

Walden University

College of Nursing

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Abstract

Influences of 12-Hour Shifts on Unhealthy Eating Habits of Acute Care Nurses

by

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MSN, University of Central Florida, 2011

BSN, University of Phoenix, 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Shift work is a necessary part of a nurses' work schedule to patients who need 24 hours of continuous care. Eating habits of nurses are influenced by working long hours, not having adequate time to take a meal break, and not having access to healthy food choices which can cause stress and exhaustion and results in weight gain and obesity. The purpose of this quantitative logistic regression analysis, guided by the health belief model and the theory of planned behavior, was to determine if there was a relationship between shift work and the unhealthy eating habits/obesity rates of acute care nurses. Data were gathered from the Nurses' Study 3, which includes information from nurses or nursing students from the United States and Canada. The sample was 8988 nurses who worked 12-hour shifts and more than 20 hours per week. The results demonstrated that the relationship between working 12-hour shifts and unhealthy eating was not statistically significant ($p = 0.39$) the relationship between working 12-hour shifts and obesity rates were not statistically significant ($p = 0.32$). Further studies are needed to determine how often nurses eat or eat while working during their shift because of perceived inability to take scheduled breaks because of workloads. The study findings provide evidence for health professionals to examine their eating habits and modify healthy eating behaviors to maintain a healthy lifestyle. When nurses learn to care for themselves, nurses are positive role models for their patients by encouraging healthy lifestyles which effects positive social change.

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Chapter 1: Introduction to the Study

Introduction

Nurses face many health and safety risks and associated workplace fatigue with working 12-hour shifts in the acute care setting. The HealthyNurse® Survey is a study focused on refining the health of the 4 million registered nurses in the United States, thereby refining the health of the general population. Data have been and continue to be collected that indicate needed improvement in the health of nurses by increasing physical activity, adopting healthy eating habits, and getting more rest (Healthy Nurse, Healthy Nation, 2019). When nurses, physicians, and other health care workers do not engage in healthy lifestyle behaviors, they may be less likely to encourage healthy lifestyle behaviors to their patients (Hidalgo et al., 2016). Finding out why nurses eat unhealthy meals, are physically inactive, and do not get adequate rest when they know the health risks associated with these factors has not been widely studied (Ross et al., 2019). Nurses often place the wellness, health, and safety of their patients before their own. They may also lack awareness of the need to care for self to be able to provide the best care to patients (American Nurses Association, 2017). By first learning to care for self, nurses can affect social change by playing an active role in reducing health disparities in their patients.

In this chapter, I summarized research literature related to the scope of the problem. I then described a gap in the knowledge of nurses in understanding the relationship between working 12-hour shifts and unhealthy eating. The purpose of the study included the type of study, study intent, and a description of the variables. The

research questions, along with null and alternative hypotheses, were stated along with identification of the independent and dependent variables, the associations being tested, and the measurement of the variables. I then identified the theories and discussed the source or origin of the theories and how they related to the study method and research questions. I then justified the selection of the study design and gave a brief description of the central study variables and method of data collection.

Background

Obesity is defined as having an undue accumulation of fat and is a major risk factor for chronic diseases such as cancer, diabetes, and cardiovascular disease (WHO, 2019a). Obesity is prevalent across the world, and as a result, at least 2.8 million people die each year from obesity (World Health Organization [WHO], 2017). The International Classification of Diseases (ICD-10) has acknowledged obesity as a chronic disease (WHO, 2016). The American Nurses Association (ANA) conducted a health risk appraisal of more than 14,000 registered nurses and nursing students. Results showed that the average body mass index (BMI) was 27.6%, which is considered overweight. Over 58% of the respondents worked 10-hour shifts or more. These results showed that education is needed regarding nutritional needs and other health needs of nurses, such as physical activity and rest. Nurses often place the wellness, health, and safety of their patients before their own and may lack awareness of the need to care for self to be able to provide the best care to patients. (ANA, 2017).

This study was built upon previous knowledge of nurses that work 12-hour shifts being overweight and obese. Nurses are promoters of health, so it was crucial that their

health and well-being is optimized. Keele (2019) posited that personal health and health care promotion is affected by the health self-care of nurses. Nicholls et al. (2017) asserted that the workplace environment influences eating habits of nurses and may contribute to obesity and overweight. A gap in the literature was nurses' knowledge of caring for self by improving their own personal health.

