God is my Rock. “With my God, I can scale any wall” (*New Living Translation*, Psalms 18:29). “His mercies never cease; great is His faithfulness” (*New Living Translation*, Lamentations 3:22

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Introduction

Stress is a part of life, and it can be positive or negative (Lazarus, 2000). Stress is defined as circumstances that are "appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). Stress can have a detrimental effect on performance and physical and mental health (Jackson & Frame, 2018). Work stress has consistently been a primary stressor for Americans over the years (APA, 2019). Stress is not only problematic in developed countries, but it is a global problem (Seňová & Antošová, 2014).

Each individual responds uniquely to the same stressor; for example, one may react positively and another negatively (Lazarus, 2000). Individuals may possess personality characteristics (inner resources) that help them appraise, adapt, and cope with stress (Bartone et al., 2019). In addition to internal resources, health-promoting lifestyle practices are linked with stress (Mak et al., 2018; Whatnall et al., 2019), positive lifestyle practices decrease stress (Drew et al., 2016).

The nursing school process can be stressful for students, which can affect their professional development and future career as nurses (Snyder, 2020). In this study, I examined the association of the lifestyle practice of weekly rest with stress and hardiness. As such, this study has the potential to provide additional knowledge of lifestyle practices that may decrease stress and improve personality characteristics that buffer stress among nursing students. The ultimate positive social change to be seen in lower attrition rates and the ability to provide quality patient care before and after graduation.

In this chapter I will provide the background, problem, purpose, and research questions and hypotheses for this study. I will also provide a concise overview of the theoretical framework based on Sawatsky's (1998) adaptation nursing model. The nature of my study, definitions, assumptions, scope and delimitations, limitations, and significance are included below.

Background

Stress is problematic for higher education students throughout the world (Deasy et al., 2014), and nursing students are no exception (Chan et al., 2019). Academics, workloads, grades (Lin et al., 2020), finances, social, and life balance conflicts (Pluut et al., 2015) are common stressors for university students. Nursing students not only have the same academic stress as other majors, but have additional challenges related to the clinical setting (Jenkins et al., 2019). In the clinical setting, nursing students interact with the patient and family (Llapa Rodrigues et al., 2016), provide patient care (Ahmed & Mohammed, 2019), deal with infectious diseases, suffering, and death (Llapa Rodrigues et al., 2016), all of which are significant stressors for student nurses. Coping with disparaging staff and continual appraisal of teachers (Bhurtun et al., 2019) can be especially challenging. Additionally, a chief stressor for nursing students is the fear of making an error and harming the patient (Suarez-Garcia et al., 2018).

Nursing students also experience physical and mental health problems, substance abuse, and performance issues due to stress. Stress has been reported to have an adverse effect on the neurological, immune (Williams & Crawford, 2016), cardiovascular (Urbanetto et al., 2019), endocrine (Olvera Alverez et al., 2019), gastrointestinal (Hsu et

al., 2018), and reproductive (Lee & Im, 2016) systems among nursing students. Sleep problems and fatigue are also related to stress in this group (Silva et al., 2019).

Nursing students experiencing stress are reported to have low levels of self-efficacy (Rayan, 2019), self-compassion (Luo et al., 2019), self-esteem, and a sense of belonging (Yıldırım et al., 2017). Anxiety (Shdaifat et al., 2020) and depression (Tung et al., 2018) are commonly related to stress among nursing students, with some presenting with suicidal ideation (Shamsaei et al., 2019). The use of tobacco, alcohol, recreational and non-prescribed drug use (Williams & Crawford, 2016) along with, stress eating (Urbanetto et al., 2019) are associated with stress among student nurses.

Performance problems for nursing students associated with stress are seen in both the academic and clinical domains (Ye et al., 2018). Nursing students report difficulty concentrating, learning (Hsu et al., 2018), and with critical thinking (Hutchinson & Janiszewski Goodin, 2013). Further, higher stress levels are predictive of lower grade point averages (GPA) for student nurses (Chen et al., 2015).

The ability to adapt and cope decreases as stress increases (Smith & Yang, 2017). Hardiness, a triad of personality characteristics of control, commitment, and challenge, reduces the detrimental impact of stress in the physical, mental, and behavioral domains among higher education students (Leslie & Hutchinson, 2018). College students with higher levels of hardiness report fewer physical complaints, lower anxiety (Kovács & Borcsa, 2017), and less suicidal ideation (Abdollahi, et al., 2015) than students with low levels of hardiness. Hardy university students can concentrate (Vealey & Perritt, 2015) and have good problem-solving skills (Abdollahi, et al., 2018). Greater hardiness levels

also have a positive effect on academic performance (Ayala & Manzano, 2018) and GPA (Maddi, et al., 2012), which reduces attrition rates (Ayala & Manzano, 2018). In sum, hardiness acts as a buffer for stress among nursing students (da Silva et al., 2014), enabling them to adapt to the stressors of the academic program (Sportsman et al., 2014). Nursing students with high levels of hardiness have a positive sense of belonging (Abdollahi & Noltemeyer, 2018) and experience less emotional exhaustion and burnout (da Silva et al., 2014).

Health-promoting lifestyle practices strengthen the ability to cope and reduce stress and strain in college students (Beccaria et al., 2016). Due to stress from nursing education, students often neglect lifestyle practices that promote health (Younas, 2017) and engage in practices that jeopardize it (Deasy et al., 2014). Nursing students who engage in self-care are better able to cope with stressors than those who do not (Jenkins et al., 2019). Unhealthy lifestyle practices such as poor diet (McSharry & Timmins, 2017), minimal exercise (Kinchen & Loerzel, 2019), inconsistent sleep hygiene (Cheung et al., 2016), tobacco, alcohol, and drug use (Williams & Crawford, 2016) are associated with stress in nursing students, affecting their overall well-being. Other self-care practices that nursing students reported as stress reducing were prayer and meditation, taking time for interpersonal relationships, animal therapy, relaxation, and creativity (Kinchen & Loerzel, 2019).

A lifestyle practice that positively influences mental and physical health is weekly rest, a 24-hour period of rest in each week (Superville et al., 2014). Working long hours and taking inadequate time to rest has a deleterious effect on well-being, effecting health

(Bannai & Tamakoshi, 2014) and performance (Pencavel, 2015). Taking a day off in each seven-day workweek for restoration is a vital facet of a healthy lifestyle (Morton, 2018).

The need for a day of restoration every seven days may be due to the seven-day rhythms seen within our world (Morton, 2018). Seven-day rhythms are seen in nature and humans. In the natural world, seven-day cycles are present in solar and geomagnetic activity (Cornélissen et al., 2002). They are also seen in single cells, plants, insects, fish, birds, rodents, animals, and humans (Reinberg et al., 2017).

In humans, seven-day rhythms have been observed in electrolytes (Birukov et al., 2016), hormones (Titze et al., 2014), metabolism (Ulmer & Cornélissen, 2013), clotting factors (Kanabrocki et al., 1995), and growth factors (Hugwil & Glassy, 2017). The human cardiovascular (Lee et al., 2013) and pulmonary (Kirchner et al., 2015) systems have seven-day patterns as well. Seven-day rhythms seen in the heart rate (HR) and blood pressure (BP) of neonates were associated with solar and geomagnetic activity (Breus et al., 2002).

The lifestyle practice of weekly rest provides the opportunity for self-care (Speedling, 2019). The practice of weekly rest has a positive impact on overall health (Superville et al., 2014) that has been observed in the neurological (Alstadhaug et al., 2007), musculoskeletal (Guerra et al., 2017), endocrine, and cardiovascular (Itani et al., 2017) systems. For example, work stress levels decrease after a 24-hour period of rest (Lyytikäinen et al., 2017). Weekly rest also affects mental well-being (De Moortel et al., 2017), with less depression observed among caregivers who practice it compared with those who do not (Guerra et al., 2017). Religious individuals and those not affiliated with

a religious group who practiced weekly rest experienced restoration, spiritual well-being, as well as time for relationships (Hough et al., 2019; Speedling, 2019).

Practicing weekly rest benefits healthcare professionals. For example, residents reported a reduction in perceived stress (Fletcher et al., 2011), feeling more alert (Philibert et al., 2013), and performing better academically and in clinical practice (Sandefur et al., 2017) when taking a day off each week. Improved patient care quality was an observed outcome of weekly rest in residents (Burchiel et al., 2017). Physicians also benefit from the practice of weekly rest, experiencing less burnout, depression (Saijo et al., 2014), fatigue, and better well-being (Tucker et al., 2010) than those who do not.

Not taking adequate time to rest each week is associated with fatigue (Blasche et al., 2017; Sagherian et al., 2017), burnout, absenteeism, and poor performance (Dyrbye et al., 2019) among nurses. Blasche et al. (2017) observed that weekly rest is needed for nurses to recover from job stressors and to provide quality patient care. When weekly rest is practiced, nurses report more vigor afterward and throughout the week (Drach-Zahavy & Marzuq, 2013).

Nursing students are the nurses of tomorrow. Currently, there are no studies about weekly rest and the nursing student. Health-promoting lifestyle practices, such as nutrition, physical activity, and no tobacco or alcohol use, are essential for nursing student health during education and throughout their professional career (Polat et al., 2016). Little is known, however, regarding the lifestyle practice of weekly rest among nursing students. This study provides the opportunity to observe whether weekly rest is associated with stress and hardiness among nursing students.

Problem Statement

Stress and health are interconnected (Lyon, 2012). The stress of too much work increases the risk of physiological and psychological health problems (Kleiner et al., 2015). Nurses experienced an increase in illness related absenteeism when work hours increased from eight hours a day to 12 hours (Rodriguez Santana et al., 2020). When work hours are long, there is insufficient time for recovery leading to health problems (Bannai & Tamakoshi, 2014). Employees working 11 or more hours per day were found to have double the risk of major depression than those working seven or eight hours (Virtanen et al., 2012). Researchers of an 18-month randomized control study observed that when working hours were reduced, workers experienced a reduction in stress, improved duration and quality of sleep, and a decrease in daytime fatigue (Schiller et al., 2017). When weekly hours were reduced from 39 to 30 hours for child and healthcare workers, cardiorespiratory, sleep quality, mental fatigue, and social relationships with friends and family improved (Akerstedt et al., 2001).

Long work hours are predictive of poor performance, a deterioration in motivation, and a decline in health (Kodz et al., 2003; Landrigan et al., 2004). Employees working more than 35 hours a week encounter stress, fatigue, reduced work input, and reduced productivity, which results in errors, injury, and illness (Pencavel, 2015). Not only is productivity decreased, but long work hours are associated with reduced learning capacity (Lee & Lim, 2017). When residents work long hours, they are five times more likely to make mistakes (Landrigan, 2004). Patient outcomes and satisfaction have consistently been related to healthcare giver fatigue and burnout (Johnson et al., 2018).

Nursing is a stressful profession (Dilig-Ruiz et al., 2018). Nurses experience stress from the responsibility of caring for their patients, being under-utilized, feelings of lack of control (Elshaer et al., 2018), the workload, conflicts with colleagues (Newman et al., 2020), and wages not reflecting the challenges of the job (Leng et al., 2020). Shift work, staffing issues, long working hours (Ross et al., 2017), and overtime (Leng et al., 2020) are significant stressors for nurses. Data show that nurses who frequently work overtime experience high work stress (Schilgen et al., 2020; Siebenhüner et al., 2020). Fatigue, burnout, and high turnover rates are frequently the result (Nejati et al., 2016). Nurses with work schedules with inadequate time off and working consecutive days in a row were more likely to experience depression (Westphal et al., 2015). Thus, nurse self-care is needed to combat the stress of nursing practice and influence quality patient care (Kinchen & Loerzel, 2019). Nurses need time for rest and restoration with respite during the shift (Nejati et al., 2016), and a rest day every week (Blasche et al., 2017).

Stress is the leading cause of graduate nurses leaving the profession (McCalla-Graham & De Gagne, 2015), with 21.2% attrition the first year (NSI Nursing Solutions, Inc., 2020) and 40% within ten years (World Health Organization [WHO], 2016). The stress experienced by students is similar to that of professional nurses (Akhu-Zaheya et al., 2015). Student nurse attrition is 9% to 42% globally (Bakker et al., 2020).

Nursing education is a challenging program of study, with a substantial workload (Chan et al., 2019). Olvera Alvarez et al. (2019) observed that nursing student lifetime stress was higher than students from other majors (Olvera Alvarez et al., 2019). Even before graduation, nursing students experience stress that increases their risk of

physiological and psychological health problems (Olvera Alvarez, 2019). Stress can impede the ability to learn by affecting concentration, the ability to retain information, and think critically (Magnavita, & Chiorri, 2018). Nursing students not only face the same academic stress that all college students do but have additional stress in the clinical setting due to dealing with people with real health problems (Sun et al., 2016).

Internal resources and lifestyle practices affect health (Pignolo, 2019). An internal resource resistant to stress is a personality style called hardiness (Booker et al., 2018). Hardiness is a collection of personality characteristics consisting of control (being in charge of one's destiny), commitment (the belief that what one is doing is significant), and challenge (determining that difficulties are opportunities; Kobasa, 1979). Hardiness has been found to buffer stress and enable nursing students to adjust to academic stressors (da Silva et al., 2014; Sportsman et al., 2014).

In addition to internal resources, lifestyle practices support an individual's ability to cope with stress (Jenkins et al., 2019). There is a significant positive relationship between the lifestyle practice of weekly rest and health (Morton, 2018), physical (Itani et al., 2017), and mental health (De Moortel et al., 2017). As of yet, weekly rest has not been studied in nursing students; however, lifestyle practices that promote health are necessary for nursing student success, professional careers, and for educating and modeling health to patients, families, and communities (Mills, 2015). Novice nurses with unhealthy lifestyle practices are more likely to leave the profession than those practicing self-care (Han et al., 2019). Thus, incorporating health-promoting lifestyle practices that lower stress and boost inner resources will better prepare nursing students personally and

professionally (Kinchen & Loerzel, 2019). What scholars do not know is whether the lifestyle practice of weekly rest, an uninterrupted 24-hour period of no gainful employment or academic endeavor in each seven-day week, will impact perceived stress and hardiness among BSN students who practice weekly rest, as compared to those who do not. Health-promoting lifestyle practices will ultimately bolster the nursing student's ability to provide quality patient care (Mills et al., 2015).

Purpose

The purpose of this comparative descriptive study was to examine whether there is a relationship between weekly rest, perceived stress, and hardiness among Bachelor of Science in Nursing (BSN) students who practice weekly rest compared with BSN students who do not. A cross-sectional quantitative design was utilized to explore whether the variable of weekly rest was associated with the variables of stress and hardiness among BSN students.

Research Questions and Hypotheses

The following research questions and hypotheses guided this study:

RQ1: – What is the relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest?

$H_0$1: There is no relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest.

H_a1: There is a relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest.

RQ2: – What was the relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest?

H_o2: There is no relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest.

H_a2: There is a relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest.

Perceived stress was measured by the Perceived Stress Scale (PSS) by Cohen (1983). The Hardiness Resilience Gauge (HRG; Bartone et al., 2019) measured hardiness. The survey also includes questions regarding whether weekly rest was practiced.

Theoretical Foundation for the Study

The theoretical framework for this study is Sawatsky's (1998) adaptation nursing model (ANM), which is a modification of Pollock's (1984) adaptation to chronic illness framework. Pollock's (1984) framework has its foundational origin in the work of Kobasa, et al. (1998) adapted the ANM to be a framework to comprehend the stress adaptation process and the stressful nature of nursing education. The major concepts of ANM are actual nursing student stress, perceived stress, hardiness characteristics, social resources, and successful coping related to the student's level of adaptation. Successful adaptation is dependent on the student's ability to cope, which rests on the personality characteristics of hardiness and social resources. The three hardiness characteristics of

control, commitment, and challenge provide a resistant resource for stress and act as buffer or mediator by improving coping and perception of stress. The positive relationship of social support strengthens the three hardiness characteristics and helps the student be confident and self-directed. This framework applies to this study due to its focus on actual stress, perceived stress, hardiness characteristics, and adaptation of the nursing student. An in-depth review of the ANM will be provided in the literature review of chapter 2.

Nature of the Study

The nature of this study is quantitative comparative descriptive. A comparative descriptive design allows between-group observation of variables as they naturally occur (Grove et al., 2013). Consistent with a cross-sectional design, the variable of weekly rest is not manipulated (Frankfort-Nachmias et al., 2015). I collected demographic data to determine whether the participants practice weekly rest. A comparative-group design allows for comparison of stress and hardiness between BSN students who practice weekly rest with those who do not.

Definitions

The conceptual definitions of the key-terms of this study are discussed below.

Hardiness: The inner courage to face stressful, potentially harmful life events and turn them into meaningful experiences (Maddi et al., 2011). Hardiness is a collection of three personality characteristics that are an internal resource resistant to stress (Sawatzky, 1998), which are control, commitment, and challenge (Kobasa, 1979). Control is one's ability to choose and influence one's life. Commitment is the determination to be

engaged in life, and challenge is the decision to learn and grow from life experiences (Kobasa, 1979).

Perceived stress: An individual's appraisal of circumstances to be beyond his or her ability to handle and a threat to his or her well-being (Lazarus & Folkman, 1984).

Stress: A stimulus, a reaction, and a process (Jackson & Frame, 2018). As a stimulus or a stressor, it is any environmental element or circumstance that necessitates a response. As a reaction, stress is the adaptive response to the stressor; as a process, stress is the interactivity of the stressor and adaptation (Jackson & Frame, 2018).

Weekly rest: An uninterrupted 24-hour period of no gainful employment (Fitzpatrick et al., 2011) and no academic endeavor in each seven-day week.

Assumptions

This study was based on a few assumptions. The first assumption is that nursing students desire to decrease or control their levels of stress. Second, nursing students desire inner characteristics that act as resources of strength and adaptability to stress. Lastly, I assume student nurses can follow directions and give an accurate report of their stress, hardiness, and practice of weekly rest.

Scope and Delimitations

I conducted a comparative descriptive study design. Other quantitative designs, such as experimental or quasi-experimental, were not appropriate for this study because the designs require manipulating the independent variable to identify causal relationships (Grove et al., 2013). A correlational design does not determine causality, but it identifies the strength of the relationship between variables (Grove et al., 2013). In this study, I

examined whether there was an association between variables, rather than causality or strength, making my study design descriptive. In this study, the weekly rest variable was not an intervention and was not manipulated. I examined whether there are differences in stress and hardiness between groups who already practice weekly rest and those who do not, making a comparative descriptive design a good fit. BSN students reported whether weekly rest was a lifestyle practice that was already incorporated in their self-care routine. Although many lifestyle practices are related to stress and hardiness among nursing students, this study was limited to one.

The participants were recruited by convenience sampling. To find a population that already practices weekly rest, I recruited from nursing programs that were more likely to have such students. Seventh-day Adventists advocate taking a 24-hour uninterrupted period each week for restoration (AdventistHealth, 2018). There are 56 Seventh-day Adventist (SDA) parochial, higher education institution-based nursing programs worldwide, 11 of which are in North America (Seventh-day Adventist Nursing Programs, 2017). This study's population was limited to BSN students since all the SDA parochial schools are BSN programs. However, this homogeneous population affects internal validity and limits generalizability.

A delimitation of this study was selecting of Sawatsky's (1998) revised adaptation nursing model over other theories on stress. Other theories I considered to base my research on were Roy's (1976) adaptation model, and Pollock's (1984) adaptation to chronic illness model. Both models highlight the stress adaptation process and physiological and psychological outcomes. In addition, Roy's model also included the

importance of the nurse's role in facilitating adaptation (Rice, 2012). Pollock's (1984) model includes the significance of one's perception of the stressor and an individual's inner resources in the adaptation process (Ford-Gilboe & Cohen, 2000). Sawatsky's (1998) adaptation nursing model is specific to the nursing student.

The scope of this study did not involve the role of the nurse or physiological outcomes for nursing students. Sawatsky's key concepts of actual stress, perceived stress, and hardiness in relation to nursing student adaptation applied in this study. The findings of this study may support the usefulness of Sawatsky's model in relation to nursing student stress and adaptation.

Limitations

A threat to internal validity in this study was the inability to ensure that the students' answers accurately reflect their actual levels of stress and hardiness. A survey allows for the threat of evaluation apprehension; participants self-report to be perceived as well-adjusted and competent. The survey included demographic information, the PSS by Cohen (1983) and the HRG, and questions regarding weekly rest were confidential and anonymous.

A threat to validity can be researcher bias. Experimenter expectancy, or expecting specific results, was minimal in this study since data were naturally occurring and not manipulated. However, a threat was hypothesis-guessing by nursing students who practice weekly rest (Grove et al., 2013). If the students were aware of the study's scope, they might be biased in their reports of stress and hardiness. Questions regarding weekly

rest were asked after the stress and hardiness instruments were completed to avert this potential threat.

The method of measurement can influence the findings of a study (Grove et al., 2013). Each variable's intensity was measured to avoid mistaken conclusions regarding the relationship of variables (Grove et al., 2013). Weekly rest is categorical and not linear; there were those who practiced it and those who did not. Likert scales were used to measure the intensity of the outcome variables of perceived stress and hardiness and to determine the degree of agreement or disagreement of a respondent's response (Houser, 2015).

Another potential threat to validity was the selection of the participants. The convenience sampling method of this study had the potential for bias (Houser, 2015). The participants attend parochial institutions advocating weekly rest; however, not all students attending practice weekly rest, allowing for comparison between groups. To decrease the potential for bias, I did not select subjects, but participation was voluntary (Houser, 2015). Since this study was descriptive, where the variable of weekly rest was not a manipulated intervention, and the students were not assigned to a group but were naturally occurring, causality could not be assigned, diminishing the risk to internal validity (Grove et al., 2013). Due to the population's homogeneous nature, the generalizability of the results was limited, but the findings could direct future studies.

Significance

The contribution of this study illuminated whether there is a relationship between weekly rest and perceived stress and hardiness among BSN nursing students. Health-

promoting lifestyle practices promote inner resources, such as hardiness (Lloyd & Campion, 2017), and reduce stress (Snyder, 2020). The findings provide additional knowledge regarding the connection between lifestyle practices and nursing student stress and hardiness.

The findings identified the stress and hardiness levels of nursing students who practice weekly rest, which inform the discipline of nursing education of the role of weekly rest as a health-promoting lifestyle practice to strengthen student hardiness and decrease stress. Low stress levels are associated with increased learning and critical thinking (Hutchinson & Janiszewski Goodin, 2013), impacting academic performance both in the classroom and clinical practice (Hsu et al., 2018). Since the clinical setting is a significant stressor for the student (Goodare, 2015) and may result in psychological and emotional impairment (Shaban et al., 2012), a decrease in perceived stress and greater hardiness increases the student's comfort in the clinical setting (Panga, 1990). Low stress and high hardiness levels increase student confidence and ability to apply knowledge and skills when relating to, assessing, and caring for the patient (Shaban et al., 2012).

Academic (Hamshire et al., 2013) and clinical (ten Hoeve et al., 2017) stress are attributed as major causes of nursing student attrition. Nursing student attrition rates range from 9% to 42% internationally (Bakker et al., 2020). The findings of this study have the potential for positive change by affecting attrition among nursing students. Lower stress levels are associated with low nursing student attrition and reduced financial strain for the student from changing majors (Kubec, 2017). Decreased attrition in schools of nursing will result in increased graduation rates to meet the global nursing shortage.

Stress may result in emotional impairment and maladaptive coping for the student affecting the nurse after graduation, impacting his or her career, and ultimately patient care (Shaban et al., 2012). Due to the stressful demands of the job, more than 21% of new nurses will leave their profession within one year of graduation (NSI Nursing Solutions, Inc., 2020) and 40% with ten years (WHO, 2016). As a result, the strain on healthcare is considerable. Turnover costs a hospital an average of $64,600 per nurse (Goss, 2015) and $3.6–$6.1 million annually (NSI Solutions, 2020). This does not include the cost to the novice nurse in terms of loss of time, effort, and tuition.

Higher stress levels have a negative impact on the nurse's ability to relate to, assess, and provide patient care resulting in suboptimal treatment (Sarafis et al., 2016). A hardy, newer nurse with lower levels of perceived stress is better equipped to provide superior care to the patient, resulting in higher patient quality of life, decreased readmission rates (Flanagan & Stamp, 2016), and an overall decrease in healthcare costs. This study determined whether the lifestyle practice of weekly rest is predictive of high hardiness and decreased perceived stress levels, which has the potential to diminish new nurse turnover rates, thereby reducing the cost to healthcare facilities (Duffield et al., 2014).

Summary

The background, problem, purpose, and significance of this study were presented in this chapter. Nursing students face significant stressors throughout their education process, in the classroom and in clinical practice (Jenkins et al., 2019). Higher levels of stress are associated with physical, mental (Gurková & Zeleníková, 2018), and

performance problems in nursing students (Ye et al., 2018). Hardiness is an inner resource that buffers and enables the nursing student to adapt to stress (da Silva et al., 2014; Sportsman et al., 2014). Previous research has shown that health-promoting lifestyle practices support inner resources (Lloyd & Campion, 2017) and reduce stress, improving nursing student well-being and decreasing attrition (Snyder, 2020).

Chapter 2: Literature Review

Introduction

Nursing education is stressful (McCarthy et al., 2018) with the risk of physical and mental health problems being linked with stress among nursing students (Olvera Alvarez et al., 2019). Nursing student performance is affected by stress to the extent that it impacts learning, applying knowledge, and the ability to provide patient care (Magnavita & Chiorri, 2018; Ye et al., 2018). Stress is also linked to increased nursing student (Kubec, 2017) and novice nurse attrition rates (WHO, 2016). Nursing students who experience high levels of perceived stress can experience impaired adaptation, which can carry over into their professional careers and ultimately impact patient care (Shaban et al., 2012).

Internal resources such as hardiness act as a buffer to stress and support nursing student well-being (Abdollahi & Noltemeyer, 2018; da Silva et al., 2014). Nursing students with high levels of hardiness are better able to cope with the stressors of their education and experience academic success (Olsen, 2017; Sportsman et al., 2014). Healthy lifestyle practices support hardiness (Lloyd & Campion, 2017).

Health-promoting lifestyle practices also support nursing student well-being (Snyder, 2020). Student nurses who do not practice self-care experience more stress than those who do (Jenkins et al., 2019). The lifestyle practice of weekly rest is associated with physical and mental well-being (Superville et al., 2014). Not only is one's physical and mental well-being affected by inadequate time off for rest and restoration (Bannai & Tamakoshi, 2014), but performance is negatively affected as well (Pencavel, 2015).

Studies are needed to examine the relationship of weekly rest with stress and hardiness among nursing students. The purpose of this study was to identify whether there is such an association.

Chapter 2 contains the literature search strategy, the theoretical foundation, theory application, theory selection rationale, and key variables. I reviewed relevant literature regarding perceived stress, hardiness, and weekly rest among nursing students. Lastly, I provided a synopsis of the literature and the identified gap in knowledge related to the study's concepts.

Literature Search Strategy

To acquire literature on the key variables of stress, hardiness, and weekly rest among nursing students for this study, I used the Walden University library to access various databases. The databases were CINAHL, Embase, ERIC, MEDLINE, ProQuest Nursing and Allied Health, PsycARTICLES, PsycINFO, PubMed, and Ovid Nursing Journals Full Text. I also used the search engine Google Scholar to locate pertinent literature. My search focused on peer-reviewed articles and conference papers, as well as dissertations with publication dates of 2015 through 2020. Older articles, books, and textbooks were used for seminal work regarding concept development and theory. Due to limited literature regarding weekly rest, my search included research articles on seven-day rhythms. Keywords and phrases included in the literature search were *nursing students or student nurses, stress, hardiness, weekly rest, rest day, day off, Sabbath, chronobiology, biological rhythms, circaseptan, Pollock's adaptation nursing model,*

nursing students or student nurses and stress, nursing students or student nurses and hardiness, and *nursing students or student nurses and rest*.

Theoretical Foundation

The theoretical framework for my study is Sawatsky's (1998) revised adaptation nursing model. Sawatsky adjusted Pollock's (1984) adaptation to chronic illness model (ACIM) to specifically address nursing student stress. Pollock developed her middle-range theory to provide a nursing explanation of the complex process of adaptation to a stressor or stimuli (Pollock et al., 1990). According to the ACIM, nursing supports the patient to interact with the environment to promote effective adaptation and enhance health.

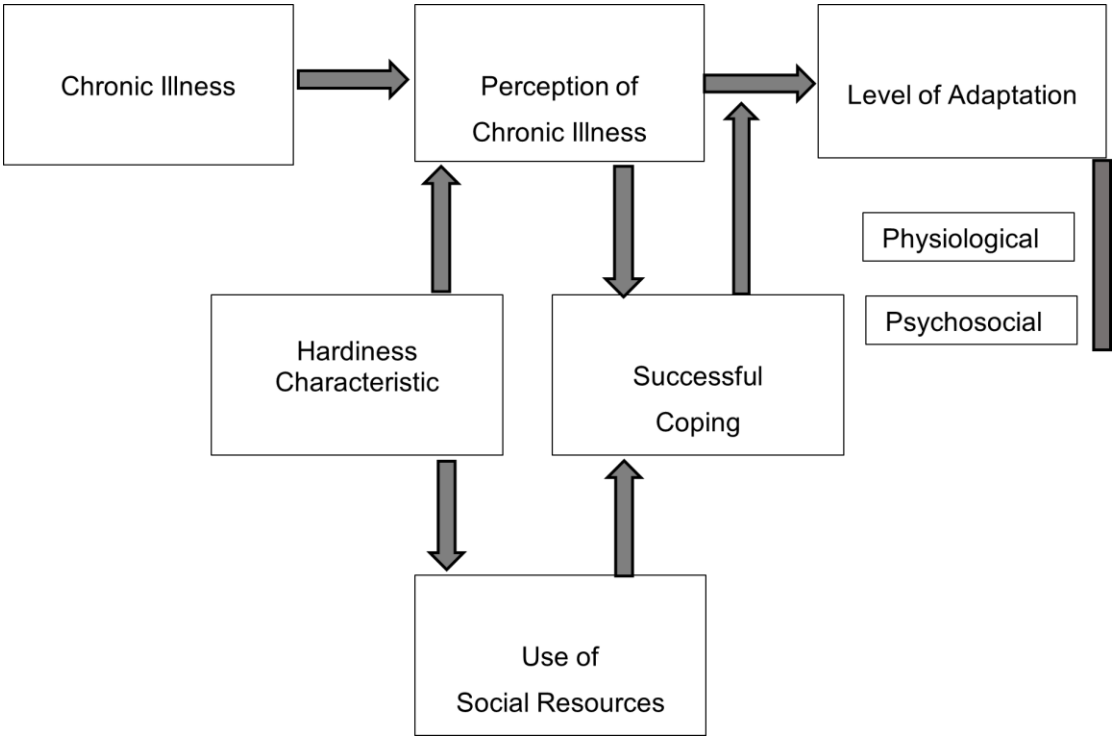
The foundation of Pollock's model was an integration of the theories of Selye, Lazarus, Helson, Roy, and Kobasa. The primary concepts are chronic illness as the stressor, perception of chronic illness, and level of adaptation depicted in physiological and psychosocial behavioral outcomes (Pollock, 1989). Successful coping, the personality characteristic of hardiness, and the use of social resources are also variables of the model (Figure 1).

Adaptation is a state of equilibrium between external demands and the internal response of the individual (Pollock et al., 1990). As a "holistic adaptive system," the individual continuously interacts with the environment to achieve and maintain balance (Roy et al., 1999, p. 3). A weighted mean of an individual's previous experience regarding a stimulus determines the one's level of adaptation (Helson, 1964). Stimuli may be endogenous or exogenous and are classified as focal, contextual, and residual.

Focal stimuli are the immediate stressors, such as chronic illness, psychological factors, and external aspects in the environment. Contextual stimuli are background elements that alter the focal stimuli. Residual stimuli are internal characteristics unique to the individual (Pollock, 1984).

Figure 1

Adaptation to Chronic Illness Model



Note: Figure 1. Moderating effect of hardiness. From "The Hardiness Characteristic: A Motivating Factor in Adaptation" by S. E. Pollock, *Advances in Nursing Science, 11*(2), 53-62. Reprinted with permission.

The adaptation process begins with the environment providing the stimulus or stressor, such as in the case of chronic illness. Pollock referred to the stress of chronic illness as chronicity (Pollock et al., 1990). Chronicity includes not only the illness itself, but also the duration of the disease and functional complications associated with the ailment.

As adaptive systems, individuals are continuously interrelating with focal, contextual, and residual stimuli using regulator and cognator subsystems that promote adaptation (Pollock, 1993). The regulator subsystem is an automatic physiological response involving chemical, endocrine, and neural pathways (Roy et al., 1999), whereas the cognator (psychosocial) subsystem uses perception, previous experiences, emotion, and judgment (Figure 1). Perception is the link between the subsystems (Pollock, 1993). Further, perception interprets the stimuli through cognitive awareness.

Stress can be positive or negative. Individuals react differently to the same stimuli or stressor, and what one individual finds stressful may not bother another (Lazarus, 2000; Selye, 1976). Eustress has a positive, healthy effect (Selye, 1976), whereas, distress has a negative, pathogenic effect. Appraisal of the stimulus is what differentiates whether it is viewed as eustress or distress. The appraisal process is grounded in one's beliefs, values, motives, and coping (Lazarus, 2000). Perception of the stimulus is as significant as the classification of the stressor in determining adaptation (Pollock, 1984).

Coping is an essential variable in adaptation. Successful coping improves or ideally annuls the stressor (Pollock, 1984). Perception of the severity of the stressor is dependent on experiences regarding the stimulus and coping ability. The individual initiates coping methods in response to his or her perception of how emotionally distressing a loss is, based on how important it is to one's well-being (Lazarus, 2000). Individuals use both emotion-focused and problem-focused coping. The use of emotions in response to a stressor is emotion-focused coping. When one determines to take steps to manage or change the situation, problem-focused coping is being used (Lazarus &

Folkman, 1984). Successful coping and the level of adaptation can be seen in physiologic and psychological behaviors or outcomes (Pollock, 1984). Thus, effective adaptation is dependent on positive coping and results in physiological, psychological, and social well-being.

Genetic factors, social support system, lifestyle practices, and personality are factors to be considered when assessing why some individuals become ill and others remain healthy (Kobasa, 1979). Some personality dispositions diminish negative stress. Hardiness is a collection of three personality characteristics composed of control, commitment, and challenge, which influence individual coping and serve as a buffer to stress (Kobasa, 1979). Control is the belief that one can influence her or his situation and is in charge of her or his destiny, instead of being powerless (Kobasa, 1979). Not only does one have decisional control, but cognitive control. Cognitive control is the ability to appraise the situation and choose appropriate coping skills to transform the event.

Commitment is active engagement in life and a strong sense of purpose (Kobasa, 1979). When commitment is present, events and relationships in the environment are meaningful. With higher levels of commitment, the individual is involved and invested in oneself and social relationships, as opposed to being passive, avoidant, and alienated (Kobasa et al., 1982). Challenge is the position that change is a normal part of life and provides the opportunity to grow (Kobasa et al., 1982). The individual with a higher level of challenge is "cognitively flexible," allowing for effective appraisal of new situations (Kobasa, 1979, p. 4). He or she values interesting experiences, selecting resources to cope and change (Kobasa et al., 1982).

Hardiness can have a direct and indirect impact on adaptation (Pollock, 1989). Hardiness can directly affect adaptation without an intervening variable that may influence physiologic or psychosocial outcomes. It can also indirectly effect outcomes and behaviors through a mediating variable that influences perception, the selection of coping method, or the use of social resources (Figure 1). Individuals with higher hardiness are more likely to perceive the illness as having a positive impact and choose to participate in healthy activities to improve their health status (Pollock, 1989).

Social resources are another facet of the ACIM and can be positive or negative. For example, social interaction has the potential to be stressful and pathogenic, which may result in illness (Lazarus & Folkman, 1984). When the social environment is positive, however, it provides the structure for the individual to successfully cope and adapt (Kobasa et al., 1982; Pollock, 1989).

Sawatzky (1998) modified Pollock's (1984) ACIM to understand nursing student stress and adaptation, calling it the adaptation nursing model revised. Sawatzky maintained the stress adaptive process while adjusting the focal stimuli of chronic illness and perception of chronic illness to nursing student actual and perceived stress as seen in Figure 2. While Sawatzky discussed that the level of adaptation could be observed in physiological and psychosocial outcomes, she did not display them in her graphic conceptualization. The fundamentals of hardiness acting as a buffer by influencing perception of the stressor and having a positive impact on cognitive and behavioral coping are retained. Also, the positive effect hardiness has on the use of social resources,

and the role that social support has on successful coping is also retained (Sawatzky, 1998).

Figure 2

The Adaptation Nursing Model (revised)

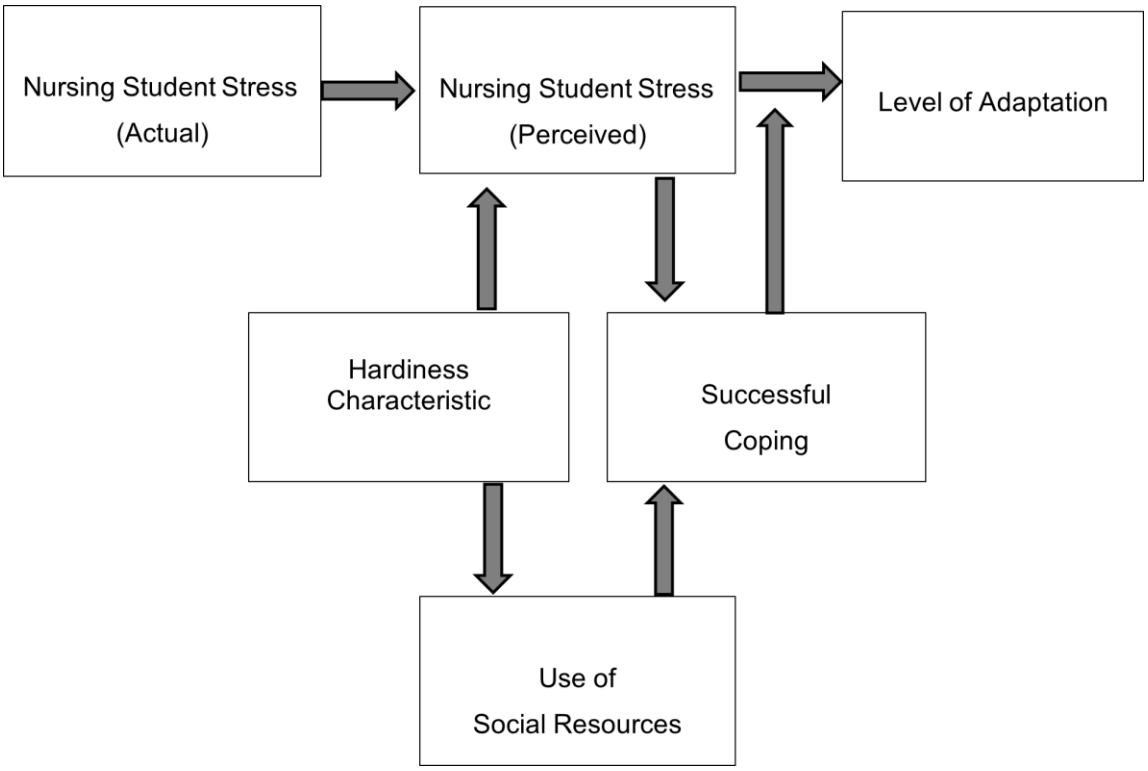


Figure 2. Sawatzky's revision of the Adaptation of Chronic Illness Model. From "Understanding nursing students' stress: a proposed framework," by J. V. Sawatzky, *Nurse Education Today, 18*, p. 108-115. Reprinted with permission from author.

Theory Application

Empirical support for the ACIM is fairly consistent. Pollock did various studies on chronic illness and the adaptation process. The premise that physiologic and psychosocial outcomes are indicative of the level of adaptation was supported in a synthesis of five of Pollock's (1993) studies that were done over seven years. Although physiologic and psychosocial adaptation were not related in the total group, when

comparing the different illness groups, physiologic and psychosocial adaptation had a positive relationship in diabetic adults but not the other chronic illnesses (Pollock, 1993). Physiologic adaptation varied among chronic illness groups signifying that it was disease-specific. However, psychosocial adaptation did not differ suggesting that the process was comparable among chronic illnesses and unrelated to diagnosis.

Hardiness had both a direct and indirect effect on adaptation (Pollock, 1993). Hardiness was positively related to physiologic and psychosocial adaptation in all studies, but the type of adaptation varied by diagnosis, which indicates that hardiness may have a direct effect on the ability to tolerate stress. Moreover, hardiness was related to participation in the use of social support, healthful activities, and education regarding illness. In turn, these activities were positively related to physiologic and psychosocial adaptation. Hardy individuals were more likely to engage in activities that promote health and indirectly have a positive impact physiologically.

ACIM's concept of perception of illness was also supported. Hardiness was found to change perception and the ability to tolerate stress (Pollock, 1993). The ability to tolerate change and stress varied among chronic illnesses but was related to increased adaptive behavior. Perception of the impact of chronic illness also varied among diseases and was observed to have a positive association with physiologic adaptation. Psychosocial adaptation was positively related to the perception of illness in all groups. The hardiness relationship with perception was also observed to effect which coping method was used, emotion or problem oriented coping (Pollock, 1989). Individuals low in hardiness perceived the impact of their illness as a threat and used emotion-based

coping. Furthermore, high hardiness was associated with problem-based coping and engagement in health-promoting activities (Pollock, 1989).

A more recent study with the ACIM as a framework examined hardiness in individuals with hemophilia (Brooks, 2008). The findings revealed that the perception of the impact of illness affects the perception of health status. When an individual perceives that his or illness is having a significant impact, there is a decreased perception of one's health and poorer psychosocial adaptation. An individual who has a positive perception of their health is less affected by the illness. Pollock (1993) held that perception was a better indicator of adaptation than the acuity of the illness. Brooks (2008) also observed that individuals high in hardiness experience greater psychosocial adaptation, and have a better perception of their health status. The results of Brook's study supported two of the tenets of the ACIM, which are the importance of personality characteristics and perception in the adaptation process. In another study, the ACIM was used to guide a study examining the psychosocial reaction to chronic illness, and perception of access to care and financial support of those with asbestos-related disease (Winters et al., 2011). The results indicated that depression negatively influenced the perception of care and financial support. These findings are congruent with the propositions of perception of illness, hardiness, and psychosocial outcomes.

Seventy-one participants with heart failure participated in a randomized controlled study using the ACIM to examine the effects of exercise on adaptation and perception of the impact of chronic illness (Harris, 2012). After 12 weeks of a home-based of low-intensity resistance training and aerobic exercise, the intervention group

showed improvement of both physiological and psychosocial outcomes. They improved and were able to walk farther, increased their daily pedometer average, had fewer hospitalizations, and their perception of their health status was more positive than the control group. The findings supported the proposition of perception in the ACIM on physiologic and psychosocial outcomes.

Researchers in Spain used Sawatzky's (1998) proposed revision of Pollock's (1984) adaptation nursing model to understand stress in novice and experienced nursing students (Jimenez et al., 2010). Nursing students in this cross-sectional study experienced clinical, academic, and external stressors with physiologic and psychologic outcomes. All students perceived clinical to be the most stressful, ranking aspects of patient care as the most difficult, followed by a lack of knowledge and skills, clinical assignments and workload, evaluation of student competence, staff, and teachers, and clinical hours conflicting with daily life. The students experienced psychological symptoms more often than physiological. The most common was anxiety, nervousness, a negative view about the future, and indecisiveness. Other symptoms that impacted student health were cognitive difficulties such as unclear thinking, depression, headaches, colds, gastrointestinal problems, pressure in the chest, difficulty breathing, dizziness, sweaty palms, numbness, and tingling. Experienced students underwent more clinical and academic stress than novice students, with second-year students presenting with the most psychological and physiological symptoms. Experienced students might have more responsibility and greater academic and clinical demands than novice students. Nursing student experience and the educational level in the nursing program are contextual factors

that influence adaptation, which supports the theoretical concept of contextual stimuli in adaptation.

The ACIM was used in the framework development of the Woman to Woman project, a computerized social support platform for chronically ill women (Cudney et al., 2005). The findings supported the importance of the psychosocial process in successful adaptation to chronic illness. Depression, loneliness, self-efficacy, and stress improved with a significant change in self-esteem, empowerment, and social support (Hill et al., 2006). Successful adaptation is dependent on positive social support (Spring et al., 2011).

Theory Selection Rationale

Health-promoting activities buffer the effects of stress and positively influence the stress adaptation process. Although it is not possible for the nursing student to change the actual stressor (focal stimuli), it is possible to identify contextual stimuli (interventions) that will promote adaptation. In my study, I examined the relationship between the practice of weekly rest and the concepts of perceived stress and hardiness among BSN students. Research has shown that lifestyle practices can significantly affect stress. Adequate sleep (Jackson et al., 2014), nutrition (Ansari et al., 2014), and exercise (Gerber et al., 2013; Gillan et al., 2013) are just a few lifestyle practices that reduce stress. The practice of weekly rest may be a method of preventing the deleterious effects of stress and have a positive impact on adaptation. According to the tenets of Sawatzky's (1998) revised nursing adaptation model, the nursing student's perception directly influences successful coping and the level of adaptation. In my study, I explored whether the practice of weekly rest supported successful coping and effective adaptation by observing

the psychological outcome of perceived stress in nursing students. I also explored whether the practice of weekly rest was supportive of hardiness in the nursing student. Within Sawatzky's (1998) model, hardiness positively influences perception and successful coping, thereby reducing stress, which affects the nursing student's level of adaptation.

Literature Review Related to Key Variables

The key variables of perceived stress, hardiness, and weekly rest were the focus of this study's literature review. The variables are discussed in relation to nursing students and the general population.

Perceived Stress

Stress and health are interconnected (Lyon, 2012). Stress is the body's response to a demand or stressor, which can be positive or negative (Selye, 1976). Selye, an endocrinologist, is the father of stress research (The Canadian Medical Hall of Fame, 2006). Selye observed that different types of stimuli had similar physiological responses. There is a physiological alarm response when a stressor is introduced, followed by resistance as the body attempts to return to a healthy state (Lipsky et al., 2004). Stress can be acute or chronic; it may be repetitive or happen once, mild or severe, predictable or uncontrolled (Lucassen et al., 2014). If the stressful situation continues, the physiological response can deplete biological resources, resulting in the final phase of exhaustion, which is the body's inability to resist stress, which may result in illness (Lipsky et al., 2004).

The same stressor can provoke different responses in people, unique to each individual (Lazarus, 2000; Selye, 1976). Different reactions to the same stressor prompted Lazarus (2000) to examine the cognitive process of stress, which is dependent upon the individual's evaluation and the personal significance of the stressor. An individual is continually appraising the situation concerning his or her well-being based on his or her knowledge and beliefs. The individual appraises how distressing a situation is based on how important it is to one's well-being and then initiates coping methods to minimize the stress (Lazarus, 2000).

Stress can be physically and psychologically demanding (Klainin-Yobas et al. (2014). Physical stress is any "event(s) that challenge the body to function beyond normal capacity," while psychological stress is mentally challenging (Cohen et al., 2003, pp. 169-170). In this study, perceived stress is defined as when circumstances are "appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19).

Effects of Stress

Stress affects every system of the body (American Psychological Association [APA], 2020). When under stress, cortisol, the stress hormone, is released (APA, 2020), and cortisol antagonists are decreased (Lennartsson et al., 2013). When stress is chronic there is an increased risk of physiological and psychological health problems (APA, 2020; Kleiner et al., 2015; Lennartsson et al., 2013).

Physiological. Neurological problems associated with stress are headaches, migraines (APA, 2020), and increased intraocular pressure in individuals with glaucoma

(Gillmann et al., 2019). Cortisol levels increase in response to acute or chronic pain (Hingert et al., 2019). Cognitive effects have been identified with acute physical and psychological stress, which reduces auditory processing (Jafari et al., 2017). Difficulty focusing and a decline in job performance are also associated with stress (Bowen et al., 2014; Jackson & Frame, 2018).

The effects of stress are also seen in the muscle-skeletal system. Tension headaches and migraines are often due to chronic muscle tension of the neck and shoulders, while lower back and upper extremity pain are attributed to job stress (APA, 2020). Hingert et al. (2019) found that continuous cortisol exposure contributes to inflammation in the vertebral discs and inhibits cartilage formation.

Cardiopulmonary symptoms associated with stress are tachypnea and dyspnea due to airway and lung constriction (APA, 2020). Extreme stress can even trigger asthma attacks (APA, 2020). Acute stress is also related to tachycardia, vasodilation, increased cardiac contractility, and hypertension (APA, 2020). Chronic stress elevates stress hormones, resulting in tachycardia, hypertension, myocardial infarction, cerebral vascular accident (APA, 2020), and death (Jackson & Frame, 2018).

In the endocrine system, glucocorticoids and cortisol are released during acute stress to provide energy to meet the challenge and reduce inflammation (APA, 2020). With chronic stress, elevated cortisol levels are correlated with hyperlipidemia, diabetes, and obesity (APA, 2020). The immune system is compromised by chronic stress. The regulatory ability of glucocorticoid and cortisol in the immune system is decreased, increasing systemic inflammation and chronic fatigue (APA, 2020). Researchers

investigating perceived stress and immunity in university students found that when stress increased, salivary immunoglobin A1 levels decreased (Engeland et al., 2016).

Stress affects the gastrointestinal system and may result in loss of appetite or overeating, acid reflux, dysphagia, increased eructation, bloating, flatulence, nausea, vomiting, gastric and intestinal pain, and even cause esophageal and intestinal spasms (APA, 2020). Individuals under stress may experience digestive problems affecting peristalsis, resulting in constipation or diarrhea. Chronic stress changes the intestinal flora, affecting mood and cognitive functioning (APA, 2020). Prolonged stress impairs the intestinal barrier, resulting in intestinal flora crossing into the peritoneal cavity (APA, 2020).

The reproductive system is also affected by stress. Stress can decrease libido in women and men (APA, 2020). Men can experience erectile dysfunction and are prone to testicular, prostate, and urinary infections due to the impact of stress on the immune system (APA, 2020).

Chronic stress can harm fertility. Prolonged stress can inhibit testosterone production, affecting sperm maturity, production, and motility (APA, 2020). In women, chronic stress can negatively impact conception and adversely affect the antepartum and postpartum periods (APA, 2020). When anxiety and depression increase, it negatively impacts the fetus, and after birth, it affects maternal-infant bonding (APA, 2020).

Stress can exacerbate premenstrual symptoms, such as fluid retention, abdominal distention, pain, and mood swings (APA, 2020). Increased stress can also cause menstrual cycle complications, such as hypomenorrhagia, menorrhagia, amenorrhea,

metrorrhagia, oligomenorrhea, and dysmenorrhea (APA, 2020). In older women, chronic stress can worsen menopausal symptoms (APA, 2020).

Psychological. Psychological problems found to be associated with stress are irritability, exhaustion (Jackson & Frame, 2018), anxiety, depression (APA, 2020; Jackson & Frame, 2018), and suicidal tendencies (Liang et al., 2020). Sleep problems, such as insomnia, are associated with stress (Bowen et al., 2014; Jackson & Frame, 2018). Increased tension, feeling underappreciated, and a negative self-view of work performance have also been associated with work stress (Bowen et al., 2014).

Sociological and Behavioral. Increased work stress was associated with decreased time for social activities, resulting in strain on family and social relationships (Bowen et al., 2014). Behavioral problems associated with stress include the consumption of alcohol, tobacco, and narcotics (Bowen et al., 2014). Fifty-six percent of individuals experiencing work stress consumed more than 3.8 liters of alcohol per week, with 4% drinking more than 7 liters a week (Bowen et al., 2014).

Nursing Student

Stress is common to people of all ages. On a scale of one to ten, a stress level of 3.8 is considered healthy (APA, 2019). Younger generations have a more difficult time with stress management than more mature generations and are more likely to turn to unhealthy behaviors such as stress eating, smoking, and drinking (APA, 2012). The younger the individual, the higher the stress level, with Gen Z reporting a stress level of 5.8, compared to 4.2 and 3.0 for Baby Boomers and older adults, respectively (APA,

2019). Nursing students experience stress early in their academic journey and as novice nurses (Snyder, 2020).

Nursing Student Stressors. Nursing students experience stress through a variety of sources. Systematic reviews of nursing students have identified academic and clinical practice to be stressors for students (Labrague et al., 2017; Labrague, et al., 2018). In an integrative review by McCarthy et al. (2018), finances, clinical practice, and academics were found to be stressful for nursing students.

Academic. Academic workload is found to be a stressor for nursing globally: China (Guo et al., 2019), Ghana (Sossah & Asiedu, 2015), India (Labrague et al., 2017), Japan (Watson et al., 2018), Jordan (Shudifat & Husban, 2015), Kingdom of Saudia Arabia, (Labrague, et al., 2018), Malaysia (Masilamani et al., 2019), Singapore (Suen et al., 2016), Spain (Sarabia-Cobo et al., 2020) and Greece, Nigeria, and the Philippines (Labrague, et al., 2018). The teacher's approach, expectations, and institutional support influenced Pakistani student nurse learning ability (Tharani et al., 2017). In Uganda, students found the academic curriculum to be the most stressful, which made class lectures dissatisfying (Amanya et al., 2018). Turkish nursing students also found lectures (Bagcivan et al., 2015; Karaca et al., 2017), rigorous theoretical lessons, and high pupil-to-teacher ratios to be sources of stress (Bagcivan et al., 2015). Ugandan students were also dissatisfied with class lectures (Amanya et al., 2018).

In addition to class workloads, nursing students from India found grades stressful (Dasgupta et al., 2020). A main stressor for nursing students in the U. S. was the need to get an A, not only in nursing courses but in every course (Poorman & Mastorovich,

2019). Examination performance was a significant source of stress for nursing students in Austria (Augner, 2015) and Uganda (Amanya et al., 2018). In an exploratory study of n=342 undergraduate nursing students, 14% experienced moderate to severe test anxiety (Vaz et al., 2018).

High-fidelity simulation is a valuable educational tool. However, it was associated with moderate to high stress levels in nursing students (Cantrell et al., 2017) and found to escalate student self-perception of incompetence (Boostel et al., 2018). In a mixed methods study of third-year students, heart rate variability (HRV) was measured during simulation (Nakayama et al., 2018). HRV decreased when giving care and decreased further when reporting, indicating simulation is stressful for students but resumed normal during break time and debriefing.

Nursing student stressors vary across countries and cultures (Labrague, et al., 2018). When comparing Greek, Nigeria, and Philippine nursing students, Philippine students experienced more stress with theory, skills, assignments, and workloads than both Grecian and Nigerian students (Labrague, et al., 2018). Whereas, Nigerian students found caring for patients and interactions with faculty and nursing staff more stressful than Philippine or Grecian students. Watson et al. (2017) found that Pakistani nursing students did not identify specific stressors like other countries do. Watson et al. attributed this to cultural differences and the fundamental structure of nursing programs in Pakistan.

Clinical. In systematic (Labrague et al., 2017) and integrative reviews (McCarthy et al., 2018), clinical practice was the highest source of stress for nursing students. Clinical practice is a stressor for nursing students throughout the world: Brazil (Almeida

et al., 2018; Llapa Rodrigues et al., 2016; Oliveira Bosso et al., 2017; Ribeiro et al., 2020), Canada (Chernomas & Shapiro, 2013), China (Guo et al., 2019; Liu et al., 2015; Ye et al., 2018; Zhao et al., 2015), Czech Republic (Gurková, & Zeleníková, 2018), Ghana (Atakro et al., 2019; Sossah & Asiedu, 2015), Greece (Labrague, et al., 2018), India (Dasgupta et al., 2020), Iran (Bazrafkan & Najafi Kalyani, 2018; Najafi Doulatabad et al., 2015; Rafati et al., 2020; Rafati et al., 2017), Israel (Admi et al., 2018), Jamaica (Graham et al., 2016), Japan (Watson et al., 2018), Jordan (Khater et al., 2014; Shudifat & Husban, 2015), KSA (Ahmed & Mohammed, 2019; Al-Gamal et al., 2018; Alyousef, 2019; Hamaideh et al., 2017; Labrague, et al., 2018; Shdaifat et al., 2020), Malaysia (Ab Latif & Mat Nor, 2019; Masilamani et al., 2019), Poland (Bodys-Cupak et al., 2019), Nigeria (Labrague, et al., 2018), Philippines (Labrague, et al., 2018), Singapore (Suen et al., 2016), Slovakia (Gurková, & Zeleníková, 2018), Spain (Sánchez-Conde et al., 2019; Sánchez de Miguel et al., 2020; Sarabia-Cobo et al., 2020; Suarez-Garcia et al., 2018; Valero-Chillerón et al., 2019), Taiwan (Hsu et al., 2018; Perng et al., 2020; Sun, Long, et al., 2016), Turkey (Bagcivan et al., 2015; Serçekuş & Başkale, 2016), UK (Galvin et al., 2015; Tee et al., 2016), United States (Grobecker, 2016; Wallace et al., 2015; Wolf et al., 2015). Clinical stressors accounted for 22% of the variance in nursing students' health, compared to academic stress, which accounted for only 5% in nursing students from Slovakia and the Czech Republic (Gurková & Zeleníková, 2018).

While clinical stressors are common to nursing students globally, stress levels vary. Bhurtun et al. (2019) found that nursing students were subjected to moderate to high stress levels associated with clinical stressors. Medium to high stress levels was also

found in nursing students from Brazil (Ribeiro et al., 2020), Jamaica (Graham et al., 2016), Philippines (Labrague, et al., 2018), Poland (Bodys-Cupak et al., 2019), and Spain (Sánchez-Conde et al., 2019). Nursing students from China (Zhao et al., 2015) and KSA (Ahmed & Mohammed, 2019; Hamaideh et al., 2017) felt moderate stress. Whereas, Israeli (Admi et al., 2018) and Jordanian (Khater et al., 2014) students experienced mild to moderate stress levels.

Common clinical stressors for the nursing student are related to the clinical setting and patient care, workload and performance, instructors, and medical staff (Bhurtun et al., 2019). Nursing students from Brazil (Almeida et al., 2018; Oliveira Bosso et al., 2017; Ribeiro et al., 2020), Iran (Bazrafkan & Najafi Kalyani, 2018), Jamaica (Graham et al., 2016), Jordan (Khater et al., 2014), and the KSA (Ahmed & Mohammed, 2019; Hamaideh et al., 2017) found the clinical environment to be highly stressful. However, another study in the KSA found the clinical setting to be the least stressful (Al-Gamal et al., 2018). Lack of resources in the clinical setting (Admi et al., 2018) and inadequate care (Rafati et al., 2017) were also sources of stress.

Student nurses experience stress before, during, and after clinical practice (Chernomas & Shapiro, 2013). Pre-clinical students experience increasing worry and fear (Sun, Long, et al., 2016), have difficulty sleeping the night before, and feel unprepared (Chernomas & Shapiro, 2013). Anxiety and self-doubt increased throughout clinical hindering, student learning and inhibiting the students' ability to relate with their patients (Sun et al., 2016) and provide care (Chernomas & Shapiro, 2013). High levels of stress,

before and throughout clinical, can bring about physical reactions of discomfort (Chernomas & Shapiro, 2013).

Iranian and Spanish students found the clinical setting unfamiliar, uncertain, and unpredictable (Rafati et al., 2017; Valero-Chillerón et al., 2019). Qualitative research on nursing students from Ghana revealed that the students felt isolated and found the conditions and equipment complex and intimidating (Atakro et al., 2019). Needle sticks and dealing with infectious diseases was a stressor for Brazilian (Llapa Rodrigues et al., 2016) and Iranian student nurses (Najafi Doulatabad et al., 2015).

Providing basic patient care is a stressor for student nurses (Ahmed & Mohammed, 2019; Akhu-Zaheya et al., 2015; Al-Gamal et al., 2018; Najafi Doulatabad et al., 2015; Ribeiro et al., 2020; Zhao et al., 2015). Jordan nursing students lacked confidence in their ability to provide care (Khater et al., 2014). Nursing students feel responsible for their patients (Liu et al., 2015) and are fearful of making a mistake and harming them (Graham et al., 2016; Suarez-Garcia et al., 2018). However, providing patient care was one of the least stressful aspects of clinical practice for nursing students from the KSA (Hamaideh et al., 2017), Jordan (Khater et al., 2014), and Malaysia (Ab Latif & Mat Nor, 2019).

Interacting with and relating to patients is a stressor for nursing students (Llapa Rodrigues et al., 2016; McCloughen et al., 2020). Llapa Rodrigues (2016) found that Brazilian nursing students were fearful of patient relationships. Furthermore, when Australian student nurses had difficult interactions with patients, the experienced negative feelings of being ignored and isolated (McCloughen et al., 2020). In contrast,

when patient interaction was positive, Turkish students perceived the patient to be supportive, which positively affected student confidence and learning (Serçekuş & Başkale, 2016). Communication and close patient contact were low sources of stress for student nurses from Jordan (Khater et al., 2014) and Poland (Bodys-Cupak et al., 2019).

Nursing students find uncertainty related to the severity of patient illness difficult (Bodys-Cupak et al., 2019; Sun et al., 2016; Valero-Chillerón et al., 2019). Uncertainty regarding patient illness left the Spanish students feeling helpless (Valero-Chillerón et al., 2019). Patient suffering and death are highly stressful for student nurses in Brazil (Llapa Rodrigues et al., 2016), Iran (Najafi Doulatabad et al., 2015; Rafati et al., 2017), Israel (Admi et al., 2018), Poland (Bodys-Cupak et al., 2019), the United States (Wallace et al., 2015), and Turkey (Bagcivan et al., 2015). However, caring for terminally ill patients was a low source of stress for Spanish students (Suarez-Garcia et al., 2018).

Fear of making errors is a significant stressor for nursing students (Bhurtun et al., 2019). Nursing students from China (Liu et al., 2015), Iran (Rafati et al., 2017), Jamaica (Graham et al., 2016), Malaysia (Ab Latif & Mat Nor, 2019), Iran (Najafi Doulatabad et al., 2015), Spain (Suarez-Garcia et al., 2018), Taiwan (Perng et al., 2020), Turkey (Bagcivan et al., 2015), and the United States indicated that the possibility of making a mistake was stressful (Wallace et al., 2015). Medication administration is an area where errors can be made that nursing students find highly stressful (Valero-Chillerón et al., 2019). Spanish students were also concerned that they might make a mistake that could harm the patient and themselves (Suarez-Garcia et al., 2018).

In a mixed methods study, Canadian student nurses felt unprepared to care for their patients (Chernomas & Shapiro, 2013). Students from Brazil (Llapa Rodrigues et al., 2016), China (Zhao et al., 2015), Iran (Najafi Doulatabad et al., 2015; Rafati et al., 2017), Poland (Bodys-Cupak et al., 2019), and Spain (Suarez-Garcia et al., 2018) found clinical practice to be stressful and were unable to help their patients. Brazilian (De Souza et al., 2016; Oliveira Bosso et al., 2017), Iranian (Bazrafkan & Najafi Kalyani, 2018), and Saudi (Alyousef, 2019) nursing students found their training to be inadequate; with students from Iran attributing it to poor instructor preparation and poor use of student time (Bazrafkan & Najafi Kalyani, 2018).

Perceived stress had a negative effect on learning and skill competence in nursing students from the United States and the U. S. Territories (Grobecker, 2016). Bhurtun et al. (2019) found the lack of knowledge and skills in clinical practice to be a significant stressor for student nurses, as did studies done in Brazil (Ribeiro et al., 2020), Czech Republic, and Slovakia (Gurková & Zeleníková, 2018), Jordan (Akhu-Zaheya et al., 2015), and the Kingdom of Saudi Arabia (Alyousef, 2019). Application of knowledge and performance of procedures in future practice was also stressful (Ribeiro et al., 2020). In contrast, a lack of knowledge and skills were not considered to be stressful for student nurses in China (Zhao et al., 2015), Jordan (Khater et al., 2014), KSA (Ahmed & Mohammed, 2019; Al-Gamal et al., 2018; Hamaideh et al., 2017), and Malaysia (Ab Latif & Mat Nor, 2019).

Clinical assignments and workload were identified to be a significant stressor for student nurses (Bhurtun et al., 2019). Nursing students from Brazil (Llapa Rodrigues et

al., 2016), China (Liu et al., 2015; Zhao et al., 2015), Jordan (Akhu-Zaheya et al., 2015; Khater et al., 2014), KSA (Ahmed & Mohammed, 2019; Al-Gamal et al., 2018; Hamaideh et al., 2017), Malaysia (Ab Latif & Mat Nor, 2019), Taiwan (Perng et al., 2020), Spain (Sánchez de Miguel et al., 2020), the United Kingdom (Galvin et al., 2015), and the United States (Wallace et al., 2015) have all identified clinical assignments and workload to be stressful. There is insufficient time to prepare or carry out patient care (Wallace et al., 2015). Sánchez de Miguel et al. (2020) found a significant relationship between academic overload, procedural stress, and clinical practice.

Clinical incompetence is a significant stressor for student nurses in Brazil (Oliveira Bosso et al., 2017), China (Zhao et al., 2015), Jordan (Khater et al., 2014), Malaysia (Ab Latif & Mat Nor, 2019), KSA (Hamaideh et al., 2017) and the United States (Wolf et al., 2015). Poor clinical performance was the highest stressor among students from Ghana (Sossah & Asiedu, 2015) and Singapore (Suen et al., 2016). Ye et al. (2018) found a significant negative relationship between perceived stress and clinical performance; as stress increases, performance decreases. Nursing students from Taiwan (Perng et al., 2020), Turkey (Bagcivan et al., 2015), and the United States (Wallace et al., 2015; Wolf et al., 2015) were afraid of failing due to their performance in clinical practice. In a study of Iranian nursing students, clinical stress was associated with dishonesty; the higher the level of perceived stress, the greater the dishonest behavior (Rafati et al., 2020).

Some of the stress from clinical performance comes from the student-teacher relationship (Ahmed & Mohammed, 2019; Akhu-Zaheya et al., 2015; Al-Gamal et al.,

2018; Hamaideh et al., 2017; Labrague, et al., 2018). Nursing students were stressed from constant observation, criticism, and not meeting instructor expectations (Admi et al., 2018; Bhurtun et al., 2019; Gurková & Zeleníková, 2018; Khater et al., 2014; Zhao et al., 2015).

In a systematic review by Labrague et al. (2017), negative faculty behavior was identified as a stressor for the nursing student, such as inadequate support (Bazrafkan & Najafi Kalyani, 2018), incivility (either verbal or ignoring) (Wallace et al., 2015), and open hostility (Hsu et al., 2018). Instructors giving negative feedback in front of others or the patient was stressful to Iranian (Najafi Doulatabad et al., 2015), Malaysian (Ab Latif & Mat Nor, 2019), and Turkish students (Serçekuş & Başkale, 2016).

Staff in the clinical setting are a significant stressor for nursing students globally: Brazil (De Souza et al., 2016; Oliveira Bosso et al., 2017; Ribeiro et al., 2020), Greece (Labrague, et al., 2018), Iran (Bazrafkan & Najafi Kalyani, 2018; Rafati et al., 2017), Jamaica (Graham et al., 2016), Jordan (Khater et al., 2014), Kingdom of Saudi Arabia (Ahmed & Mohammed, 2019; Al-Gamal et al., 2018; Alyousef, 2019; Hamaideh et al., 2017; Shdaifat et al., 2020), Malaysia (Ab Latif & Mat Nor, 2019), Nigeria, Philippines (Labrague, et al., 2018), Taiwan (Hsu et al., 2018), Turkey (Bagcivan et al., 2015; Karaca et al., 2017; Serçekuş & Başkale, 2016), the United Kingdom (Galvin et al., 2015), and the United States (Wallace et al., 2015). Student nurses in Jamaica found interacting with staff stressful (Graham et al., 2016). Brazilian (De Souza et al., 2016; Oliveira Bosso et al., 2017; Ribeiro et al., 2020), Iranian (Rafati et al., 2017), and Turkish (Serçekuş & Başkale, 2016) nursing students found it difficult to communicate effectively with staff.

When voicing concerns to the staff, nursing students from the United Kingdom felt ignored (Galvin et al., 2015).

Some of the difficulties with staff are due to nursing students feeling that they are constantly observed (Bhurtun et al., 2019). However, Labrague et al. (2017) reported that student stress was due to malicious staff behavior directed at them, making the student feel unwelcome (Galvin et al., 2015) and feeling isolated (McCloughen et al., 2020). Malaysian student nurses found the staff to unsympathetic and would pass the workload onto students (Ab Latif & Mat Nor, 2019). Nursing students in Iran found staff to be unsupportive (Bazrafkan & Najafi Kalyani, 2018) and treated them as servants (Rafati et al., 2017). Turkish students felt that staff criticized them and that they were not part of the team (Serçekuş & Başkale, 2016). In addition, Saudi (Alyousef, 2019) and Turkish students reported feeling underappreciated by doctors, nurses, and patients (Bagcivan et al., 2015).

Hopkins et al. (2018) identified that nursing students were subjected to aggression and violence in clinical practice and were at risk of suffering an acute physiological stress response. Nursing students experienced uncivil behavior from nurses and doctors, such as discrimination (Galvin et al., 2015; Najafi Doulatabad et al., 2015), being ignored (McCloughen et al., 2020; Rafati et al., 2017; Shdaifat et al., 2020; Wallace et al., 2015), open hostility (Hsu et al., 2018), and verbal abuse (Wallace et al., 2015). Ignoring was the most frequent type of abuse identified among Saudi students, with 22.2% experiencing moderate to severe stress, leaving more than 51% of students feeling overwhelmed (Shdaifat et al., 2020). Tee et al. (2016) studied nursing students in the

United Kingdom and found that almost half had experienced bullying and harassment in clinical practice, 20% of which involved a staff nurse. Nursing students who have been subjected to bullying have difficulty providing quality care and working with others. They also experienced embarrassment, anxiety, and anger, with almost 20% considering leaving nursing (Tee et al., 2016).

The difference between theory and actual practice in the clinical setting is a stressor for nursing students in Ghana (Atakro et al., 2019), Israel (Admi et al., 2018), Iran (Bazrafkan & Najafi Kalyani, 2018; Najafi Doulatabad et al., 2015), and the United States (Wallace et al., 2015). Poor application of the nursing process, such as care plans and improper physical examinations by the staff nurses (Atakro et al., 2019), makes it more difficult for students to apply what they have learned (Hsu et al., 2018).

Attitudes toward nursing as a career influenced Chinese nursing student stress levels (Ye et al., 2018). Linear regression of nursing students in Taiwan showed low interest in clinical practice was associated with higher stress levels (Perng et al., 2020). Singaporean student nurse satisfaction with clinical practice is a significant predictor of stress; the lower the student satisfaction, the greater the stress (p <0.001) (Suen et al., 2016).

Repetition often helps to familiarize an individual to a task and reduce associated stress and anxiety. However, stress related to clinical practice did not decrease after the initial clinical among first-year Spanish student nurses (Sánchez-Conde et al., 2019). Sánchez-Conde et al. (2019) observed nursing student HRV during four months of clinical practice and found that a high stress response remained throughout. In Singapore,

nursing students with >20 weeks of clinical practice experienced higher stress levels than those with less than four weeks (Suen et al., 2016). Perceived student social isolation was related to a higher sympathetic response and perceived stress (Sánchez-Conde et al., 2019).

Brazilian nursing students experienced high levels of stress during clinical training; however, those students who felt they had adequate support, primarily from friends and family, experienced less stress (Almeida et al., 2018). Turkish students also found their peers to be supportive (Serçekuş & Başkale, 2016). Whereas nursing students from China (Zhao et al., 2015), the Czech Republic (Gurková & Zeleníková, 2018), Jordan (Khater et al., 2014), KSA (Ahmed & Mohammed, 2019), Malaysia (Ab Latif & Mat Nor, 2019), and Slovakia (Gurková, & Zeleníková, 2018) found peers to be a source of stress in clinical.

Social challenges. Social pressure, such as complicated relationships with peers and faculty, was a significant stressor for nursing students outside of the clinical environment (Alyousef, 2019; Labrague, et al., 2018; Wolf et al., 2015). Social challenges can vary between cultures and countries as well. Nigerian nursing students have higher stress levels from social relationships than Grecian or Philippine students (Labrague, et al., 2018).

Life Balance. Life balance is another stressor for nursing students (Tagher & Robinson, 2016; Labrague, et al., 2018). Nursing students from Brazil (De Souza et al., 2016), Canada (Chernomas & Shapiro, 2013), China (Guo et al., 2019; Liu et al., 2015; Zhao et al., 2015), Ghana (Sossah & Asiedu, 2015), Jordan (Khater et al., 2014), KSA

(Alyousef, 2019) and the UK (Galvin et al., 2015) found the interpersonal stress of balancing relationships with family and education to be stressful. Life balance stress can differ depending on the country and culture. When comparing life balance stress among nursing students from Greece, Nigeria, and the Philippines, Nigerian students were more stressed (Labrague, et al., 2018). Another aspect of life balance that was found to be a stressor was inadequate time for leisure activity for nursing students from Brazil (De Souza et al., 2016), Canada (Chernomas & Shapiro, 2013), China (Liu et al., 2015), Japan (Watson et al., 2018), and Uganda (Amanya et al., 2018).

Financial. In an integrative review by McCarthy et al. (2018), finances, clinical practice, and academics were found to be significant stressors for nursing students. Finances were found to be a stressor for nursing students from many countries: Australia (Grant-Smith & de Zwaan, 2019), Brazil (Oliveria et al., 2017; Ribeiro et al., 2020), Canada (Chernomas & Shapiro, 2013), China (Guo et al., 2019; Liu et al., 2015), Jamaica (Graham et al., 2016), KSA (Alyousef, 2019), Malaysia (Masilamani et al., 2019), Singapore (Suen et al., 2016), Spain (Sarabia-Cobo et al., 2020), Uganda (Amanya et al., 2018) and the UK (Galvin et al., 2015). Nursing students with financial difficulties presented with higher stress levels than those without (Suen et al., 2016). Low income levels and perceiving finances to be insufficient are predictors of stress for Brazilian nursing students (Ribeiro et al., 2020).

Clinical practice contributed to Australian students' financial stress through additional travel costs, meals, uniforms, childcare (for students with children), and resources and materials (Grant-Smith & de Zwaan, 2019). Conflicts with paid

employment and clinical placement further compound financial stress for students (Grant-Smith & de Zwaan, 2019); compounding the problem, Singaporean students with financial stress presented with higher stress levels in academics, clinical practice, and self-confidence than those without (Suen et al., 2016).

Personal Factors. Nursing students also have stressors that are more personal in nature. For the Ugandan nursing student, having a long-distance walk from living quarters to the educational setting and high parental expectations were stressors (Amanya et al., 2018). A personal stressor for nursing students from Ghana was being separated from family for the first time (Sossah & Asiedu, 2015).

Poor time management skills are a personal stressor experienced by nursing students in Brazil (De Souza et al., 2016; Oliveira Bosso et al., 2017) and the Midwestern United States (Wolf et al., 2015). Another is the fear of failure (Tagher & Robinson, 2016). Nursing students from Ghana (Sossah & Asiedu, 2015), Japan (Watson et al., 2018), and Spain (Sarabia-Cobo et al., 2020) found feelings of inadequacy and lack of confidence to be stressful.

Effects of Stress and the Nursing Student. Nursing students, like the general public, experience detrimental effects from stress. Repercussions of stress can be seen in the student nurse's physical and mental health (Gurková & Zeleníková, 2018). Higher stress levels predict of poor physical and mental well-being (Klainin-Yobas et al., 2014; Li & Hasson, 2020). Students who have a higher vulnerability for experiencing stress are more at risk (Racic et al., 2017).

Physiological. Nursing students have been observed to experience the negative physiological effects of stress worldwide. Stress was a significant predictor of poor physical health in nursing students from Thailand (p <0.01) (Klainin-Yobas et al., 2014) and India (p <0.05) (Javeth, 2018). In a study of nursing students from Greece, Nigeria, and the Philippines, researchers observed that the higher the perceived stress score, the worse the student's physical health (p <.01) (Labraguue, et al., 2018).

Stress can have a negative effect on the neurological system. Pain is associated with perceived stress in nursing students from Greece, the Philippines, and Nigeria (p <0.01) (Labrague, et al., 2018). In a phenomenological study, nursing students reported experiencing pain associated with high-stakes testing (Tagher & Robinson, 2016). Headaches are correlated to stress in nursing students from Taiwan (Hsu et al., 2018) and Australia, of which 97.3% of Australian students reported it as being the most common pain, followed by muscle and joint pain (83.6%), and back pain (76.4%) (Williams & Crawford, 2016). Stress has been found to have a negative impact on cognitive abilities among student nurses in Taiwan, making it difficult to concentrate (Hsu et al., 2018).

Student nurses participating in a phenomenological study reported experiencing stress related fatigue (Tagher & Robinson, 2016). Nursing students from Greece, the Philippines, and Nigeria perceived stress levels were found to have a significant negative relationship with fatigue and sleep (p<0.01) (Labrague, et al., 2018). Canadian student nurses were found to have difficulty sleeping the night before clinical (Chernomas & Shapiro, 2013). Poor sleep quality was found to be correlated with stress in nursing students from Brazil (Medeiros da Silva et al., 2020), Taiwan (Hsu et al., 2018), and the

United States ($p < 0.01$) (Zhang et al., 2018); the higher the level of stress, the shorter the interval and quality of sleep (Silva et al., 2019). However, researchers observed a weak correlation between stress and sleep ($r^2=0.0179$) among Omani nursing students, even though more than 35% experienced excessive to severe daytime sleepiness (Isac & Abraham, 2020).

Nursing students also experience cardiovascular problems attributed to stress. Canadian students experienced heart palpitations (Chernomas & Shapiro, 2013). Hypertension was associated with stress in Brazilian nursing students (Urbanetto et al., 2019). Olvera Alverez et al. (2019) observed that the higher the lifetime stress exposure among student nurses in the United States, the greater the risk for hypertension. Stress can impact the endocrine system. Nursing students with higher stress were at greater risk for diabetes (Olvera Alverez et al., 2019). More than 52% of Brazilian nursing students experienced weight gain, with 66.3% reporting high to extremely high stress levels (Urbanetto et al., 2019). Students who were overweight/obese and experienced weight gain during the four-month course did not participate in physical activity, made poor dietary choices, stress eat, and had an altered waist circumference (Urbanetto et al., 2019). Stress was also associated with decreased physical activity and detrimental dietary choices in Irish nursing students (Deasy et al., 2015). In a longitudinal study over ten weeks, the stress hormone cortisol was found to increase in student hair samples (Stetler & Guinn, 2020). Cortisol increase in the hair correlated with stressful academic events but not with perceived stress. Stress strains on the immune system; 74.5% of Australian

nursing students reported high stress, and almost 90% experienced cold, flu, and sore throat symptoms (Williams & Crawford, 2016).

Gastrointestinal (GI) disturbance is frequently correlated with stress. Sixty-five percent of Korean nursing students had GI symptoms, with more than 31% reporting three or more symptoms (Lee et al., 2011). Lee et al. (2011) found that students with high perceived stress were 3.52 times more likely to complain of GI symptoms than those with lower levels. Taiwanese nursing students experienced stomachaches, diarrhea, and constipation associated with stress (Hsu et al., 2018). Canadian student nurses who experienced high stress in clinical reported nausea and vomiting (Chernomas & Shapiro, 2013).

Stress has been associated with reproductive problems in nursing students (Lee & Im, 2016). In a ten-week longitudinal study of female Korean students, perceived stress was directly related to premenstrual symptoms ($p<0.001$) (Lee & Im, 2016). Depressive symptoms partially mediated the relationship between stress levels and premenstrual symptoms (total indirect effect = 0.25, $p <0.012$) (Lee & Im, 2016).

Stress is also related to self-medicating practices that are harmful to nursing student well-being, such as tobacco, alcohol, recreational drugs, and non-prescribed prescription drugs (Williams & Crawford, 2016). More than 50% of Turkish nursing students identified stress as the reason for starting to smoke (Yiğitalp, 2015). Yiğitalp (2015) identified a significant relationship between smoking and age ($p=0.021$). A significant statistical difference ($p=0.033$) was found between nursing student levels, with more than 37% of smokers in the fourth level (Yiğitalp, 2015). When looking at the

relationship between stress and high-risk behaviors among Irish nursing and education students, Deasy et al. (2015) found that almost 42% of the students had high stress levels associated with the use of alcohol and tobacco. Nursing students experienced more stress than education students ($p<0.0027$) (Deasy et al., 2015). Boulton and O'Connell (2017) noted a higher incidence of substance abuse related to high stress levels among nursing students in the United States and the U.S. Territories. However, when student views of faculty support were high, non-prescribed medications to boost academic performance were less (Boulton & O'Connell, 2017). The association between substance abuse and stress levels was also observed in Australian nursing students; 74.5% had high levels of stress, and almost 11% used recreational drugs (Williams & Crawford, 2016).

Psychological. The negative effects of stress on nursing student psychological well-being has long been established. Current literature continues to support that stress is predictive of psychological distress among nursing students globally: Australia (He et al., 2018), Bosnia and Herzegovina (Racic et al., 2017), Brazil (Macedo de Freitas et al., 2018), China (Smith & Yang, 2017), Greece, Nigeria, and the Philippines (Labraguue, os et al., 2018), India (Javeth, 2018), Thailand (Klainin-Yobas et al., 2014), and Turkey (Karaca et al., 2019). Karaca et al. (2019) observed that the risk of psychological distress doubled by 1.02 as stress increased.

In a phenomenological study, nursing students stated that they experienced withdrawal, fear, feeling overwhelmed, and over-eating with the stress of nursing placement exams (Tagher & Robinson, 2016). Anxiety is a mental health condition associated with perceived stress among nursing students around the world. A positive

correlation between stress and anxiety was found among nursing students from Austria (Augner, 2015), Bosnia and Herzegovina (Racic et al., 2017), Canada (Chernomas & Shapiro, 2013), China (Luo et al., 2019), Hong Kong (Cheung et al., 2016), Iran (Shamsaei et al., 2019), Kingdom of Saudi Arabia (Shdaifat et al., 2020), Peru (Diaz-Godiño et al., 2019), Sri Lanka (Rathnayake & Ekanayaka, 2016), Taiwan (Hsu et al., 2018), and the United States (Zhang et al., 2018). Regression analysis revealed that chronic stress predicted test anxiety (Augner, 2015).

In a meta-analysis of 27 studies examining the prevalence of depression, 34% of student nurses were depressed, and 41% were younger students (Tung et al., 2018). Tung et al. (2018) noted that depression was more pervasive among Asian students, with 43% reporting depression. Stress has been found to be positively associated with depression among nursing students from Australia (Williams & Crawford, 2016), Austria (Augner, 2015), Bosnia and Herzegovina (Racic et al., 2017), Brazil (Silva et al., 2019), Canada (Chernomas & Shapiro, 2013), China (Luo et al., 2019), Hong Kong (Cheung et al., 2016), Iran (Shamsaei et al., 2019), Kingdom of Saudi Arabia (Shdaifat et al., 2020), Sri Lanka (Rathnayake & Ekanayaka, 2016), Taiwan (Chen et al., 2015), and the United States (Olvera Alvarez et al., 2019; Wolf et al., 2015; Zhang et al., 2018). Olvera Alverez et al. (2019) found that the greater the exposure to stress over a lifetime, the greater the risk for depression. Chen et al. (2015) observed that stress was predictive of depressive symptoms, explaining 39.7% of the variance.

Depression was found to be a predictor of suicide in Spanish nursing students (Aradilla-Herrero et al., 2014). A study of Iranian nursing students' stress was found to

be associated with depression (Shamsaei et al., 2019). Shamsaei et al. (2019) identified that 9.1% of student nurses reported suicide ideation, and multiple regression revealed that depression was predictive of suicidal thinking.

Stress has been found to impact various psychological characteristics that influence nursing student performance and well-being. A negative association was found between stress and self-efficacy ($p<0.01$), the confidence in one's ability to govern motives and behaviors, among nursing students from Jordan (Rayan, 2019).

Mindfulness, being present, aware, and accepting of the situation, decreased when stress levels were high ($p<0.01$) (Rayan, 2019). Among Chinese student nurses, as stress increased resilience, the ability to recover decreased ($p<0.01$) (Smith & Yang, 2017). Self-compassion, having the attitude of understanding one's self, was also inversely correlated to stress among Chinese nursing students ($p<0.001$) (Luo et al., 2019). A strong association between stress and self-esteem was seen among nursing students from Nepal (Acharya Pandey & Chalise, 2015), Turkey (Yıldırım et al., 2017), and the United States (Grobecker, 2016); when self-esteem levels were higher, stress levels were lower. Student nurses perform well when they feel they are part of the team during clinical placement (Grobecker, 2016). Grobecker (2016) found that perceived stress levels dropped 0.42 of a point for every step increase of student nurse sense of belonging.

Stress and Academic Performance

Stress can positively or negatively influence academic performance (Zhu et al., 2017). In a longitudinal study over 20 weeks, Chinese business, engineering, science, and liberal arts students were found to have a significant positive relationship between

academic performance and challenge stress (eustress) and decreased academic performance with hindrance stress ($p<0.001$) (Zhu et al., 2017). When exploring factors associated with stress in Turkish college students, classroom stress and good communication were predictors of academic success (Aydin, 2017). Conversely, poor communication between students and faculty contributes to decreased learning and student achievement (Hamaideh & Hamdan-Mansour, 2014). Along with poor communication, low self-esteem and low academic motivation were found to have a negative influence on academic achievement among pharmacy, medical, nursing, and respiratory therapist undergraduate students in the Kingdom of Saudi Arabia, with academic motivation being the primary predictor of academic achievement accounting for 25% of the variance (Hamaideh & Hamdan-Mansour, 2014).

Academic stress was a predictor of poor academic performance among Dutch first-year undergraduate students (Pluut et al., 2015). Stress was also found to be a predictor of missed class attendance and missing assignments among undergraduate psychology students in the United States (Thomas & Borrayo, 2016). Malaysian undergraduate students with high levels of academic stress had lower self-regulation abilities (the ability to keep calm) and lower mindfulness (the capacity to be engaged and pay attention), which affected academic progress (Hj Ramli et al., 2018). Students who reported missing class or assignments two times were found to present with significantly higher perceived stress. Iqbal et al. (2015) identified that 53% of medical students in India experienced stress; 31.5% had moderate to extremely high stress, impacting their academic performance and professional development. Perceived stress was found to be a

predictor of academic performance on the German M1 Exam given at the end of the medical students' second year; higher stress levels predicted lower M1 Exam scores (Kötter et al., 2017). Multiple linear regression revealed a negative correlation between stress and GPA among Chinese undergraduate dental students (Lin et al., 2020). In a longitudinal study of first-year science, technology, engineering, and math (STEM) majors, stress was associated with academic performance, with nearly a 1.0-point drop in GPA for increasing stress levels (Rice et al., 2015).

Nursing Student Academic Performance

Stress affects nursing student performance. Perceived stress is negatively associated with clinical performance, self-directed learning, application of theory, applying the nursing process, skill performance, effective communication, ability to care for and engage with the patient, academic development (Ye et al., 2018), and critical thinking (Hutchinson & Janiszewski Goodin, 2013). When comparing nursing students with healthcare workers in Italy, Magnavita and Chiorri (2018) identified that higher stress levels resulted in work impairment and job strain among students in the clinical setting. Akhu-Zaheya et al. (2015) observed a significant negative correlation between stress and clinical performance ($p<0.05$) among nursing students in Jordan.

Korean nursing students' academic resilience and outcomes decreased as academic stress increased (Jung & Kang, 2018). Among nursing students in Taiwan, stress was significantly associated with depression, which had a negative relationship with grade point average (Chen et al., 2015). Fonseca et al. (2019) observed that flow in learning (the ability for profound concentration) and self-esteem were negatively

associated with stress (p<0.001). Flow in learning influences positive academic outcomes and increases satisfaction. Higher stress levels in nursing students impede concentration, learning, and academic performance (Hsu et al., 2018; Magnavita & Chiorri, 2018). Factors that contribute to student nurses' academic performance are the learning process, such as motivation and being prepared; past academic outcomes; learning patterns, such as attitudes and study habits; and expectations from parents or oneself (Vaz et al., 2018).

Hamaideh and Hamdan-Mansour (2014) did not find a correlation between stress and academic performance. However, 24.1% of the total sample were nursing students, and the researchers did not compare results between majors. Stress was not significantly associated with GPA among Austrian nursing students (Augner, 2015). Depression and previous experience with poor academic performance did contribute to test anxiety (Augner, 2015).

Hardiness

During the late 1970s, researchers questioned the validity of the idea that stressful events directly precipitated illness (Hurst et al., 1976; Kobasa, 1977). Kobasa (1977) contemplated why some individuals who encountered highly stressful situations thrived while others did not. Personality, genetics, physiological tendencies, life experiences, social support, socio-economic influences (Kobasa, 1977), and lifestyle practices (Kobasa et al., 1982) are predisposing factors that weaken or strengthen the stress-illness relationship.

Kobasa (1977) used existential personality theory as the framework for her study. The foundational premise of existential psychology is that the individual is self-

determining and seeks to find meaning in life and live authentically (Maddi, 1978). Existential psychology assumes that life is ever-changing and that change is stressful (Kobasa, 1977). One creates personal meaning through a series of life choices and reflection (Maddi, 1978). Life provides challenging opportunities from which one may choose to grow and develop or reject the chance, hold onto familiar ways of thinking, and remain stagnant (Maddi, 1978). Kobasa (1979) posited that the personality type that experiences high-stress events and does not become ill is hardy. The hardy individual lives authentically takes responsibility, is actively involved, committed, and open to change (Kobasa, 1977).

Kobasa (1977) hypothesized that individuals with a hardy personality who experience high stress would present with less illness. She included 670 male executives experiencing high stress from organizational change and were considered hardy if they experienced high stress and low illness (HS/LI). One hundred participants were randomly selected from each HS/LI and high stress/high illness (HS/HI) groups. Mean differences were evaluated by *t* tests followed by step-wise discriminant function analysis to identify personality characteristics. Kobasa divided each group in half to cross-validate the findings.

Although stress and illness had a significant correlation, it was not a strong relationship (Kobasa, 1977). Participants experienced substantial organizational change, high stress, and moderate amounts of illness. Kobasa found significant personality differences between the HS/HI and hardy HS/LI groups. The hardy personality viewed work more positively and experienced rapid career advancement compared to the HS/HI

group. Hardy individuals were more comfortable with and practiced self-reflection more than the HS/HI group (Kobasa, 1977) and viewed their personal lives as less stressful (Kobasa, 1979). The findings indicated that a hardy personality is a predisposing factor in staying healthy (Kobasa, 1979).

Kobasa (1979) called the personality characteristics that were supportive of health hardiness. Hardiness is a triad of interrelated personality characteristics that provide "existential courage" to turn potentially harmful life events into meaningful experiences (Maddi et al., 2011, p. 370). Kobasa's (1979) hardiness characteristics are:

1. Control – Having influence over life events and choices rather than being powerless.
2. Commitment – Adherence to being involved and engaged in life rather than withdrawn.
3. Challenge – Endeavoring to learn and grow from all life experiences rather than being threatened.

These personality characteristics, referred to as the 3C's of hardiness (Maddi, 2002), work together to uphold authentic living by recognizing and determining one's beliefs, values, and priorities to support equilibrium, serving as a buffer to stress (Kobasa, 1979). How a hardy person appraises a stressor minimizes his or her perception of the threat thereby influencing the choice to use active coping strategies and seek resources to cope reducing the negative outcomes of the stressful experience (Oliver, 2009).

Hardiness has been a concept of interest over the past 40 years. Some have voiced concern regarding the hardiness construct, theory, and methodology (Funk & Houston,

1987; Hull et al., 1987). Other studies have examined various aspects of hardiness, including construct validation, ability to buffer stress, coping methods, and behavioral, physiological, and psychological health outcomes (Maddi, 2002; Maddi, 2006).

There has been speculation about whether hardiness is a single concept composed of three aspects or three separate concepts (Ford-Gilboe & Cohen, 2000). This speculation is due to early research using two approaches to evaluating hardiness (Hull et al., 1987). Kobasa (1977) used three subscales to measure hardiness as a whole, whereas in later research, she evaluated the effect of each of the 3C's separately. Early hardiness research results indicated that the subscales for the 3C's were not equal in predicting health (Hull et al., 1987). In five studies evaluated by Hull et al. (1987), the subscale for commitment was the best at predicting health and illness, followed by control, predicting 80%, and challenge only 20%. These findings led to the conclusion that hardiness is three separate concepts and to question whether the personality characteristic of challenge should be included (Funk & Houston, 1987; Hull et al., 1987).

Maddi (2002) maintained that all 3C's are needed when facing life's stressors. Sinclair and Tetrick (2000) posited that the 3C's are components of a complex construct. Two meta-analyses of hardiness support this perspective. Oliver (2009) observed that uniformity varied regarding the 3C's and that each subscale was better at predicting different outcomes. Even though challenge has weaker predictive power compared to commitment and control, it had better homogeneity among some correlates. Commitment and control had moderate to high levels of variation between studies regarding the correlate of job satisfaction, while challenge showed nearly none. On the other hand,

challenge had greater heterogeneity regarding the correlate of burnout compared to commitment and control (Oliver, 2009). Even though the 3C's are distinct, they have a conceptual interrelationship (Eschleman et al., 2010). All 3C's are distinct and intercorrelated (Karagiannopoulou & Kamtsois, 2016).

A primary concern with the hardiness concept was that it was a product of negative affectivity due to negatively worded questions (Funk & Houston, 1987). Individuals high in negative affectivity view the world and their lives through a negative lens, focusing on problems and failures, even without stress (Watson & Clark, 1984). Maddi and Khoshaba (1994) addressed this concern and found that hardiness predicted psychological health even when controlling for negative affectivity. Sinclair and Tetrick (2000) found that hardiness is unique from negative affectivity and was predictive of health and performance.

An early concern of Funk and Houston (1987) was the validity of hardiness as a buffer to stress, believing there was insufficient empirical evidence. Maddi (2006) contended that hardiness is the link that protects against stress. Hardiness develops within the individual resilience to stressful situations by viewing the stressor as an advantage and an opportunity (Maddi, 2006). Recent studies support Maddi's perspective. Hardy military recruits not only experienced greater life satisfaction, but hardiness predicted resilience and protected against stressful events (Skomorovsky & Stevens, 2013). Veterans with higher hardiness levels were observed to experience less parenting stress following deployment (Tomassetti-Long et al., 2015). Hardiness was also found to be a protective buffer against posttraumatic stress disorder (PTSD) for military following

deployment (Thomassen et al., 2018), prisoners of war (Zerach et al., 2017), police officers (Potard et al., 2018), and mothers of children with cancer (Stoppelbein et al., 2017), as well as traumatic stress as a result of compassion fatigue in nurses (Frey et al., 2018). Abdollahi, et al. (2014) found that hardiness served as a buffer for stress in nurses, contributing to their optimism and happiness. For emergency room nurses, the impact of experiencing violent-related stress was less for those higher in hardiness, indicating that hardiness is supportive of overcoming a stressful situation (Park et al., 2018).

Hardiness buffering ability is evident in psychological and physiological domains. In a systematic review, Booker et al. (2018) identified hardiness as a form of mental fortitude. After controlling for pre-deployment, hardy peacekeeping military personnel presented with fewer mental health complaints (Thomassen et al., 2015), and individuals transitioning through the transgender alteration process experience better mental health, with hardy persons experiencing increased self-esteem and gender congruence (Ho & Mussap, 2017). Alfred et al. (2014) found that psychological well-being was lower in veterans who conformed to masculine norms and that hardiness mediated the effect; the lower the level of hardiness, the greater the conformity. Less depression (Dhillon & Arora, 2017; Mohamadi Hasel et al., 2013; Ng & Lee, 2019), anxiety (Figueroa & Zoccola, 2015: Reknes et al., 2018) and somatization were found in individuals with higher levels of hardiness (Figueroa & Zoccola, 2015), although hardiness did not affect the depression response to bullying (Reknes et al., 2018). The hardiness subscale commitment was found to moderate emotional stability (Merino-Tejedor et al., 2015), with hardy individuals experiencing fewer negative emotions (Mazaheri et al., 2015).

Hardiness was found to be a protective element against suicide among individuals receiving substance abuse treatment, with hardy persons experiencing less suicidal ideation (Abdollahi & Abu Talib, 2015).

The psychological impact of hardiness can be seen among the young and the old. Hardy Hungarian adolescents presented with less trait and state anxiety, with low levels of hardiness accounting for 17% of trait anxiety (Kovács & Borsca, 2017). Elderly individuals with high hardiness levels experienced less loneliness than those with low levels (Ng & Lee, 2019).

When comparing between high and low levels of hardiness, hardy nurses had better mental health (Park et al., 2018)) and well-being (Akbarizadeh et al., 2013). Hardy nurses were happier, with hardiness mediating perceived stress and happiness (Abdollahi et al., 2014). Furthermore, hardiness was predictive of nurse burnout (Frey et al., 2018; Negri, 2018); those with low hardiness levels had greater work-life stress and considered leaving the profession (Bagley et al., 2018). Using multiple regression analysis, Negri (2018) found that for every increase of one on the hardiness scale, there was a drop of -11 in the burnout score. The hardiness characteristic of commitment predicted anxiety and depression in nurses (Saksvik-Lehouillier et al., 2016). Bagley et al. (2018) found that nurses with low hardiness levels were more introverted experienced low self-esteem and more significant depression than those who were hardy. Hardy nurses presented with less emotional exhaustion, higher levels of personal accomplishment (Queiros et al., 2013), and better quality of life than those with low levels of hardiness (Alipour Hamze Kandi & Zeinali, 2017; Hatamipour et al., 2017).

Hardiness was found to have a positive effect psychologically and physically (Mohamadi Hasel et al., 2013; Orme & Kehoe, 2014), with mental health mediating the relationship between hardiness and physical health among military personnel (Taylor et al., 2013). Hardiness was found to support general health among nurses and bank managers (Akbarizadeh et al., 2013; Ghule & Shejwal, 2016). In a quantitative study of lesbian, gay, and bisexual individuals, those with higher hardiness levels reported less stigma consciousness and fewer health problems (Figueroa & Zoccola, 2015). Higher hardiness levels enabled injured athletes to utilize physical resources to expedite healing (Salim et al., 2016). Individuals with oral lichen planus, an autoimmune disease of the oral mucosa, who had higher levels of the subscale challenge experienced fewer symptoms (Mohamadi Hasel et al., 2013). Hardiness is also predictive of a higher risk of sleep-related problems among healthcare workers (Booker et al., 2018) and naval personnel with low hardiness levels (Nordmo et al., 2017). Bartone et al. (2016) observed that hardiness is also predictive of cardiovascular health, where hardy individuals presented with lower body mass index (BMI) and higher levels of high-density lipoproteins (HDL). The immune response markers of hardy individuals indicated an adaptive response to stress, whereas those low in hardiness exhibited an unhealthy immune response reaction (Pandey, 2017; Pandey & Shrivastava, 2017; Sandvik et al., 2013).

Hardiness is associated with positive adaptation and coping. In individuals with irritable bowel syndrome, hardiness was associated with positive emotion regulation and the ability to reframe thinking (Mazaheri et al., 2015). Mothers of children with cancer

who had low levels of hardiness exhibited greater avoidance symptoms and difficulty coping than hardy mothers (Stoppelbein et al., 2017). School teachers high in total hardiness had a positive view of workplace stress, perceived that they had the ability to control their work environment, had positive perceptions regarding the organization, and were satisfied with their jobs (Parameswari & Kadhiravan, 2014). Following a sports injury, hardy athletes were able to adapt and reframe their thinking, viewing the stressful event as a challenge and opportunity for growth and capitalizing on physical and social resources (Salim et al., 2015; Salim et al., 2016). Three years after graduating from West Point, officers high in hardiness were better at capitalizing and building on their stressful experiences than those with lower levels (Bartone et al., 2013). The hardiness characteristic commitment was shown to positively contribute to cadets' ability to cope and positively appraise stressful events (Johnsen et al., 2013). Whereas soldiers low in hardiness employed avoidance coping when encountering combat stress (Bartone et al., 2017), with avoidance coping mediating between hardiness and PTSD symptoms (Thomassen et al., 2018).

Current research also supports the generalizability of hardiness having a positive relationship with performance; it applies to various populations. Hystad and Bye (2013) found that hardy Filipino cargo ship crew members practiced safety measures more than workers with low hardiness levels. In a quantitative study of multi-occupational employees, those with high hardiness levels exhibited a greater work effort and experienced less work fatigue than those with low levels (Merino-Tejedor et al., 2015). Bank managers with high hardiness levels demonstrated greater task performance

requiring specialized skills to do the job and contextual performance, which is helping others and doing more than is expected, than those low in hardiness (Ghule & Sheiwal, 2016). Athletes with low levels of hardiness returned to their sport too early experienced re-injury, and performed poorly compared to those high in hardiness (Salim et al., 2016). Thomas et al. (2013) found that hardiness was a function of skill level and performance when comparing professional motorcyclists to club cyclists; professionals had high hardiness levels.

The relationship between hardiness and performance has been studied at length within the military. Studies of Norwegian, Swedish, and United States (U. S.) soldiers found that higher levels of hardiness support the capacity to perform under stress (Bartone et al., 2013; Johnsen et al., 2013; Rydstedt & Osterberg, 2013). When observing Dutch military soldiers during basic training, researchers found that hardiness is predictive of behavioral persistence, physical performance, and attrition; for each point of increase in hardiness, there is an 8% upturn in perseverance and retention (Lo Bue et al., 2016). In another study regarding performance and retention among United States military academy (USMA) cadets, a positive association was found between hardiness and Whole Candidate Score (WCS), a test used to select cadets, and performance on Cadet Performance Scores and retention. However, grit had a stronger relationship with retention than hardiness (Maddi, et al., 2012). Maddi, et al. (2012) found that even when controlling for WCS, hardy cadets had higher performance scores than those with low hardiness levels. In a subsequent study, hardiness was found to more reliable than grit when measuring performance and retention (Maddi et al., 2017). Results from a

longitudinal study of West Point officers revealed that hardiness was predictive of leadership performance in real-world situations, and those with high levels of hardiness demonstrated adaptability (Bartone et al., 2013). Higher levels of hardiness among Norwegian border patrol cadets were predictive of successful completion of a rigorous 250-kilometer ski in winter arctic conditions, even after controlling for diet, exercise, and sensation seeking (Johnsen et al., 2013). The opposite is also true; low levels of hardiness, for both United States and Norwegian deployed military, affected performance as seen by consumption of greater amounts of alcohol than hardy soldiers (Bartone et al., 2017).

Hardiness also impacts performance among nurses, with hardy nurses having higher-ranking jobs than those with low levels (Bagley et al., 2018). Hardiness is a protective factor for nurses with shift work (Booker et al., 2018; Saksvik-Lehouillier et al., 2016), predicting better adaptation (Storemark et al., 2013). Booker et al. (2018) found that nurses with higher hardiness levels had less daytime sleepiness than those with low hardiness. Although Saksvik-Lehouillier et al. (2016) did not find hardiness predictive of sleepiness, they did find that it was predictive of fatigue, accounting for 15% of the variance.

The positive buffering effect of hardiness on stress and its 3C's has also been observed in the academic realm (Karagiannopoulou & Kamtsios, 2016). The subgroup control has had a negative association with academic stressors of lack of leisure time, fear of failure, and student competition (Karagiannopoulou & Kamtsios, 2016). Individuals with higher levels of the subgroup challenge have less fear of failure than those with low

levels (Karagiannopoulou & Kamtsios, 2016). Undergraduates high in total hardiness experienced less fear of failure and diminished stress regarding academic performance. However, the subgroup commitment was associated with stressors: lack of leisure time, fear of failure, academic overload, and competition with other students (Karagiannopoulou & Kamtsios, 2016).

Higher levels of hardiness have a positive association with psychological, physiological, coping, and behavioral outcomes and improve the college student's mental health by diminishing the negative impact of stress (Abdollahi, 2015; Knowlden et al., 2012; Leslie & Hutchinson, 2018). High hardiness levels predicted better mental health (Knowlden et al., 2012). College students with higher levels of hardiness were found to have healthier mental health domains in cognitive, social, emotional, self-esteem, self-efficacy, and life attitudes (Saxena, 2015), and hardy nursing students had a greater sense of belonging (Abdollahi & Noltemeyer, 2018). In Malaysian undergraduates, hardiness has been identified as a protective element against suicide ideation, with hardiness partially mediating (Abdollahi, , 2015; Abdollahi, 2015) and moderating between stress and suicidal thoughts (Abdollahi, et al., 2018). Among international students, hardiness is predictive of acculturative stress, with hardy undergraduates having an easier adjustment to foreign cultural situations (Yakunina et al., 2013). Brazilian nursing students experienced high levels of emotional exhaustion, cynicism, and difficulty with professional efficacy, and hardiness acted as a buffer to stress, with 68% of hardy nursing students not presenting with burnout (da Silva et al., 2014).

The effect of mental health on physical health has been well documented. Adolescents low in hardiness had more anxiety and somatic symptoms than their counterparts (Kovács & Borcsa, 2017). Golenstaneh (2018) observed that in university students with pain, there was a positive relationship between hardiness and pain self-efficacy; the higher hardiness level, the lower the complaints of pain. Although, when examining Iranian and English female university students, Tarimoradi (2014) did not find a relationship between public health and hardiness, even though hardiness was the same for both groups.

Hardiness positively influences a student's ability to cope by enabling the individual to identify the stressor and engage in problem-solving coping (Maddi et al., 2011). Malaysian undergraduates with high hardiness levels were more optimistic, flexible problem solvers, and used positive coping styles (Abdollahi, Talib, Yaacob, & Ismail, & Motes, 2015). Higher levels of hardiness support students during stressful events and diminish feelings of hopelessness and despair (Abdollahi, Hosseinian, et al., 2018). Hardiness was a supportive factor for nursing students coping with the demands and stressors of their academic program (Sportsman et al., 2014).

Dealing with academic stress is vital to a student's success. Hardiness predicts academic performance more than resourcefulness, optimism, dedication, absorption, or vigor (Ayala, & Manzano, 2018). Hardy first-year university students had lower attrition rates than those low in hardiness (Ayala & Manzano, 2018). Low hardiness levels predict poor problem-solving skills among undergraduate students (Abdollahi, , 2015; Abdollahi, et al., 2018). College athletes with higher levels of hardiness and optimism experienced

greater flow than those with low levels, with optimism accounting for 16% of the variance and hardiness 11% (Vealey & Perritt, 2015). In a meta-analysis, Olsen (2017) found that nursing students not only recognized the importance of the ability to manage stress with academic success, but those who were successful in their program had high hardiness levels. Abdollahi and Noltemeyer (2018) found that hardiness has a positive direct and indirect effect on academic achievement. Hardiness indirectly effected clinical performance due to the student's perception of their efforts and the culture of the clinical setting for both Thailand and U.S. students (Sportsman et al., 2014).

The relationship between hardiness and academic performance is evident due to the positive association with student grade point average (GPA) (Maddi, Harvey, et al., 2012). Sportsman et al. (2014) found that hardiness indirectly affected GPA. It is interesting to note that even though Greek undergraduate social science students who had high levels of the subscale commitment still experienced stressors of feeling like they had a lack of leisure time, a fear of failure, academic overload, and competition with other students, had the highest GPA scores; indicating the positive effect of eustress (Karagiannopoulou & Kamtsios, 2016). However, hardiness was not associated with GPA or attrition among Master of Science in Nursing students (Bond et al., 2012).

Weekly Rest

A brief outline of pertinent aspects that are foundational to the practice of weekly rest is covered below. Rhythmic time structures and literature regarding seven-day cycles found within our world and present in humankind are reviewed. An account of various

workweeks and their association with human well-being are also discussed before examining research regarding the practice of weekly rest.

Chronomics

The need for weekly rest may be due to weekly rhythms manifested within our natural world. Chronomics is the study of rhythmic time structures, also known as chronomes (Cornélissen & Halberg, 2000). These chronomes are found in natural and biological domains (Mehling & Fluhr, 2006). Biological chronomes organize physiological processes, the study of which is known as chronobiology (Mehling & Fluhr, 2006). A plethora of research has been done on chronobiologic rhythms, especially circadian (24 $\pm$ 4 hours), and their role in human health.

An exclusive focus on circadian rhythms does not give a complete picture of biological processes (Halberg et al., 2001). Observation of other infradian rhythms (>28 hours) may direct the optimal course of treatment (Halberg et al., 2001). Circaseptan rhythms (7 $\pm$ 3 days) are also found in the natural and biological domains. Circaseptan chronomes found in nature, possible origin, human biology, and disease processes and treatment are presented to establish a foundation for weekly rest.

In Nature. Circaseptan periodicity is present across species, of which homo sapiens are a part (Reinberg et al., 2017). Single-cell organisms, both with and without a nucleus, exhibit circaseptan rhythms (Halberg et al., 2005). Humans are comprised of eukaryotic cells. The electrical portion of the eukaryotic cell displayed a more prominent circaseptan amplitude than the circadian (Halberg et al., 2003). Seeds (Spruyt et al., 1987), insects (Meyer-Rochow & Brown, 1998; Mikulecky & Bounais, 1997), fish

(Cornélissen et al., 1995; Halberg et al., 2003), fowl (He et al., 2014; Pauly et al., 2009), and mammals all have a circaseptan rhythm.

Circaseptan chronomes have been observed in rats' corticosterone levels (Jozsa et al., 2005), horse sperm (Marques et al., 1996), and spider monkey activity (Muñoz-Delgado et al., 2018). These seven-day chronomes found within cells, seeds, insects, fish, fowl, and mammals are endogenous. However, the differences in spider monkey activity were attributed to human interference instead of endogenous factors (Muñoz-Delgado et al., 2018). The evidence of seven-day chronomes in nature adds support to the premise that the circaseptan chronomes in homo sapiens may be endogenous and that humans may benefit from weekly rest.

Possible Origin. Ancient observers recognized human circaseptan chronomes. Hippocrates in 400 BCE, Galen in the middle to late 100 CE, and Avicenna during 1,000 CE identified circaseptan patterns in disease (Cornélissen & Halberg, 2000; Mikulecky & Mikulecky, 2014). Circaseptan patterns in disease have often been attributed to the social week due to occupational stress (Gallerani et al., 2017; Nordenskjold et al., 2019; Rigatelli & Zuin, 2020; Servoss et al., 2002; Strike & Steptoe, 2003). However, some studies give additional insight that goes beyond culture or the social week. Cornélissen et al. (2002) studied geomagnetic activity in relation to the social 7-day week and the occurrence of cardiovascular-related events in Moscow, Russia. Cornélissen et al. (2002) identified significant circaseptan patterns in arrhythmias, MI, hypertensive crises, sudden cardiac death, and stroke morbidity. The researchers also found significant circaseptan patterns of approximately 6.75 days in geomagnetic activity distinctive from the social

week (Cornélissen et al., 2002). The circaseptan rhythm of geomagnetic activity, and the KP index of global geomagnetic disturbance correlate with the ~ 10.5-year solar cycle (Cornélissen et al., 2002). Circaseptan patterns were also seen in geomagnetic pulsation in a geographical area more than 600 kilometers from a town (Cornélissen et al., 2002). These findings support a physical and biological week that is statistically different from the social week (Cornélissen et al., 2002).

In a retrospective study of 129,917 individuals living in a low geomagnetic region of Mexico, Mendoza and Díaz-Sandoval (2004) observed a circaseptan pattern of MI associated with environmental factors of solar activity. In another retrospective study, angina, arrhythmia, hypertension, MI, and heart failure were related to semi-circaseptan and circaseptan chronomes; the strongest was circaseptan (Díaz-Sandoval et al., 2008). In addition to the societal week, Díaz-Sandoval et al. (2008) contributed these findings to the environmental factors of 3.5-day and 7-day periods of solar activity. The circaseptan chronomes of heliogeomagnetic activity (the interconnection between solar and earth's geomagnetism) may be the origin for the chronomes seen in nature and humans and influence humanity's need for weekly rest.

Human Physiology. Circaseptan chronomes, found in the natural world and within human biology, are the foundation for the need to study the practice of weekly rest among nursing students. Circaseptan chronomes have been identified in various human biological systems, such as the endocrine, immune, and cardiovascular. In chronomic studies of electrolytes, the circaseptan chronome was observed for the frequency of sodium, calcium, magnesium (Birukov et al., 2016), and potassium (Breus et al., 2002).

The weekly pattern of sodium excretion was directly related to cortisol and inversely to aldosterone (Titze et al., 2016). Two longitudinal studies of long-term space flight simulation, over 105 and 205 days, examined electrolytes with fixed salt intake. Circaseptan periodicity was observed in aldosterone, cortisol, cortisone, and sodium excretion unrelated to salt intake (Rakova et al., 2013; Titze et al., 2014).

The immune system shows a circaseptan rhythm unrelated to the societal week. Erythema skin reactions to tuberculin and response to kidney damage have circaseptan patterns (Haus & Smolensky, 1999). There are also seven-day chronomes related to platelet production of B-cell growth factor and development (Hugwil & Glassy, 2017).

Chronobiological rhythms are seen in clotting factors as well. Kanabrocki et al. (1995) examined fibrinogen levels in a longitudinal study of 4,133 military veterans. A prominent circaseptan chronome was identified, with a peak on the weekend that the researchers attributed to endogenous factors.

Periodicity has been found in the cardiopulmonary system. In a longitudinal study over 280 days, using cosinor analysis, Kirchner et al. (2015) identified chronomic cycles when assessing intrathoracic fluid load. All participants had circadian cycles of thoracic impedance, while employed participants had a significant circaseptan rhythm with an acrophase of Wednesday (Kirchner et al., 2015).

Many chronomic studies have been done on the human cardiovascular system. When reviewing the literature, Otsuka et al. (2009) observed that non-photic rhythms, such as circaseptan, have larger amplitudes than circadian photic cycles in heart rate variability. Two longitudinal studies of chronomes in heart rate (HR) showed a

circaseptan rhythm in both sexes, a woman's sleeping HR with a nadir of Sunday (Chen & Chen, 2011), and a man's HR peaking on Monday (Delyukov et al., 2001). In both studies, the researchers attributed the periodicity to natural components of solar, geophysical, atmospheric, and the societal week.

Circaseptan cycles have also been observed in human systolic (SBP) and diastolic (DBP) blood pressure (Cornélissen et al., 2008; Lee, Lee, Lee et al., 2003; Lee, Lee, Cornélissen, et al., 2003; Lee et al., 2013; Otsuka et al., 2004; Watanabe et al., 2003). In a three-week study of a 16 year-old male, SBP & DBP had a significant $p<0.001$ circaseptan rhythm, peaking on Friday (Lee, et al., 2003). Other studies identified an acrophase of late Sunday and early Monday (Lee, et al., 2003; Lee et al., 2013; Otsuka et al., 2004). The acrophase of late Sunday and early Monday corresponds with the onset of cardiovascular events discussed earlier. Lee et al. (2013) emphasized the importance of considering chronomes other than circadian when evaluating vascular disease.

Chronomic studies on neonates indicate that human biological circaseptan rhythms are partly endogenous or genetic (Cornélissen & Halberg, 2000). A significant circaseptan rhythm of a full-term baby boy's HR was more prominent immediately after birth than the circadian (Watanabe et al., 2002). Watanabe et al. observed the infant's HR over seven months and found that the circadian rhythm was not significant for the first 11 days, but by the second month, it was predominant. Cardiovascular circaseptan periodicity was found to have a greater amplitude than circadian in both a full-term baby boy and a 26-week preterm baby boy (Halberg et al., 2003). The HR, SBP, DBP, and MAP of 86 premature babies in the intensive care unit in the Czech Republic showed a

significant ($p<0.05$) more prominent circaseptan cycle than the circadian (Sieglova et al., 2003). Breus et al. (2002) found that there was a correlation between the circaseptan patterns of HR, SBP, DBP, and mean arterial pressure (MAP) of neonates and the circaseptan rhythm of solar activity, K index of geomagnetic activity ($p<0.005$). Furthermore, the neonatal circaseptan patterns of SBP, DBP, MAP, HR, and body weight are more similar in monozygotic twins than in dizygotic twins, indicating a genetically determined weekly pattern (Cornélissen et al., 2001).

Two studies identified cardiac circaseptan chronomes in comatose patients unrelated to the societal week, one in Spain (Peyró et al., 2002) and the other in China (Guan et al., 2011). The circaseptan amplitude was more significant than the circadian in HR (Guan et al., 2011) and SBP and DBP (Guan et al., 2011; Peyró et al., 2002). The circaseptan amplitude was more than three times higher than the circadian (Peyró et al., 2002). These results show that cardiac circaseptan periodicity is endogenous.

In a two-year longitudinal study, BP and HR were monitored on n=217 depressed and non-depressed participants in Japan. Both healthy and depressed participants demonstrated a circaseptan cycle with SBP and DBP (Otsuka et al., 2004). Otsuka et al. observed that while healthy individuals have a rhythm that shows a Monday effect, which may be influenced by a social week, depressed subjects do not, suggesting that the circaseptan biological rhythm of BP is endogenous (Otsuka et al., 2004). Over three and a half years, Yamanaka et al. (2005) examined the BP of n=224 participants in Japan as to whether depression was predictive of cardiovascular disease (CVD). Using a multivariate Cox model, Yamanaka et al. found that BP had a circaseptan component. A Monday

increase of DBP of 5 millimeters of mercury (mmHg) was observed and predictive of CVD. Yamanaka et al. also observed that depressed participants exhibited a more prominent circaseptan variation in SBP and DBP compared to non-depressed.

Weekly patterns have also been observed to impact mental well-being. Wilczynska (2013) found that positive and negative effects have a circaseptan rhythm. Positive affect peaks on Thursday, with negative affect lowest on Friday and Saturday. Negative affect begins to climb Sunday and throughout the rest of the week (Wilczynska, 2013). Wilczynska attributes this chronome to being influenced by the societal week.

Results of studies regarding dream formation have shown a circaseptan pattern. Dream formation from memories, which are interpersonal encounters, occurred one and seven days after the incident (Nielsen, 2004). Another study of 470 psychology students' dream retrieval found that dreams were formed from a week before. This lag in dream formation was most likely to be incidents related to a location, resolved problems, interpersonal encounters, and positive emotions (Nielsen et al., 2004).

Treatment. The interdependence of chronomes and health can be seen in the treatment of disease. Halberg et al. (2001) found that more than an exclusive focus on circadian rhythms is need to give the complete picture. Observation of other infradian rhythms, such as circaseptan, may direct the correct course of treatment (Halberg et al., 2001). Circaseptan chronomes have contributed to the management of the treatment of disease in humans (Cornélissen & Halberg, 2000).

Medication administration must be matched with biological rhythms to achieve maximum effectiveness (Ghosh et al., 2017). The circaseptan chronomes in organ

transplant (Haus & Smolensky, 1999) and malignant tumor growth (Lee, Lee, Cornélissen et al., 2003) have guided therapy. Malignant growth patterns in salivary and urinary tumor markers leukemia cells have a ciraseptan chronome (Cornélissen et al., 2001). A study done in complete darkness revealed electromagnetic properties in the biorhythms of adenosine triphosphate (ATP) metabolism in leukemia, mammalian, and glioma tumor growth that are circaseptan, which highlights the optimization of chemo and radiotherapy (Ulmer & Cornélissen, 2013). Ulmer (2014) studied the effects of timing radiotherapy with biorhythms and found that coordinating treatment with the circaseptan rhythm of ATP concentrations yielded ideal results. The timing of treatment is associated with decreased toxicity, greater quality of life, and survival rates in colon, lung, and ovarian cancer patients (Librodo et al., 2012). Dronca et al. (2012) found that chemotherapy administration in metastatic melanoma patients must be synchronized with the chronomic rhythms of cytokines and other immune system subsections. Weekly medication administration inhibited tumor growth more than equal daily doses (Halberg et al., 2003). Brain tumor patients who received prophylaxis pritumumab immunotherapy have optimal results when treatment is coordinated with the circaseptan increase of anti-anti-idotypic antibody (Ab3) (Hugwil & Glassy, 2017). Hugwil and Glassy (2017) observed that the administration of immunotherapy with circaseptan antibody levels produced optimal results for patients with brain tumors.

The Seven-day Week

The earliest historical record of a seven-day week, other than the creation week recorded in the Bible, was in Babylon in 700 BCE (Duncan, 1998). The seven-day

Gregorian calendar began in 1582 CE and has been adopted globally except for a few countries (Duncan, 1998). However, the seven-day week has not always been practiced. Different regions of the globe have had anywhere from three to ten-day weeks (Duncan, 1998; "Week," 1911). Indigenous Columbians had three and four-day weeks ("Week," 1911). Malaysia, Persia, the Indonesian tribes, and ancient Scandinavians had five-day weeks ("Week," 1911). The Bantu tribe of central Africa, ancient Mesopotamians, and Incas had five to ten-day weeks (Duncan, 1998), and early Romans had an eight-day week (Schmitz, 1848). The absence of these various cultural weeks today is unknown but may result from a global economic society (Duncan, 1998).

A growing body of evidence points to a seven-day cycle built within the genomes (Halberg et al., 2001). Two countries have attempted to break from the seven-day week. Both countries included a rest day within their societal week, but it did not achieve the desired effect of superior productivity, and the citizens' well-being suffered.

The French instituted the metric system-based revolutionary calendar in 1793 (Zerubavel, 1977). Each month had three ten-day weeks, with ten hours a day and 100 minutes an hour. Work and business transpired nine days and a day off on the tenth. There was an increase in mental health problems, and hospitals were full of the sick (Nedley, 2014). The revolutionary calendar only lasted 12 years (Zerubavel, 1977).

In 1931 CE, Joseph Stalin changed the calendar in Russia to a five-day week (Freeze, 2002). The calendar was organized into shifts, each starting on a different day of the week, with the worker having one day off once every five days (Freeze, 2002). Friends and family members did not have the same day off. There was an increase in

infant mortality, a decrease in family size, and alcoholism increased (Freeze, 2002). Deviating from the seven-day week resulted in physical and mental health problems for the people of Russia and France, which may be rooted in endogenous and exogenous factors within human physiology and the natural world.

Long work hours and insufficient time for rest and relaxation have deleterious physiological and psychological effects. The effects of overwork can present in the form of cardiovascular disease (Itani et al., 2013), endocrine disorders (Itani et al., 2017), depression, anxiety (Virtanen et al., 2012), and increased injuries (Guerra et al., 2017). Taking time to rest and regenerate each week is an integral component of a healthy lifestyle (Morton, 2018). Not only does adequate rest reduce stress and fatigue, but it also increases productivity (Pencavel, 2015) and the ability to learn (Lee & Lim, 2017).

Many countries require weekly rest and have put labor laws in place to protect the worker (Earle et al., 2011; Totterdell et al., 1995), allocating an uninterrupted 24-hour rest period within each seven-day work week (Fitzpatrick et al., 2011). Almost all economically competitive countries require a minimum of one rest day each week (Earle et al., 2011), such as the European Union (Employment, Social Affairs & Inclusion, 2020), Hungary (Hirdi & Hong, 2014), Japan (International Labour Organization, 2020), South Korea (Umeda, 2018), and the United Kingdom (Health and Safety Executive, 2020). However, the United States does not (Earle et al., 2011). Individual states within the United States determine the standard for weekly rest. Colorado, Illinois, Maryland, Massachusetts, New Hampshire, New York, North Dakota, Pennsylvania, and Texas require a continuous 24-hour rest day each week (Coil et al., 1997). The definition of

weekly rest for this study is an uninterrupted 24-hour rest period of no gainful employment or academic endeavor within each seven-day workweek.

Physiological and Psychological Effects of Weekly Rest

Research points to the physiological and psychological benefits of the lifestyle practice of weekly rest, which may be due to seven-day biological rhythms (Morton, 2018). Literature regarding the effects of weekly rest on physical health, mental health, residents, physicians, and nurses will be discussed below.

Physiological Effects. A significant positive relationship exists between the lifestyle practice of weekly rest and physical and mental health (Superville et al., 2014). Superville et al. evaluated the health benefits of the lifestyle practice of weekly rest. The 5,411 participants were randomly selected from a larger homogenous Adventist Health Study – 2. Results showed that the practice of weekly rest had a partial indirect effect on physical health through mediators of religious support, healthy diet, and exercise.

The practice of weekly rest, or lack thereof, has been found to impact overall health, affecting neurological, musculoskeletal, cardiovascular, and endocrine systems. In a longitudinal study over 12 months, Alstadhaug et al. (2007) identified a significant decrease (p <0.001) of migraines on Sundays and determined that rest days are a preventive measure to reduce migraines.

When evaluating work hours and days off, almost 70% of caregivers working in a borough of Goiâs, Brazil, worked longer than 12 hours daily (Guerra et al., 2017). Guerra et al. identified that more than 84% of the caregivers provided continuous care without

rest days. Caregivers who did not have rest days were more likely to suffer from back problems (p=0.039) than those who had a weekly rest day (Guerra et al., 2017).

The link between stress and obesity has long been established. Job stress and long work hours have been associated with obesity in nurses (Chin et al., 2016). Too much work and not taking rest days predict obesity (Itani et al., 2013; Itani et al., 2017). Clergy who take a day off each week for rest and relaxation are better equipped to cope with job stress and are less likely to be obese than those who do not practice weekly rest (Ferguson et al., 2015).

Results from a retrospective longitudinal study conducted from 1999 to 2006 on 30,194 Japanese government employees showed that working less than nine hours a day and taking weekly rest days promoted health. Employees who worked long hours and did not take weekly rest days were at higher risk for metabolic syndrome, hypertension, and hypertriglyceridemia than those who took weekly rest days (Itani et al., 2013). A more recent study of 22,423 Japanese workers showed that not taking weekly rest was associated with dyslipidemia (Itani et al., 2017). The healthy lifestyle practice of weekly rest decreases the risk of Metabolic Syndrome (MetS) (Itani et al., 2017).). However, after adjusting for covariates, Kuwahara et al. (2014) study on 40,851 Japanese employees did not show an increase or decrease in the prevalence of diabetes-related to additional weekly work hours.

Heart rate variability (HRV) is an effective way to evaluate stress; decreased variability is indicative of the greater stress. Finnish rescue workers' HRV increased after one rest day following a 24-hour shift (Lyytikäinen et al., 2017). The low/high-frequency

ratio of HRV decreased significantly after one rest day, indicating a decrease in stress levels. The stress percentage decreased by almost 12% after 24 hours of rest, indicating the importance of weekly rest in recovering from work stress (Lyytikäinen et al., 2017).

Psychological Effects. The effect that weekly rest has on mental well-being impacting physical health was seen in a study by Anson and Anson (2001). When looking at the effect of holy days and Sabbaths (the Jewish rest day) on mortality rates in Israel, compared to the rest of the week, it was found that there was a significant reduction in the number of deaths on Sabbath in both men and women (Anson & Anson, 2001). However, this was not the case for other Jewish holy days. The physiological benefit of a decreased mortality rate during the Jewish Sabbath stems from the cessation of the business and stress of life, as well as opportunity for socialization, and subsequent well-being (Anson & Anson, 2001).

Long work hours and not having a weekly rest day are stressful and detrimental to mental well-being (De Moortel et al., 2017; Kleiner et al., 2015); which occurs in multiple geographical locations such as Europe, Asia, and North and South America. In a study of 21 European countries, men and women who were required to work more than the standard 35-40 hours a week experienced negative mental well-being (De Moortel et al., 2017). Men, however, did not suffer adverse effects if the extra work was voluntary.

Caregivers in Brazil who did not have weekly rest had higher caregiver burden scores (p=0.002) and depression (p=0.016) (Guerra et al., 2017). South Korea has enacted the Labor Standards Act to reduce the weekly maximum working hours and ensure that the worker has one day a week off (Umeda, 2018). Korean workers who work at least one

weekend day a month are more likely to experience depressive symptoms (Lee et al., 2015). Men were 1.45 times, and women were 1.36 times more likely to present with depressive symptoms than those who did not work a weekend shift. Those who worked more than four weekend shifts a month experienced the most depression (Lee et al., 2015).

While both Americans and Germans experienced negative well-being related to long work hours, the number of hours that mental well-being is affected is different for each country (Kleiner et al., 2015). For the German worker, there is a significant correlation between poor mental health and working more than 60 hours a week (Kleiner et al., 2015). For the American worker, it is more complicated. Results showed a significant relationship for part-time workers and those working up to 49 hours a week with poor mental well-being, but not for those working more than 50 hours (Kleiner et al., 2015). Kleiner et al. indicated that other factors may contribute to mental well-being in the United States, such as the health system and monetary rewards for overtime work. In Germany, part-time workers have the same access to benefits as full-time workers and are penalized for working more than 48 hours a week (Kleiner et al., 2015).

Superville et al. (2014) identified a significant correlation between the practice of weekly rest and mental health. This relationship was both direct and indirect. Fifty-three percent of the relationship was due to the mediators of diet, exercise, religious community support, and religious coping, such as faith in God (Superville et al., 2014).

Populations that intentionally set aside one rest day a week, also known as Sabbath-keeping, have found it to have a positive impact on their lives. Mental health

benefits experienced by orthodox Jews have been related to being able to withdraw from the busyness and demands of life, time for introspection, and cultivating relationships (Dein & Loewenthal, 2013). Other themes that were identified from a qualitative study of Jewish family observance of Shabbat, a day of rest, were family time, family unity, and building self-worth and a sense of belonging in their children (Marks et al., 2018).

Seventh-day Adventists (SDA) also observe a weekly rest day. Studies have found that having a weekly rest day is associated with mental well-being (Bailey & Timoti, 2015). White et al. (2015) did a mixed methods study examining SDA mental health clinicians, academics, and students. They found that those who practiced weekly rest experienced a significant difference in the quality and quantity of rest in their lives compared to those who did not. For SDA pastors, the experience of Sabbath-keeping is a paradox (Carter, 2013). Carter found that SDA pastors' weekly rest day was busy, stressful, and draining due to the demands of preaching and interpersonal relationships with their congregation, but it was also energizing. The benefits the pastors experienced were spiritual well-being, cultivating gratitude, physical rest, recreation, and building family relationships (Carter, 2013).

A cross-sectional study showed that there was a positive association was found between weekly rest and quality of life, social support, quality sleep, relaxing activities, spiritual well-being, and reduction in demands on time and life chaos in Methodist clergy who intentionally rested a day each week (Hough et al., 2019). After controlling for the covariate of social support, only spiritual well-being and quality of life showed a significant relationship to weekly rest (Hough et al., 2019).

A qualitative study focused on the experience of those practicing weekly rest that were not affiliated with a particular religious community. Not only did participants experience deeper relationships with family and friends, a sense of gratitude, and spiritual well-being, but they also encountered greater self-awareness due to time for introspection and reflection (Speedling, 2019). Another theme that was identified was that weekly rest provided the opportunity for self-care, helping them cope with stress and burnout. Participants found that weekly rest affected the rest of their week; they felt revived and experienced greater serenity (Speedling, 2019). Weekly rest allowed time to consider the needs of others and to be of service (Speedling, 2019). Speedling concluded that the participants' experience was holistic, impacting the individual's well-being, the family and the community.

Physicians and Residents. The importance of having weekly rest has been acknowledged by the Accreditation Council for Graduate Medical Education (ACGME), which accredits medical resident programs throughout the U. S. Prior to ACGME involvement, residents were required to work 24 hours a day, seven days a week. This workload resulted in sleep deprivation among residents, impacting both speed and accuracy in the cognitive domains of memory, reasoning, and simple and complex attention (Lim & Dinges, 2010), as well as concentration and mood (Whalen & Walsh, 2011).

The need for a weekly rest day became nationally apparent in 1984 due to the death of a young woman under the care of residents in a teaching hospital in New York. In 1988, it was recommended that residents have one day off in every seven days

(Philibert & Taradeijina, 2011). More than a decade later, the recommendation became a requirement in the ACGME's 2003 standards on maximum work hours of medical residents to improve patient safety and resident well-being (Philibert et al., 2011).

Since the ACGME has implemented the restrictions, medical residents' overall quality of life has improved physically, psychologically, and socially (Ahmed et al., 2014; Lin et al., 2019). Residents have reported decreased fatigue (Riebschleger & Nasca, 2011), feeling more rested and alert (Philibert et al., 2013), reduced perceived stress (Fletcher et al., 2011), decreased emotional exhaustion and burnout (Block et al., 2013; Philibert et al., 2013; West et al., 2016), improved mood (Philibert et al., 2013; Riebschleger & Nasca, 2011), and overall satisfaction with their educational experience (Desai et al., 2018; Riebschleger & Nasca, 2011). The ACGME work standards for residents have resulted in an improvement in their performance (Philibert et al., 2013; Sandefur et al., 2017).

Another result of implementing the ACGME standards has been seen in the quality of patient care (Burchiel et al., 2017; Riebschleger & Nasca, 2011). Resident personalization toward the patient has increased (West et al., 2016), and patient mortality rates have improved (Fletcher et al., 2011). However, the outcomes of patient safety, complications, and errors have been mixed, with some studies finding improvement and others with no difference (Burchiel et al., 2017; Fletcher et al., 2011; Philibert et al., 2013; Sandefur et al., 2017).

Residents are not alone in experiencing the adverse effects of having insufficient days off; physicians do, too. Physicians who worked more than 48 hours a week or seven

days in a row experienced greater fatigue and diminished quality of life than those who did not (Tucker et al., 2010). Higher rates of burnout and depression occur in physicians who do not take weekly rest days (Saijo et al., 2014; Wada et al., 2010), which affects not only the doctor but the patient as well.

Nurses. Adequate rest is necessary for nurse well-being and patient safety. The Institute of Medicine (2004) recommended limits on hours worked daily and weekly to address nurse fatigue. The effects of fatigue are seen in a decrease in alertness, communication, ability to concentrate, and task performance (Sagherian et al., 2017). There is an association between days off and fatigue (Blasche et al., 2017; Sagherian et al., 2017), burnout, absenteeism, and performance (Dyrbye et al., 2019). Chronic and acute fatigue impaired nurse work performance (Sagherian et al., 2017). Sagherian et al. found that nurses who work on their day off experienced more chronic fatigue than those who rested.

Having at least eight days off each month may protect nurses from burnout (Wisetborisut et al., 2014). Nurse vigor increases, and emotional exhaustion decreases after 48 hours of rest (Marzuq & Drach-Zahavy, 2012). Blasche et al. (2017) observed that changes to vigor and emotional exhaustion took 24 hours of rest to change. Weekly rest is necessary to allow for recovery from stress and the demands of work to maintain nurse personalization and patient safety (Blasche et al., 2017).

Weekly rest has been found to be more effective in decreasing emotional exhaustion and increasing vigor in nurses, depending on when it occurs (Drach-Zahavy & Marzuq, 2013). Drach-Zahavy and Marzuq found that rest on the weekend resulted in

less emotional exhaustion and greater vigor than rest during the week. However, there were no differences in which day of the week rest occurred as long as the nurse deliberately took time to relax (Drach-Zahavy & Marzuq, 2013).

Summary

The literature in this review exposed that nursing students experience considerable stress, not only due to academics but also finances (McCarthy et al., 2018), social challenges (Alyousef, 2019), life balance issues, personal factors (Tagher & Robinson, 2016), and especially clinical setting and practice (Labrague et al., 2017; McCarthy et al., 2018). Stress experienced by nursing students can have deleterious effects on their ability to learn and perform (Hsu et al., 2018; Magnavita & Chiorri, 2018; Ye et al., 2018), on grades (Chen et al., 2015), physiologically, and psychologically (Gurková & Zeleníková, 2018; Racic et al., 2017). Nursing student stress may be detrimental to their commitment to their nursing education, resulting in attrition (Riley et al., 2019) and may also result in novice nurses leaving the profession (Goodare, 2015).

The literature supports the stress-buffering ability of the three personality characteristics of control, commitment, and challenge and the positive benefits in the psychological, adaptive, and behavioral domains among nursing students. Hardiness diminishes the negative impact of stress and improves student mental health (Leslie & Hutchinson, 2018). Hardy nursing students experience less burnout (da Silva et al., 2014), suicidal ideation (Abdollahi, , et al., 2018), and have a strong sense of belonging (Abdollahi & Noltemeyer, 2018). Nursing student performance is positively affected by hardiness in both clinical practice (Sportsman et al., 2014) and academics (Olsen, 2017;

Sportsman et al., 2014). Hardiness supports nursing student performance due to the student viewing the stressful demands of the nursing program positively (Sportsman et al., 2014).

Heliogeomagnetic chronomes that are present in the world are not influenced by the societal week but are associated with circaseptan patterns in nature and humans (Breus et al., 2002; Cornélissen et al., 2002; Cornélissen & Halberg, 2000; Guan et al., 2011; Mendoza & Díaz-Sandoval, 2004; Peyró et al., 2002) and therefore may be inherent within human genomes (Halberg et al., 2001). The physiological and psychological benefits associated with the lifestyle practice of weekly rest may be attributed to these seven-day biological rhythms (Morton, 2018).

The current literature reviewed here suggests the importance of the practice of weekly rest in the physiological, psychological (Superville et al., 2014), social (Speedling, 2019), and spiritual domains (Hough et al., 2019). The benefits of the practice of weekly rest are seen in the neurological (Alstadhaug et al., 2007), musculoskeletal (Guerra et al., 2017), cardiovascular (Itani et al., 2017), and endocrine (Itani et al., 2017) systems. Those who practice weekly rest report decreased fatigue (Sagherian et al., 2017), less burnout (Dyrbye et al., 2019), and greater vigor (Blasche et al., 2017) and performance (Dyrbye et al., 2019). Greater mental well-being (De Moortel et al., 2017; Kleiner et al., 2015), self-awareness (Speedling, 2019), cultivation of relationships (Speedling, 2019), and less depression (Saijo et al., 2014) were reported by those who took a day off each week. Taking a 24-hour period away from the stress of

patient care is needed to destress and better meet the patient's needs (Blasche et al., 2017).

The purpose of this study was to examine whether there is a relationship between the practice of weekly rest with stress and hardiness among nursing students. Like residents and nurses, nursing students need time to recover from the demands of the stress of school and life. No studies have been done on weekly rest with this population. Scholars do not know whether the lifestyle practice of weekly rest, an uninterrupted 24-hour period of no gainful employment or academic endeavor in each seven-day week, is associated with stress and hardiness among BSN students. In the following chapter, I provide details and rationale on methodology and research design.

Chapter 3: Research Method

Introduction

The purpose of this comparative descriptive study was to examine whether there is a relationship between weekly rest, perceived stress, and hardiness among BSN students who practice weekly rest compared with BSN students who do not. In this chapter, I address the research design and rationale, as well as the methodology of population participation, recruitment, sampling procedures, and data collection. I also identify the instrumentation of each construct and provide the operational definition of each variable. A thorough presentation of my data analysis plan is provided, and lastly, threats to validity and ethical procedures.

Research Design and Rationale

Quantitative research requires a rigorous, meticulous outline of each aspect of the study before data can be collected (Houser, 2015). The problem, the purpose, and research questions all direct the research design (Creswell, 2014). Researchers use descriptive designs when they suspect a phenomenon is present, but very little is known (Grove et al., 2013; Houser, 2015). There is a small body of literature regarding weekly rest with stress and inner resources, with none to date concerning nursing students. Descriptive designs provide the opportunity to gain information and describe relationships as they naturally occur (Houser, 215).

In this study, the research questions are as follows:

(a) What is the relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest?

(b) What is the relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest? A comparative descriptive design is used to answer these questions.

As a comparative descriptive design, this study examined relationships among variables to obtain an overall view. The purpose of comparative descriptive designs is to identify relationships and describe variable differences, without manipulation, among two or more groups as they naturally occur (Cantrell, 2011; Grove et al., 2013). In this study, the groups were not assigned but occur naturally. Nursing students who do not practice weekly rest are included as a comparison group to those who practice it.

Independent variables are those that are implemented to examine the result in the dependent variable. Descriptive design variables are not manipulated and are not considered independent and dependent (Grove et al., 2013). However, in comparative descriptive studies, when the variable is naturally occurring, and participants with and without said variable are compared to examine the potential association, it is considered an independent variable (Cantrell, 2011; Houser, 2015). In this study, the independent variable is weekly rest, and the dependent variables are perceived stress and hardiness. I used a survey to determine the practice of weekly rest and levels of perceived stress and hardiness. A thorough discussion of the instruments to be used in the survey is given later in this chapter.

A survey is an effective method for obtaining knowledge regarding respondents' characteristics at a single point in time (Houser, 2015). Survey use is an efficient way to reach a larger number of participants (Houser, 2015). I invited 11 schools of nursing to

participate in this study. Another benefit of a one-time survey is that it limits the amount of time required from participants. The estimated time constraint for participants to complete the survey was 15–20 minutes.

Methodology

Population and Sampling Procedures

Population

Participants were BSN students. The Institute of Medicine (IOM) identified that the nursing workforce were uniquely positioned to help meet the challenges of an evolving healthcare system and recommended that 80% of nurses have a BSN by 2020 (Institute of Medicine [IMO], 2011). Nurses with a baccalaureate degree or above would be better equipped to lead and coordinate care within the clinical setting and the community (IMO, 2011). As a result, there has been 11.2% rise of more BSN graduates, between 2009 and 2019, than those attending an associate degree program (Campaign for Action, 2021). BSN students that were invited to participate were those have taken, or are currently enrolled in, nursing courses with a clinical practice element. BSN students find the clinical setting and patient care stressful (Bhurtun et al., 2019). Nursing students who have not been exposed to clinical will likely not have experienced the same kind of stress associated with nursing education and therefore may skew the results.

Sampling Procedures

I recruited BSN students attending parochial schools of higher education that promote the practice of an uninterrupted 24-hour period for restoration each week. Throughout the world, SDA colleges and universities encourage the practice of weekly

rest, but it is not required (AdventistHealth, 2018). There are 56 SDA parochial higher education institutions with BSN programs (Seventh-day Adventist Nursing Programs, 2017). BSN students from 11 nursing programs in North America were asked to participate.

Probability sampling would provide the most reliable results for determining generalizability in a quantitative study (Houser, 2015). However, random sampling was not possible in this study due to the need to find participants that practice weekly rest; therefore a non-probability convenience sample was used. Convenience sampling means that participants are enrolled because it is convenient. This approach has the potential to lead to bias, especially when the researcher is involved in selecting participants (Houser, 2015). To minimize bias, nursing programs invited to participate were from various locations in North America where I, as a researcher, am not affiliated.

Power Analysis

A sample must be large enough to ensure that the results represent a population (Houser, 2015). A priori power analysis will be done to determine the necessary sample size to reduce the possibility of Type I and Type II errors (Mayr et al., 2007), using G*power analysis 3.1.9.2 for MANOVA with global effects, of two groups and two dependent variables. The standard α-level of .05 will be used in this analysis so that there is 5% chance of an error (Field, 2009).

When determining the sample size using MANOVA, f^2 is the effect size that was used: $f^2 = 0.02$ small effect, $f^2 = 0.15$ medium effect, and $f^2 = 0.35$ for a large effect (Steyn & Ellis, 2009). An $f^2 = 0.15$ will be used so that there will be a medium strength of

association. To be certain that there is an 80% chance of detecting that the effect is real, I selected a power of $\beta = 0.8$ (Field, 2009). Sixty-eight participants were required.

Procedures for Recruitment, Participation, and Data Collection

I invited nursing students from 11 North American SDA BSN programs to participate in my study by emailing and phoning the dean or department head of the institutes' nursing program and informing them of the parameters of my study. I asked the nursing programs that did agree to participate to allow me to use the school's email addresses for all BSN students that were enrolled in nursing courses with a clinical practice element. After receiving permission, I introduced myself in the email to the students, explained participation requirements, provided a brief explanation of the research, discussed confidentiality and anonymity, that their participation is voluntary, and invited them to participate. Information regarding receiving support if issues arise was also included in the email for easy retrieval if desired. I also informed them of the approximate time commitment, provided a link to the online survey, and thanked them for their time (See Appendix B).

Demographic information collected were age, gender, marital status, children, current educational level in their nursing program, religion, and questions regarding the student's practice of weekly rest (See Appendix C). Participants were invited to participate by email with a link to the survey using SurveyMonkey®. Informed consent was provided in the email, which included the purpose, benefits, possible risks of the study, available resources if needed, and that participation was voluntary and anonymous. The participant was informed that her or his email address would not be attached to the

data on the web-based survey platform to ensure anonymity. By clicking on the survey link in the email, and continuing to advance in the survey, the participant indicated understanding of the informed consent. The informed consent also included that a participant might exit the online survey at any time if he or she decided not to continue participation.

The method of data collection used the secure online survey system of SurveyMonkey®. Demographic information of age, gender, marital status, children, and standing in nursing program were obtained first in the survey. The PSS was after the demographics. Questions were then asked regarding the student's participation of weekly rest and religion. Thereafter, a link was provided for the student to continue from SurveyMonkey® to MHS to complete the HRG. The survey took approximately 15 to 20 minutes to complete. At the conclusion of the survey, the participants were thanked for their participation.

Instrumentation and Operationalization of Constructs

Two self-reported instruments were used in this study to measure the dependent variables of perceived stress and hardiness.

Perceived Stress Scale

The impact of stress is influenced by the individual's appraisal of the event (Lazarus & Folkman, 1984). Cohen et al. (1983) developed the Perceived Stress Scale (PSS) to measure the extent an individual feels that life's circumstances are stressful and overwhelming. The PSS may be used to investigate the process and role of stress in pathology and evaluate perceived stress as an outcome (Cohen & Williamson, 1988).

Since the PSS is useful in examining elements that influence or are affected by stress appraisal (Cohen & Williamson, 1988), it is an appropriate choice for investigating whether there is a relationship between weekly rest and perceived stress among nursing students in this study.

The first PSS had 14-items, which was shortened to 10-items by excluding four questions with weaker associations, thereby improving reliability (Cohen & Williamson, 1988). The third scale was developed for telephone surveys with just four questions. The PSS was designed for a middle school education level and questions are not specific to any particular situation but are applicable generally (Cohen et al., 1983). Questions ask about the frequency of thoughts and feelings within the past month; using a five-point Likert system of never to very often. Questions are both positively and negatively phrased. The four that are worded positively are reverse-scored. Test scores range from 0 to 40; higher scores indicate greater perceived stress (Cohen & Williamson, 1988). A score less than 13 indicates low stress and 20 or more denotes high stress (Isac & Abraham, 2020).

The 10-item Perceived Stress Scale (PSS-10) (Cohen & Williamson, 1988) was used in this study. The PSS-10 takes about five minutes to complete. Permission to use Cohen's PSS-10 is given on the Carnegie Mellon University website for nonprofit education and academic research (Carnegie Mellon University, n.d.) (See Appendix D).

The PSS-10 been used extensively to measure perceived stress (Isac & Abraham, 2020), and has been translated into 27 languages (Carnegie Mellon University, n.d.). The PSS-10 is a valid measurement of the construct perceived stress (Baik et al., 2019). It has

been found to be correlated with stress events experienced over a week and a year, as well as one's health status and usage of health care services (Baik et al., 2019).

The PSS-10 has been found to be a valid and reliable instrument among various populations, such as those with health issues (Cohen et al., 1983; Taylor, 2015), students (Abdollahi, et al., 2018; Abdollahi, 2015; Cohen et al., 1983; Engeland et al., 2016; Gutman et al., 2020; Lin et al., 2020; Thomas & Borrayo, 2016), nurses (Abdollahi, et al., 2014; Park et al., 2018), and the general population (Bastianon et al., 2020; Cohen & Janicki-Deverts, 2012; Cohen & Williamson, 1988; Huanng et al., 2020; Maroufizadeh et al., 2018). The PSS-10 has a Cronbach's $\alpha = 0.078$ (Cohen & Williamson, 1988). Current studies using the PSS-10 with nursing students had a Cronbach's alpha range of 0.75 to 0.89 (Abdollahi, et al., 2018; Grobecker, 2016; He et al., 2018; Isac & Abraham, 2020; Lee & Im, 2016; Mun et al., 2011; Zhang et al., 2018).

Hardiness Resilience Gauge

Hardiness is a form of mental fortitude that serves as a buffer to stress (Booker et al., 2018). As a result of Kobasa's (1977) dissertation she developed an instrument to measure hardiness using portions of 18 different components of 6 instruments resulting in 101 negatively worded items to measure the 3C's of control, commitment, and challenge (Bartone et al., 2019). Criticism of the negative affectivity of the instrument (Funk & Houston, 1987), questions of factor structure, and the length has led to further refinement over the past 40 years (Bartone et al., 2019). Bartone (1984) improved the hardiness scale by reducing it to 50 negatively worded items. Since 1984, Bartone has upgraded his hardiness scale six times incorporating positively worded questions, enhanced validity

and reliability, and improving ease of translation and adaption to other cultures (Bartone et al., 2019). The result was the 15 item Dispositional Resilience Scale (DRS-15), of five items for each of the 3C's, which has been widely used with a variety of populations. However, the shortness of the DRS-15 may not fully reflect the intricacy of hardiness and its subscales (Bartone et al., 2019). To address this the Hardiness Resilience Gauge (HRG) was developed.

The HRG was developed by using the DRS-15 and 21 other items (Bartone et al., 2019). A sample of 1,873, of adults ages 18 or older, from all 50 states in the U. S. participated in the online survey. Analysis of the 36 items revealed that 28 items were the most psychometrically rigorous, with 10 items for both subscales of commitment and challenge, and eight items for control (Bartone et al., 2019), most of which were positively worded (Kirnan & Ventresco, 2021). Internal reliability of the HRG is robust with a Cronbach's $\alpha = 0.93$ and high alpha levels for each subscale (commitment $\alpha = 0.89$, challenge $\alpha = 0.85$, control $\alpha = 0.84$; Bartone et al., 2019). The HRG also showed high test-retest values with small effect size differences (Bartone et al., 2019). In a study of medical students the HRG demonstrated excellent reliability with a Cronbach's α of 0.9302 (White et al., 2020).

The HRG is managed by Multi Health Systems® (MHS) and takes approximately five to ten minutes to complete (Houser & Cahill, 2021). The respondent indicates the degree that the statement applies, using a 4-point Likert scale with a range of not at all true to completely true (Kirnan & Ventresco, 2021). Although the HRG is not intended for diagnosis, it is beneficial for sequential hypothesis testing, inferential research,

creation of interventions to promote hardiness in individual growth (Houser & Cahill, 2021), and recruitment of resilient individuals in high stress situations (Kirnan & Ventresco, 2021). Since the HRG is appropriate for inferential research and identification of potential interventions to promote hardiness, it was a good fit and was used in this study. MHS administered the HRG on their secure online platform and provided a research summary of the data to me at the completion of the designated survey period.

Data Analysis Plan

Data Analysis Software

I used Statistical Package for the Social Sciences (SPSS) version 27 for Windows 10 for data analysis. Prior to data collection I developed a codebook to label, describe, and organize demographic information and each variable for data input.

Data Cleaning and Screening

I was the only one to input the data in SPSS in order to ensure coder reliability and reduce risk of data entry errors (Houser, 2015). I double checked the data entries (Grove et al., 2013) from SurveyMonkey® before downloading into SPSS. When essential data was missing a subject needed to be excluded from analysis (Grove et al, 2013). Subjects who did not answer the questions regarding the independent variable of weekly rest were excluded. Dependent variable missing data was imputed by taking the mean of all other subjects within that factor level (Warner, 2013). The data is stored for five years in a SPSS file on my computer, which is password protected, and on an external hard drive that I keep locked in my fire safe.

Research Questions and Hypotheses

The research questions for this study were:

RQ1: – What is the relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest?

H_o1: There is no relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest.

H_a1: There is a relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest.

RQ2: – What is the relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest?

H_o2: There is no relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest.

H_a2: There is a relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest.

Statistical Tests

The statistical test needs to fit the research design and data to be able to distinguish differences (Grove et al., 2013). Consideration of the independent variables, dependent variables, and assumptions must be considered when determining which method of analysis to use (Green & Salkind, 2014).

I used one-way multivariate analysis of variance (MANOVA) as the method of choice to test the hypotheses in this study. MANOVA may be used in experimental and quasi-experimental studies using random sampling, and in field studies utilizing groups that would occur naturally (Warner, 2013). MANOVA is an extension of one-way analysis of variance (ANOVA; Houser, 2015). ANOVA tests the mean differences of a factor that is divided into two or more groups, or levels, with one interval dependent variable (Green & Salkind, 2014). Whereas, MANOVA allows for two or more interval dependent variables and factors may be within-groups or between subjects (Green & Salkind, 2014). MANOVA allows for identifying possible relationships between the factor levels of weekly rest and the dependent variables of perceived stress and hardiness. In this study, the independent variable is the practice of weekly rest with groups of those who practice weekly rest and those who do not. The dependent variables of perceived stress and hardiness are interval.

A report of Box M test was provided to assess whether the assumption of equality of variance is met. The Box's test is needed when the sample sizes are not equal (Warner, 2013), which is most likely to be the case in this study. Multivariate tests of Pillai's trace, Wilk's lambda, Hoteling's trace, and Roy's largest root provided the results of MANOVA. What violations of assumptions occurred in this study determined which of the multivariate tests was the most robust (Ates et al., 2019). Discriminate analysis (DA) was used to further clarify MANOVA results by amplifying differences (Green & Salkind, 2014). DA coefficients provide information regarding the outcome variables contribution (Field, 2009).

Threats to Validity

External Validity

External validity has to do with how a study can benefit, be applied, and its generalizability to a large population (Houser, 2015). This study's sample is a convenience sample, making it a potential threat to external validity (Houser, 2015). Therefore, in order to reduce the potential for bias, I did not select participants; participation was voluntary (Houser, 2015). In addition, inviting participants from 11 nursing programs around North America addressed the threat to external validity, by representing nursing students from around the country levels of perceived stress and hardiness.

Internal Validity

Selection bias may be a threat to internal validity in samples that are not random (Grove et al., 2013). Selection bias is also a threat when subjects are selected because they differ in some way. Since the independent variable is naturally occurring and subjects are not being assigned to a group, selection bias was not a threat (Grove et al., 2013).

Internal validity is the degree to which the results are a true representation of the sample (Grove et al., 2013). There is a threat of evaluation apprehension, when the participant desires to be thought of as capable and will self-report inaccurately (Grove et al., 2013). Confidentiality and anonymity were stressed to address this. Hypothesis guessing was a potential threat by nursing students who practice weekly rest, who may be biased and misreport perceived stress and hardiness (Grove et al., 2013). Therefore,

questions regarding the independent variable were asked after the student had answered all questions regarding the dependent variables. Researcher bias of experimenter expectancy, of anticipating particular results, can be a threat to internal validity (Grove et al., 2013). However, experimenter expectancy was minimal since the independent variable was not manipulated and was naturally occurring.

Construct Validity

Rooted in theory, construct validity is the degree to which a measure relates to the conceptual variables of the study so that the results will reflect reality (Frankfort-Nachmias et al., 2015). Construct validity can be determined by predicting properties that may be related to the measure, and then empirically measure said properties (Frankfort-Nachmias et al., 2015). Factor analysis is often used to determine construct validity (Houser, 2015). Another method to determine construct validity is comparing the measure to other instruments that measure the same concept (Frankfort-Nachmias et al., 2015).

The PSS-10 was refined from the PSS-14 by using factor analysis and has demonstrated construct validity (Taylor, 2015). The validity of the PSS-10 has been verified in various populations, cultures, and physical mental health issues (Maroufizadeh et al., 2018; Taylor, 2015). The PSS-10 has demonstrated construct validity with other physical and mental health measures that evaluate anxiety, depression, and emotional exhaustion (Baik et al., 2019; Maroufizadeh et al., 2018; Sun, et al., 2019).

Construct validity of the HRG is supported with other measures that are related to hardiness, such as coping styles, burnout, cynicism, professional efficacy, and general life

satisfaction (Bartone et al., 2019). Confirmatory factor analysis revealed that the hierarchical model, of the three subscales of control, commitment, and challenge integrated within the comprehensive factor of hardiness, was a strong fit (CFI = .98, RMSEA = .08; Bartone et al., 2019). This is indicative that the HRG is a valid measurement of hardiness.

Threats to statistical conclusion validity happen when the assumptions of a statistical test is violated. The assumptions of MANOVA are: scores are independent, normal distribution, and outcome variables are homogeneous (Warner, 2013). The Box's test was used to test for the assumption of homogeneity of covariance.

Ethical Procedures

In order to safeguard that participants would not experience harm as a result of this study, all procedures and potential risks were reviewed and approved by Walden University's Institutional Review Board (IRB). Walden's IRB ensures that the benefits of a study are greater than the risks. Walden University's IRB approval number for this study is # 04-29-22-0353038. Students can be a vulnerable population due to the student teacher relationship, however this was not an issue in this study. There is no risk of participant coercion since I did not have a relationship with any of the nursing programs or the nursing students. In addition to Walden University's IRB approval, permission to access potential participants was sought from each site's institutional gatekeepers. Site gatekeepers were informed of my study's purpose and procedures, and permission was sought for access to participants' school email addresses.

A primary ethical issue for research studies is providing informed consent (Houser, 2015). In this study, the email to the potential participant served as an invitation to participate and an informed consent (See Appendix B). The purpose, potential benefits, participant age of 18 years of age or more, and inclusion criteria were presented. Information was given regarding preservation of participant anonymity; names were not collected, and email addresses were not associated with their data. The participant was also assured that his or her data would not be shared outside of this study. The participant was also informed that her or his participation was voluntary and that they would not suffer adverse consequences if choosing not to participate or withdraw. Consent was given by clicking on the link to the online survey platform SurveyMonkey®. Lastly, my contact information as the researcher and Walden University's research participant advocate's contact information was provided.

There are research topics that need to be handled in a sensitive manner to avoid harm, such as, psychological issues (Rudestam & Newton, 2015). There was a minimal risk of this being an ethical issue since this study regarded the participant's perceived stress. Contact information of the participant's school counseling center was given to mitigate potential negative feelings that might have been triggered by the survey.

Ethical issues of data collection and storage were addressed. Data was collected using the secure online survey platform SurveyMonkey®, which is a password protected platform only accessible by me. Email addresses were not associated with the data. The data was transferred from SurveyMonkey® to a SPSS file in my password protected personal computer and an external hard drive locked in my safe. The data was only seen

by myself, my dissertation committee, and my statistician. The data will be stored for 5 years, after which it will be deleted.

Summary

This quantitative study used a comparative descriptive design to explore whether there is a relationship between the lifestyle practice of weekly rest with stress and hardiness among BSN nursing students. G*power analysis was used to determine a sample size of at least 68 participants. Convenience sampling of participants was sought from SDA parochial nursing programs throughout the United States. An invitation to participate in this study was by using participants' school email addresses. The secure online platform SurveyMonkey® was used to collect participant answers to demographic data and the PSS to measure perceived stress. The participant accessed the HRG, from a link on SurveyMonkey® to MHS to measure hardiness. Data was transferred from SurveyMonkey® and MHS to SPSS 27 for analysis using MANOVA. Threats to external, internal, construct, and statistical validity and ethical consideration were discussed. Walden University IRB approval was obtained prior to data collection. In the following chapter I will review the data that was collected and present the results in detail.

Chapter 4: Results

Introduction

My purpose in this comparative descriptive study was to examine whether there is a relationship between weekly rest, perceived stress, and hardiness among BSN students who practice weekly rest when compared with BSN students who do not. The research questions were as follows:

RQ1: – What is the relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest?

H_o1: There is no relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest.

H_a1: There is a relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest.

RQ2: – What is the relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest?

H_o2: There is no relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest.

H_a2: There is a relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest.

In this chapter, I review the Institutional Review Board (IRB) developments, and how I handled deviations from my proposed plan outlined in Chapter 3. I also report the

data collection process, time frame, response rates, and a description of the sample. Furthermore, I review the method of analysis, descriptive statistics of the instruments, and the results.

Data Collection

Institutional Review Board Process

After receiving conditional approval from Walden University's IRB, I contacted 11 schools of higher education from around North America with BSN programs to participate in this study. I submitted applications to the 11 IRB and nursing program gatekeepers between July 13, 2022 and August 2, 2022. The proposed age of eligibility for this study was to be 18 years. Two nursing programs were in states requiring that 19 years is the age of maturity for a participant to consent. I notified Walden University's IRB of the need to change the age of eligibility from 18 years to 19 years. The Walden IRB approved this change.

Data Collection Timeframe

Eight of the 11 nursing programs approved my application by September 26, 2022. One site did not meet the criteria since it had an RN to BSN component. Two schools declined. Walden University's IRB gave final approval for my study October 6, 2022. The total potential sample size from the eight participating nursing programs was 1,145.

Nursing program gatekeepers from each site sent out the invitational email to their BSN students. Consistent with my plan in Chapter 3, the invitational email informed the potential participant that they gave consent by clicking on the link and proceeding to the

survey. In addition, a detailed informed consent was included in SurveyMonkey® requiring the volunteer to answer *yes* or *no* to continue to survey.

I conducted a priori G power analysis to determine sample size using a power of $\beta = 0.8$, a medium effect of $f^2 = 0.15$, and $p < .05$, which indicated I needed 68 participants, 34 in each weekly rest practice group. Reminder invitational emails were sent out by site gatekeepers to obtain the 34 participants for each group. Data collection occurred from October 12 through November 5, 2022 (see Table 1).

Table 1

Data Collection Time Frame

Nursing Program Site	Site Gatekeeper's Approval Date	Initial Email Invitation Send Date	Reminder Email Invitation Send Date
1	July 27, 2022	October 12, 2022	October 24, 2022
2	July 27, 2022	October 19, 2022	October 28, 2022
3	August 2, 2022	October 27, 2022	November 1, 2022
4	August 3, 2022	October 17, 2022	October 27, 2022
5	September 12, 2022	October 12, 2022	October 27, 2022
6	September 15, 2022	October 12, 2022	October 24, 2022
7	September 26, 2022	October 12, 2022	October 24, 2022
8	September 26, 2022	October 7, 2022	October 24, 2022

Description of Sample

Altogether 118 participants responded to the invitational email, making the response rate 10.3%, 17 participants did not meet eligibility or continue beyond informed consent. Four participants did not answer the question regarding the practice of weekly and were excluded from the analysis, with a final N = 97. There were two parts to my survey. The first part included demographic information, PPS-10, and questions regarding weekly rest on SurveyMonkey's® online platform with a link to MHS to

complete the HRG for the second part. Of the N = 97, 42.27% did not continue to the second part of the survey to complete the HRG. I received 56 cases that finished both parts of the survey (see Table 2 and Table 3).

Table 2

Comparison of Perceived Stress Response Rates and Means

PSS-10 Sample Size	*N* = 97				*N* = 56			
	f	%	*M*	*SD*	*f*	%	*M*	*SD*
Missing Data	0	0%			41	42.3%		
Total			22.99	6.05			22.13	5.58
Weekly Rest Practice Groups								
No	53	54.6%	24.04	5.47	26	26.8%	22.81	5.28
Yes	44	48.4%	21.72	6.52	30	30.9%	21.53	5.85

Note. PPS-10 = Perceived Stress Scale-10 items

Table 3

Hardiness Response Rates and Means

HRG Sample Size	*N* = 56			
	f	%	*M*	*SD*
Missing Data	41	42.3%		
Total			54.30	11.19
Weekly Rest Practice Groups				
No	26	26.8%	56.96	9.38
Yes	30	30.9%	52.00	12.23

Note. HRG = Hardiness Resilience Gauge.

Of the total participants, 42.3% did not continue to the second part of the survey to answer questions regarding hardiness, resulting in only 56 complete cases. The priori sample size requirement of 68 was not met with only 56 participants; in sum 30 practiced weekly rest, and 26 did not.

Handling of Discrepancies

Missing data reduces sample size, which could result in a type I error of rejecting the null (Fox-Waslyshyn & El-Masri, 2005). When data are missing for dependent variables, the means of all other subjects within that factor level may be imputed (Warner, 2013). My proposed plan in Chapter 3 was to impute the mean of missing data. Therefore, I imputed the HRG means of the weekly rest practice groups for the missing HRG data to address the issue of sample size requirements. For those who did not practice weekly rest, $M = 56.96$, and $M = 52.00$ for those who practiced weekly rest, allowing for all N = 97, making an adequate sample of 44 who practice weekly rest, and 53 who do not (see Table 2).

However, when imputing the means for the missing data, the assumptions for undertaking a MANOVA analysis were not met. The extent of missing data is an essential factor to consider in the handling of missing data (Finch, 2016). When the extent of missing data is 40% or more, imputation should not be used (Finch, 2016). Since 42.3% of the participants did not complete the second part of my survey regarding hardiness, my analysis was restricted to complete case analysis, which were 56 participants who completed both parts of the survey. While this does not meet G*power analysis for a medium effect, it does qualify for a large effect. A G*power analysis using a power of $\beta = 0.8$, a large effect of $f^2 = 0.35$, and $p < .05$ call for 32 participants.

Demographic Information and Representation of Population

Almost 59% of participants who completed both parts of my survey were in their final year of nursing school, 26.8% in the third year, 8.9% in the second year, and 5.4%

in the first. Although participation in my study is relatively representative of the average age of the BSN population, it is not for gender. Of the 56 BSN students, 46.4% were 19 to 22 years old, and 78.5% were 27 or younger. These rates are similar to North America's BSN demographics where 75.8% are < 25 years old (NLN, 2022). The female-to-male BSN student rate, however, was higher in my study than in North America. According to the National League of Nursing (2022), 87% of BSN students are female, and 13% are male. In my study, only 7.1% of the participants were male. Comparing the gender rates of the complete cases and those who only filled out the first part of my survey, there is better representation with 11.3% males (see Table 4).

Most participants in my study were single (80.4%), 10.7% were married, and 8.9% were divorced. Additionally, almost 11% cared for children < 18 living at home. In addition to their academic challenges, many BSN students were gainfully employed; 66.1% work part-time and 5.4% full-time (see Table 4).

There were 30 participants (53.6%) who practiced weekly rest; 26 (46.4%) did not. The sample represents eight religious ideologies: Agnostics, Protestants, Atheists, Baptists, Catholics, Non-denominational, Seventh-day Adventists (SDA), and participants who indicated *other* as their religious affiliation. The smallest represented religious affiliation group was Agnosticism (1.8%), and the largest was SDA (39.3%) (see Table 4). This was a convenience sample to obtain participants that practice weekly rest, thereby inviting SDA schools of higher education.

As a convenience sample, there was a potential threat to external validity, whether it can be generalized to the BSN population at large. This threat was minimized since

individual participants were not selected; participation was voluntary (Houser, 2015). In addition, nursing students were invited from programs around North America, not from just one region.

Table 4

Demographic Information

Characteristic	*f*	N = 56 Percent of Sample
Gender		
Male	4	7.1%
Female	52	92.9%
Other	0	0%
Age		
19 - 22	26	46.4%
23 - 27	18	32.1%
28 - 24	4	7.1%
35 +	7	12.5%
Missing Data	1	1.8%
Relationship Status		
Single	45	80.4%
Married	6	10.7%
Divorced	5	8.9%
Widowed	0	0%
Children at home under the age of 18		
No	50	89.3%
Yes	6	10.7%
Gainfully Employed		
No	16	28.6%
Part-time	37	66.1%
Full-time	3	5.4%
Academic Year		
First	3	5.4%
Second	5	8.9%
Third	15	26.8%
Fourth	33	58.9%

(table continues)

Table 4 cont.

Demographic Information

Characteristic	*f*	N = 56 Percent of Sample
Religious Affiliation		
Agnostic	1	1.8%
Atheist	4	7.1%
Baptist	5	8.9%
Catholic	6	10.7%
Evangelical	0	0%
Islam	0	0%
Mormon	0	0%
Non-denominational	9	16.1%
Protestant	2	3.6%
Seventh-day Adventist	22	39.3%
Other	7	12.5%
Practice Weekly Rest		
No	26	46.4%
Yes	30	53.6%
Day of Weekly Rest		
Sunday	15	26.8%
Monday	1	1.8%
Tuesday	1	1.8%
Wednesday	0	0%
Thursday	1	1.8%
Friday	10	17.9%
Saturday	26	46.4%
Missing Data	2	3.6%

Results

Method of Analysis and Assumptions

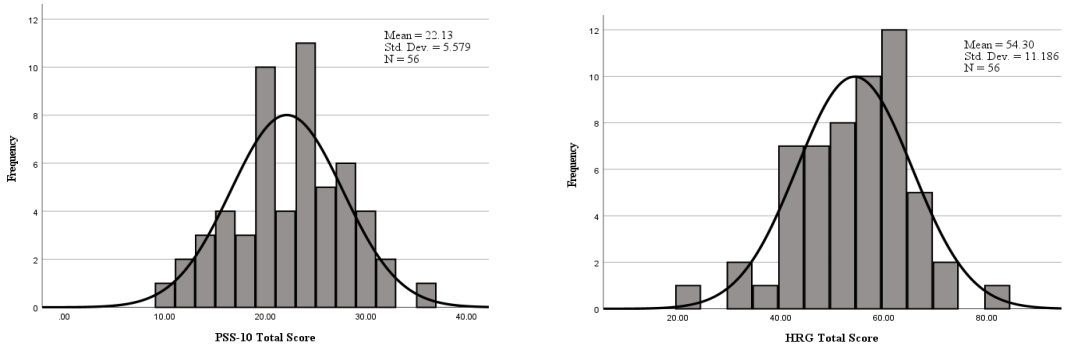
I used the Statistical Package for the Social Sciences (SPSS) version 28 for Windows 10 to analyze my data, and I used one-way MANOVA to explore whether there were any differences between BSN students who practice weekly rest compared to those who do not practice weekly rest on students' perceived stress and hardiness levels. Even though this was a convenience sample, the assumption of random sampling was met since

participation was voluntary. The participants individually accessed the secure online survey to self-report their experiences, meeting the assumption of independence of observations. Both the dependent variables of perceived stress and hardiness showed normal distribution and the absence of outliers (see Figure 3 and 4).

Mahalanobis distance evaluates the presence of an outlier by measuring the distance of the cases from the mean (Field, 2009). A higher value indicates outliers. Mahalanobis distance depends on the sample size and the number of predictor variables. Values higher than 15 are problematic if the sample size is 100, with three predictor variables; when N = 30, with two predictors, values < 11 indicate no outliers (Field, 2009). The highest Mahalanobis distance found among the 56 participants in my study was 8.38, indicating an absence of outliers. Therefore, the assumption was met.

Figure 3

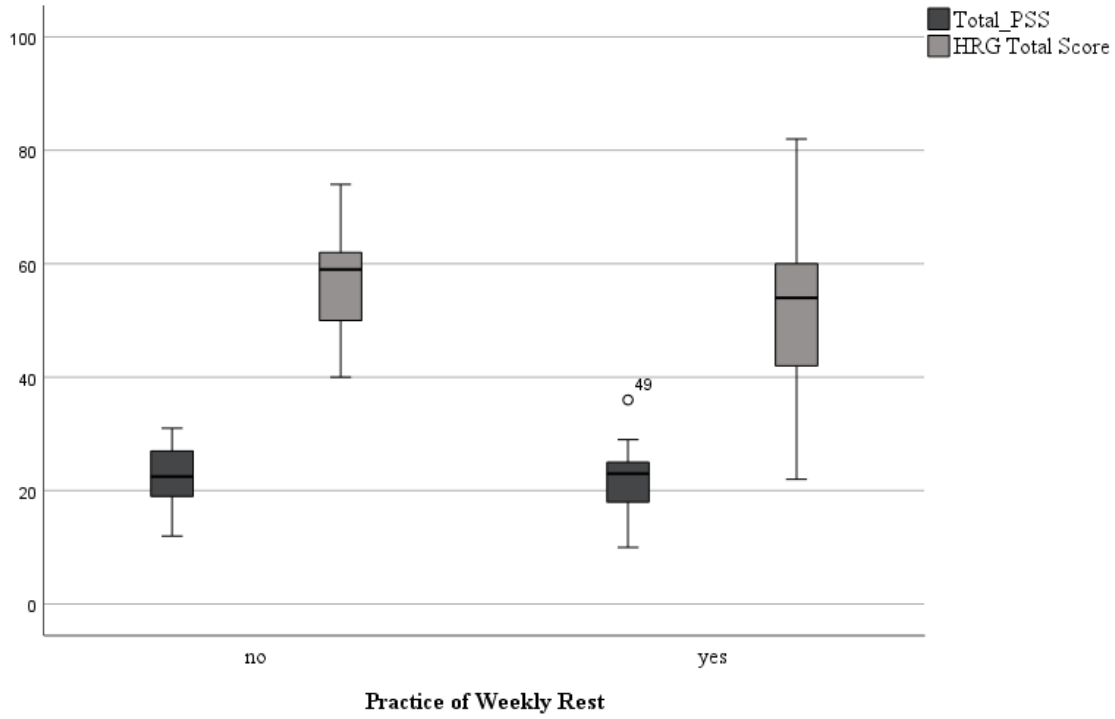
Histograms of Dependent Variables: Perceived Stress and Hardiness



Note. PPS-10 = Perceived Stress Scale-10 items; HRG = Hardiness Resilience Gauge

Figure 4

Multivariate Normality



In addition, there are four more assumptions for MANOVA (Warner, 2013). First, the assumption of multivariate normality must be met. Multivariate normality is an expansion of the assumption of normal distribution where the independent variable, which in this study is the weekly rest practice groups, shows normal distribution (Field, 2009). The Shaprio-Wilks test showed that there was no evidence of non-normality seen in the group that does not practice weekly rest, or in the group that does practice weekly rest for the dependent variable perceived stress ($W = .959$, $p > .05$; $W = .967$, $p > .05$, respectively) or hardiness ($W = .965$, $p > .05$; $W = .979$, $p > .05$, respectively) (see Table 5). Therefore, the assumption of multivariate normality was met.

Table 5

Tests of Normality

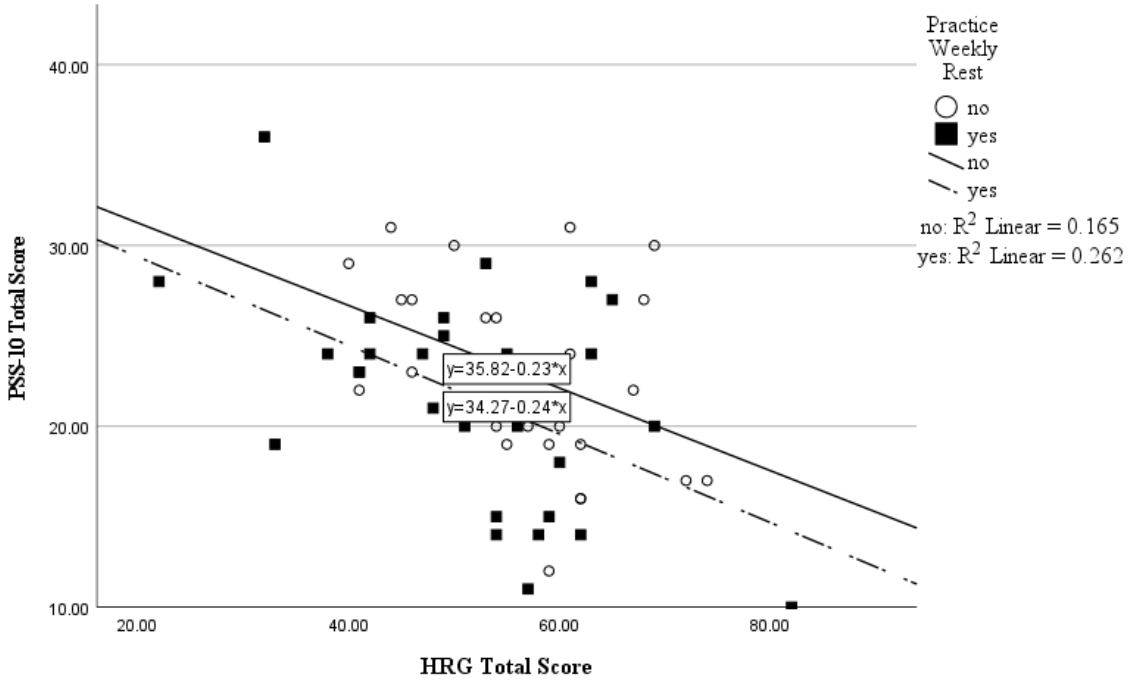
Instrument	Practice Weekly Rest	Shapiro-Wilk Test		
PSS-10		Statistic	df	Significance
	No	.959	26	.371
	Yes	.967	30	.468
HRG				
	No	.965	26	.503
	Yes	.979	30	.807

Note. PPS-10 = Perceived Stress Scale-10 items; HRG = Hardiness Resilience Gauge

The next assumption is linearity. When the dependent variable results plot in a straight line, the assumption for linearity is met (Field, 2009). For MANOVA, there needs to be a linear relationship between dependent variable for each group of the independent variable. The independent variable groups in this study were those who practice weekly rest, and those who did not practice weekly rest. The scatterplot confirmed a negative linear relationship between hardiness and perceived stress in both practice groups (see Figure 5).

Figure 5

Relationship of Perceived Stress and Hardiness among Weekly Rest Practice Groups



Note. Individual participant scores for Perceived Stress (PPS-10) and Hardiness (HRG) are represented as dots or squares.

The third assumption is of homogeneity of variance-covariance. Homogeneity of variance is that the spread of the dependent variable data is similar between independent variable groups (Field, 2009). In addition, homogeneity of variance-covariance means that variances of dependent variables are approximately equal between independent variable groups, but that variance is similar between the dependent variables (Field, 2009). Box's M test addresses homogeneity of variance-covariance. If Box's M result is significant, $p < .001$ homogeneity of variance-covariance is violated. The Box's M test is robust when group sizes are not equal (Field, 2009); as is the case in this study with n = 26 in the group who do not practice weekly rest and n = 30 in the group that do practice

weekly rest. The Box's M test result of 1.91, $p = .61$, indicating that it was not significant. The Levene's test also shows that assumption of homogeneity of variance was met. The Levene's test result was non-significant ($p > .05$) for both perceived stress and hardiness, with a $F(1, 54) = .061$, $p = .81$, and $F(1,54) = 1.04$, $p = .80$, respectively (see Table 6). Therefore, the assumption of homogeneity of variance-covariance was met.

Table 6

Tests of Homogeneity of Variance

Box's Test of Equality of Covariance Matrices						Levene's Test of Equality of Error Variances			
Box's M	F	df1	df2	Sig.		Levene Statistic	df1	df2	Sig.
1.917	.612	3	1715505.360	.607	PSS-10[a]	.061	1	54	.807
					HRG[a]	1.038	1	54	.313

Note. The Box's M tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups. The Levene's tests the hypothesis that the error variance of the dependent variable is equal across groups.
[a] Based on the Mean.

The last assumption for MANOVA is that there is no multicollinearity, where correlations between variables are not too closely related (Field, 2009). I used Pearson's correlation to evaluate multicollinearity. Pearson's correlation indicated that there is no multicollinearity. There was a significant moderate degree of correlation between perceived stress and hardiness, $r = -.430$, $p < .001$, and a coefficient of determination $R^2 = .185$, which accounts for 18.5% of variation (see Table 7). Therefore, the assumption of multicollinearity was met.

Table 7

Tests of Multicollinearity

		PSS-10 Total Score	HRG Total Score
PSS-10 Total Score	Pearson Correlation	1	- .430[a]
	Sig. (2-tailed)		< .001
	N	56	56
HRG Total Score	Pearson Correlation	- .430[a]	
	Sig. (2-tailed)	< .001	
	N	56	56

Note. PPS-10 = Perceived Stress Scale-10 items; HRG = Hardiness Resilience Gauge.
[a] Correlation is significant at the 0.01 level (2-tailed).

MANOVA Results

Since there were no violations of MANOVA assumptions, I conducted a one-way MANOVA to address both research questions for this study. The research questions were:

RQ1 – What is the relationship between weekly rest and perceived stress among BSN students who practice weekly rest compared to those who do not practice weekly rest?

RQ2 – What is the relationship between weekly rest and hardiness among BSN students who practice weekly rest compared to those who do not practice weekly rest?

The BSN students in my student reported PSS-10 scores ranging from 10 to 36; of these 5.4% showed low levels of perceived stress, and 69.9% presented with high levels (see Table 8). One-way MANOVA revealed a mean of 22.13 for perceived stress, and that BSN students who practiced weekly rest had lower mean PSS-10 scores than those who did not (M =21.53, SD = 5.85; and M = 22.81, SD = 5.28, respectively) (see Table 3).

Table 8

Frequency and Range of Scores

Weekly Rest Practice Groups	PSS-10 Score		HRG Standardized Score	
	f	Percentage	f	Percentage
Low Score – Both Groups	3	5.4%	10	17.9%
No	0	0%	4	15.4%
Yes	3	10.0%	6	20.0%
Mid-Range Score – Both Groups	14	25.0%	36	64.3%
No	7	26.9%	18	69.2%
Yes	7	23.3%	18	60.0%
High Score – Both Groups	39	69.6%	10	17.9%
No	19	73.1%	4	15.4%
Yes	20	66.7%	6	20.0%

Note. PPS-10 = Perceived Stress Scale-10 items; HRG = Hardiness Resilience Gauge.

The BSN students who did not practice weekly rest had higher HRG scores than those who practiced weekly rest (M = 56.96, SD = 9.38; and M = 52.0, SD = 12.23, respectively) (see Table 2). The HRG question mean was also higher for those who did not practice weekly rest compared to those who did (M = 2.03, SD = 0.68; and M = 1.86, SD = 0.75, respectively) (see Table 9). The HRG standardized score for all participants was M = 100.73, SD = 12.60. The HRG standardized score for those who practiced weekly rest was M = 101.10, SD = 13.49 and M = 100.31, SD = 11.75 for students who did not (see Table 9).

Table 9

HRG Scoring Comparison

Weekly Rest Practice Groups	$N = 56$					
	HRG Total Score		HRG Questions		HRG Standardized Score	
	M	SD	M	SD	M	SD
Total	54.30	11.19	1.94	0.72	100.73	12.60
No	56.96	9.38	2.03	0.68	100.31	11.75
Yes	52.00	12.23	1.86	0.75	101.10	13.49

Note. HRG = Hardiness Resilience Gauge.

I used Pillai's Trace test to evaluate whether the practice of weekly rest had a significant relationship with the dependent variables of perceived stress and hardiness. Pillai's Trace is considered accurate when the Box's M, and the Shapiro-Wilk's test are non-significant even if the sample group sizes are unequal (Field, 2009). The closer the Pillai's Trace is to one, and if the $p < .05$, the findings are significant. The relationship between the weekly rest practice groups and both dependent variables of perceived stress and hardiness were not significant ($V = 0.10$, $F(2,53) = 3.09$, $p = .054$) (see Table 10). Since Pillai's Trace was not significant follow up analysis was not done.

Table 10

Multivariate Test

Pillai's Trace	Value	*F*	Hypothesis *df*	Error *df*	Sig.	Partial Eta Squared
Weekly Rest	.104	3.091	2.000	53.000	.054	.104

Descriptive Statistics of Instrumentation

I used the online platform SurveyMonkey® to ask questions regarding the independent variable of weekly rest practice and the dependent variable of perceived

stress. I provided participants a link at the end of the survey in SurveyMonkey® to MHS to self-report about the dependent variable of hardiness.

Perceived Stress

The dependent variable, perceived stress, was operationalized using the 10-item Likert scale PSS-10 (Cohen & Williamson, 1988). The PSS-10 is a reliable instrument having Cronbach's $\alpha = 0.78$ (Cohen & Williamson, 1988). The PSS-10 had a high Cronbach's $\alpha = .82$ in this study. These results are similar to current studies of nursing students that used the PSS-10, which had a Cronbach's alpha range of 0.75 to 0.89 (Abdollahi, et al., 2018; Grobecker, 2016; He et al., 2018; Isac & Abraham, 2020; Lee & Im, 2016; Mun et al., 2011; Zhang et al., 2018).

Hardiness

The dependent variable of hardiness was operationalized using the HRG 28-item Lickert scale (Bartone et al., 2019). The reliability of the HRG is robust with Cronbach's $\alpha = 0.93$ (Bartone et al., 2019). In this study, the internal reliability of the HRG is also robust with Cronbach's $\alpha = .914$.

Summary

In this comparative descriptive study, I examined whether there was a relationship between weekly rest, perceived stress, and hardiness among BSN students who practice weekly rest compared with those who do not. I used one-way MANOVA to explore my study's two research questions. One-way MANOVA, and follow-up univariate ANOVAs indicate that the null hypothesis is correct and that there is no significant relationship between the practice of weekly rest and perceived stress or hardiness.

In Chapter 5, I will discuss the interpretation of results. I will also discuss this study's limitations, validity, and reliability of this study. Lastly, I will discuss the implications and make recommendations for future studies.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this comparative descriptive study was to examine whether there was a relationship between weekly rest, perceived stress, and hardiness among BSN students who practice weekly rest compared with BSN students who do not.

I used one-way MANOVA to analyze the data of 56 BSN students from eight nursing programs in North America. The Pillai's Trace test result (p = .054) revealed no significant relationship between the two weekly rest practice groups and perceived stress and hardiness. In this chapter, I review why this study was conducted and its purpose. I will also summarize key findings and discuss the interpretation of the findings. Lastly, I will describe the limitations, make recommendations, and discuss the implications of this study.

Interpretation of the Findings

Perceived Stress

Nursing students' perceived stress mean scores found in current literature are similar to what participants reported in my study (PSS-10 $\mu = 22.13 \pm 5.58$). According to Bodys-Cupak (2021), Jagoda and Rathnauyake (2021), Owen and Pfeiffer (2023), and Zhang et al. (2018), mean scores for nursing students' perceived stress ranged from μ = 20.09 to $\mu = 21.3$. PSS-10 test scores range from 0 to 40; higher scores indicate greater perceived stress (Cohen & Williamson, 1988). A score less than 13 indicates low stress, and a score of 20 or more denotes high stress (Isac & Abraham, 2020).

Health-promoting lifestyle practices reduce stress (Jenkins et al., 2019; Snyder, 2020). Weekly rest is a vital component of a healthy lifestyle (Morton, 2018) that supports physical and mental health (Superville et al., 2014). However, the differences between the lifestyle practice groups of weekly rest means in my study were not significant, and therefore, do not support the literature.

Hardiness

I used the HRG (Bartone et al., 2019) to measure hardiness. After a thorough literature review, no studies were found that included nursing students as participants using the HRG. This may be because the HRG a newly improved measurement of hardiness.

Studies show that nursing students with high hardiness are better able to cope with the demands of nursing education (Olsen, 2017; Sportsman et al., 2014) because hardiness acts as a buffer to stress (da Silva et al., 2014). Student nurses with higher hardiness scores were better equipped for self-regulated learning due to their higher scores of self-belief and self-efficacy (Zhang et al., 2023). Higher hardiness scores were associated with higher religious coping and moral intelligence scores of Iranian nursing students during the COVID-19 epidemic (Momenjoo et al., 2021). These studies are difficult to compare with my findings due to using of measurements other than the HRG.

After thoroughly reviewing the literature, I found studies that used the HRG to explore hardiness in various populations, such as soldiers, medical students, and the general population. Standardized scoring of the HRG is divided into low, mid-range, and high quartiles; 90–110 is mid-range (MHS, 2022). In my study, 64.3% of participants

demonstrated mid-range hardiness with a $\mu = 100.73 \pm 12.60$, which was similar to findings in the development of the HRG regarding gender and age, which was $\mu = 100.6 \pm 14.4$ for females, and $\mu = 100.5 + 15.51$ for 18–24 years old (Bartone et al., 2023).

Standardized scores are lower for the BSN students in my study than medical students with a $\mu = 111.63 \pm 8.95$, which may be due to the average age of 27.04 for the medical student (White et al., 2020). Whereas 46.4% of the nursing students were 19–22 years old, and 32.1% were 23–27 years. In two other military medical student studies, the HRG standardized score were higher. After an intensive surgical skills course, 35 military medical students' mean increased from 111 to 117 (Szybist et al., 2019). After a week-long mass-casualty training course, 34 osteopathic students' HRG standardized score mean increased from 109.17 to 112.37 (Nevins et al., 2023). When comparing the HRG question mean of the BSN students with soldiers with an average age of 24.5, the soldiers' question mean of $\mu = 2.898 \pm 0.418$ (Rybakovaitė et al., 2022) is higher than the nursing students in this study ($\mu = 1.94 \pm 0.72$).

In a study of 363 Canadians, hardiness was negatively associated with anxiety and depression when dealing with COVID-related stress (Bartone et al., 2022). Age was significantly associated with anxiety and depression; younger participants presented with more depression and anxiety. The HRG standardized score of $\mu = 97.16$, with an average participant age of 48.8 years, was lower than the $\mu = 100.73$ for the BSN students in my study, with 46.4% being < 22 years of age.

Health-promoting lifestyle practices promote inner resources, such as hardiness (Lloyd & Campion, 2017). My findings do not show that the lifestyle practice of weekly

rest supports hardiness in BSN students. What is interesting to note is that in my study, the HRG total score mean and the HRG question mean are lower for those who practice weekly rest compared to those who do not, but the HRG standardized scoring is higher in those who practice weekly rest than those who do not (see Table 9).

Findings and Theory

Sawatzky's (1998) adaptation nursing model (revised) was the theoretical foundation of my study. Sawatsky (1998) modified Pollock's (1984) adaptation of the chronic illness model to understand nursing student stress and adaptation. The central concepts of the revised adaptation nursing model are an internal or external focal, contextual, or residual stressor of the student, the student's perception of the stressor, hardiness characteristics, resources, and successful coping related to the student's level of adaptation.

Adaptation is a state of equilibrium (Pollock et al., 1990) where the individual continuously interacts with stressors to achieve and maintain balance (Roy et al., 1999). Adaptation to a stressor is dependent on the individual's perception, which is influenced by past experiences (Lazarus, 2000). Hardiness influences an individual's perception of a stressor and the use of resources, which affect coping and adaptation (Pollock, 1989). Hardiness acts as a buffer for stress among nursing students (da Silva et al., 2014). The ability to successfully cope and the level of adaptation can be seen in mental and physical outcomes (Pollock, 1984).

Theoretically, the use of resources would be associated with lower perceived stress and higher levels of hardiness. The perceived stress levels of the BSN students in

my study are slightly lower in students who practice weekly rest than those who do not. Even though the data in my study showed that nursing students who practiced weekly rest experienced lower perceived stress levels and higher standardized hardiness scores than those students who did not, the findings were not significant and do not add support to Sawatzky's (1998) adaptation nursing model.

Limitations of the Study

My study had several limitations. The findings of my study and the methodology restrict the generalizability of my results. The design of my study being cross-sectional is a limitation since it only provides data from a brief point in time. I used a convenience sample to find participants who practiced weekly rest. Convenience sampling has the potential for bias (Houser, 2015), but the threat was minimized because participation was voluntary (Houser, 2015). Since the independent variable of weekly rest was naturally occurring, the threat to internal validity was diminished (Grove et al., 2013).

In order to have a sample size with medium effect using a two-tailed test, I needed 68 participants (34 in each group) using a power of $\beta = 0.8$ and $p < .05$, but only 56 participants completed the surveys. The G*power MANOVA with global effects post hoc analysis for a sample size of 56 and a medium effect of $f^2 = 0.15$ and a $p < .05$, resulting in a power of $\beta = 0.714$.

Demographic information was obtained first, followed by the PSS, which used a Likert scale to measure the intensity of perceived stress. The proposed plan was then to ask questions regarding hardiness using the HRG, which also uses a Likert scale, followed by categorical questions regarding weekly rest. Due to the proprietary rights of

the HRG by MultiHealth Systems (MHS), this was not possible. MHS required that the HRG be accessed through their website. A link to MHS was placed to complete the HRG after demographic information and the PSS in SurveyMonkey®. This change in the order of the questions may have threatened the validity of the results due to hypothesis guessing. In addition, 42.3% of the participants did not continue to complete the HRG, which affected the results.

The nature of using a survey wherein the participant self-reports is a limitation. To limit the threat to internal validity, in the informed consent, I apprised participants that the online survey platform (SurveyMonkey®) was secure, and that their IP address would not be attached to the survey. In the informed consent, I also assured volunteers that their data would be anonymous, and that they were to create their ID code.

Recommendations

There are a few recommendations based on my study findings. Since the findings were not significant, further study is merited. Further studies with larger sample sizes may clarify the relationship. Another recommendation would be to look at the relationship between the buffering effects of hardiness on perceived stress among BSN students comparing weekly rest practice groups.

Additionally, I recommend a study that would compare three weekly rest groups. Attention to a variable's intensity is necessary to avoid mistaken conclusions regarding the relationship between variables (Grove et al., 2013). A third group of "varied" would further clarify the results. White et al. (2015) recognized the need for this third category in their research on weekly rest and mental health professionals.

A final recommendation would be to conduct a mixed-methods study. A mixed-methods study could provide additional information regarding how BSN students practice weekly rest. In addition, it could clarify the potential benefits or negative aspects of the lifestyle practice.

Implications

Prior to this study, no research was done on the relationship between the lifestyle practice of weekly rest and stress and hardiness among BSN students. As health-promoting lifestyle practices strengthen the ability to cope and reduce stress and strain in college students (Beccaria et al., 2016), the findings of my study can inform nurse educators to guide students to help them find interventions to decrease the stress and strain of nursing education and to develop inner resources and positive coping skills. My findings did not show a difference between weekly rest practice groups regarding perceived stress or hardiness; however, the trend of lower levels of perceived stress and higher hardiness levels was observed in students who practiced weekly rest than in those who did not. Therefore, further exploration into weekly rest and factors that increase hardiness and decrease stress among nursing students is needed to support academic success and BSN retention. The implications would lead to increased academic performance and student nurse retention, which may follow the student into their professional career, ultimately affecting patient care and positive social change.

Although the results of my study do not directly support Sawatzky's (1998) adaptation nursing model, successful adaptation was noted in slightly lower perceived stress levels and higher hardiness levels for BSN students who utilized the resource of the

lifestyle practice of weekly rest compared to those who did not. The sample size was small, with only 67.7% of participants completing both parts of the survey. A larger sample would offer clearer insight.

A recommendation regarding practice would be to continue to support the BSN student to implement health-promoting lifestyle practices to enable them to better cope with the stress of nursing education. Nursing students that practice self-care are better able to cope with stressors than those who do not (Jenkins et al., 2019).

Conclusion

This cross-sectional comparative descriptive study provided quantitative findings that perceived stress is an ongoing problem among BSN students. This study is the first to explore whether there is a relationship between the lifestyle practice of weekly rest with perceived stress and hardiness among BSN students. My study revealed no significant relationship between weekly rest and perceived stress or hardiness among BSN students. The findings of my study validate the need for further exploration into lifestyle practices that support hardiness and reduce stress. Due to the limitations of the small sample size of my study, further research needs to be done to clarify my findings.

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Appendix A: Permission to use the Adaptation Model Revised

To: joann.sawatzky@XXXXXXXX

Mon 6/4/2018 5:17 PM

Subject: The Adaptation Model Revised

Hello everly…

YES - Absolutely – permission granted! I just ask that you acknowledge it as mine!

best of luck with your studies!

best regards

j

Jo-Ann V. Sawatzky RN, PhD

Professor

Associate Dean, Graduate Programs

College of Nursing

Rady Faculty of Health Sciences

University of Manitoba

Appendix B: Recruitment Email to Potential Participants

Subject Line: Nursing Student Research Study

Hello,

This is an invitation to participate in a study regarding nursing student stress. My name is Everly Batuik and I am a student too; a doctoral candidate at Walden University College of Nursing. You qualify to participate if you are at least 18 years old and enrolled in a nursing course with a clinical element of taking care of patients.

- The purpose of this study is to examine whether there is a relationship between a lifestyle practice, you may or may not already be doing, and stress and your inner strength resources. Your participation will help to increase knowledge in the area of nursing student stress.
- The online survey is anonymous. Your name and email address will NOT be associated with your answers.
- Your answers will only be used for this study, they will not be shared.
- The data will be in a locked file and destroyed in five years.
- Your participation is voluntary and you may stop at any point. It will take approximately 15 minutes to complete.
- If you are interested in the results, a summary of the study will be given to your school. You may contact your school or me.
- If you experienced any issues you feel you want to discuss with someone, as a result of this study, your institution has a counseling center that you may reach out to at: XXXXXXXXX

- If you have questions feel free to text, call, or email me. You may save this email to refer to.
- You give your consent by clicking on this link: XXXXXXXXXXXXXXX

Thank you for your time.

Everly Batuik, MSN, RN
Doctoral Candidate, Ph.D. in Nursing
Walden University

Walden University Research Participant Advocate
Phone: XXXXXXXXXX
Email: XXXXXXXXXX

Appendix C: BSN Student Survey

Thank you for being a part of this study. For report accuracy, please select the answers that best describes your current views and situation as honestly possible. There are no right or wrong answers. You indicate your consent to being part of this study by continuing with this survey.

Demographic Information

Age	18 - 22	23 - 27	28 - 34	≥35
Gender	Male	Female	Other	
Marital Status	Single	Married	Divorced	Widowed
Children <18 living at home	Yes		No	
Gainfully Employed (earning wages)	No	Part Time	Full Time	
Current Academic Year in Nursing	First	Second	Third	Fourth
Do you practice weekly rest? Defined as an uninterrupted 24- hour period of no gainful employment (no paid work) or academic endeavor (no studying) in each seven-day week.	Yes		No	
How often do you practice weekly rest?	Almost always	Sometimes	Rarely	

Demographic Information Continued

What day of the week do start your practice of weekly rest?	Sunday
	Monday
	Tuesday
	Wednesday
	Thursday
	Friday
	Saturday
What time of day do you begin weekly rest?	When I wake up.
	When I go to bed.
	Sunrise to sunrise.
	Sunset to sunset.
	Midnight to midnight.
	Other
Religious affiliation. Choose one that best describes you.	Agnostic
	Atheist
	Baptist
	Buddhist
	Catholic
	Evangelical
	Islam
	Judaism
	Mormon
	Nazarene
	Non-denominational
	Protestant
	Seventh-day Adventist
	Other

Almost done! Click here to answer questions on inner strength resources:

XXXXXXXXXXX

Appendix D: Permission to use Perceived Stress Scale 10-items

Permission to use Dr. Cohen's PSS-10 can be found on Carnegie Mellon University Department of Psychology's website. https://www.cmu.edu/dietrich/psychology/stress-immunity-disease-lab/scales/index.html

Appendix E: Email to Potential Site IRB Director and Nursing Program Director

Subject Line: Nursing Student Research Study

Name of Dean/Chair and IRB Director

School/Department of Nursing

Name of College/University

Dear _____,

I am a doctoral candidate at Walden University's College of Nursing. I am writing to inquire about the possibility of your nursing students participating in my study.

My area of interest is nursing student stress. My proposed study is regarding whether there is a relationship between the lifestyle practice of weekly rest and nursing student perceived stress and hardiness. Weekly rest is defined as a consecutive 24 hour period of no gainful employment or academic engagement. May I have your permission to access your nursing students who are enrolled in nursing courses with a clinical element?

This study will be anonymous; done by online survey. In addition to demographic information, the students will be asked to complete the Perceived Stress Scale 10-item (PSS-10) by Cohen and Williamson (1988) and the Hardiness Resilience Gauge (HRG) by Bartone et al. (2019). The survey will conclude with a few questions regarding the practice of weekly rest.

Thank you for your consideration. At the completion of this study, I will be happy to share the findings with you.

Sincerely,

Everly Batuik, MSN, RN
Doctoral Candidate, Ph.D. in Nursing
Walden University

Appendix F: Permission to use the Adaptation to Chronic Illness Model

This Agreement between Walden University -- Everly Batuik ("You") and Wolters Kluwer Health, Inc. ("Wolters Kluwer Health, Inc.") consists of your license details and the terms and conditions provided by Wolters Kluwer Health, Inc. and Copyright Clearance Center.

License Number	5656120885763
License date	Oct 25, 2023
Licensed Content Publisher	Wolters Kluwer Health, Inc.
Licensed Content Publication	Advances in Nursing Science
Licensed Content Title	The hardiness characteristic: A motivating factor in adaptation
Licensed Content Author	Susan Pollock
Licensed Content Date	Jan 1, 1989
Licensed Content Volume	11
Licensed Content Issue	2
Type of Use	Dissertation/Thesis
Requestor type	University/College
Sponsorship	No Sponsorship
Format	Electronic
Will this be posted online?	Yes, on a secure website
Portion	Figures/tables/illustrations
Number of figures/tables/illustrations	1
Author of this Wolters Kluwer article	No
Will you be translating?	No
Intend to modify/change the content	No
Title of new work	Relationship of Weekly Rest to BSN Appraisal of Stress and Hardiness
Institution name	Walden University
Expected presentation date	Dec 2023
Portions	Figure 1. Moderating effects of Hardiness (indirect) on page 60.
Requestor Location	Walden University 57299 Highway 204 WESTON, OR 97886 United States
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