Problem Statement

Many nurses work shifts of 12 hours or more. Twelve-hour shifts began in the 1970s. The convenience of having more days off during the week is appealing to many nurses, provides more continuity of care, and makes the scheduling process is easier. But the disadvantages of working long hours is the increase in job burnout, fatigue, and the increased risk of making errors (Love-Hate Relationship: Nurses & the 12-Hour Shift, n.d.). These shifts can also influence eating habits because of the irregular eating times, lack of time to eat a healthy meal, and lack of access to healthy foods (Souza et al., 2019).

Selected articles relating to how 12-hour shifts contribute to the unhealthy eating habits of nurses and barriers and facilitators to lifestyle change and health promotion were described here. Keywords searched were: *12-hour shift(s), eating behavior, nutrition, nurses, acute care, American, and United States* in databases PubMed, CINAHL, and MEDLINE. Han et al., (2011) showed results presenting evidence-based information that shift work and long work hours negatively affect the quality and quantity of sleep, which makes it challenging to adhere to healthy behaviors which can increase obesity.

Hidalgo et al. (2016) conducted a study examining practices that promoted the health and lifestyle behaviors of health professionals in Brazil, hoping to increase awareness and develop methods to improve the promotion of health and lifestyle behaviors in healthcare workers so that the behavior can be passed on to the patients. Nicholls et al. (2017) used a social-economic framework to examine the factors that encourage and impede healthy eating in working nurses. Results of the integrative review showed barriers to healthy eating included physical workplace environment, adverse work schedules, individual barriers, and work-related social eating practices. Monaghan, et al. (2018) sought to identify factors that influenced the eating habits of nurses during their shifts which included lack of time due to patient load, placing patient care over self-care, reluctance to ask other nurses to cover their patients while eating lunch, and unhealthy food options. Perry et al. (2018) found that many acute care nurses do not meet the daily recommended servings of vegetables (5) and fruits (2). Older nurses were more likely to adhere to the recommendations than younger nurses but were more likely to be obese or overweight. Schneider et al. (2019) found that the health-related behavior of nurses was often no better than the patients in their care. Because nurses are often viewed as role models to their patients, health promotion practices are less likely to be effective in educating the patients.

Purpose of the study

The purposes of this quantitative study were to determine the (a) relationship between 12-hour shifts and the eating habits (unhealthy vs healthy) of acute care registered nurses, and (b) the relationship of working 12-hour shifts and the obesity rates

of acute care registered nurses. Secondary data that describes the health and nutritional status of nurses was examined to help address the crucial need to improve nurses' health.

Research Questions and Hypotheses

The research questions for my study were:

RQ1: What is the relationship between working 12-hour shifts and eating (unhealthy vs healthy) habits of acute care nurses?

H_01 : There is no relationship between working 12-hour shifts and eating habits (unhealthy vs healthy) of acute care nurses.

H_a1 : There is a relationship between working 12-hour shifts and the eating habits (unhealthy vs healthy) of acute care nurses.

RQ2: What is the relationship between working 12-hour shifts and obesity rates of acute care nurses?

H_02 : There is no relationship between working 12-hour shifts and obesity rates of acute care nurses.

H_a2 : There is a relationship between working 12-hour shifts and obesity rates of acute care nurses.

The associations being tested were the relationship between working 12-hour shifts and unhealthy eating (cookies, candy, donuts, pizza) of acute care nurses and the relationship between 12-hour shifts and if obese ($BMI < 30 \text{ kg/m}^2$) or not ($BMI < 30 \text{ kg/m}^2$). These discrete dichotomous variables were measured using a nominal ranking scale of yes (0) or no (1).

Theoretical Framework

I based my study on the health belief model (HBM) and the theory of planned behavior (TPB). The HBM was developed in the 1950s when United States public health researchers were examining psychological models that would generate a more effective health education program. The HBM offered a way to understand individual health-related behaviors and enabled the design of effective messages for public health (Guidry et al., 2019). There are six components of the HBM. Perceived susceptibility: (a) individuals believe that they are more at risk for certain health problems, so they may be more motivated to implement healthier behaviors; (b) perceived severity, which is defined as individuals having a strong understanding of the consequences of unhealthy behaviors and are motivated to change their behavior to avoid them; (c) perceived benefits which is defined as individuals expecting that the healthier behavior will reduce the risk of developing health issues related to unhealthy behaviors; (d) perceived barriers which is defined as individuals not wanting to take the time to learn how to make changes, may feel the cost is too much, and may not be mentally ready to make the change; (e) cause to action which is defined as individuals motivated to make the behavior change; and (f) self – efficacy which is defined as individuals having confidence in their own ability to perform the healthier behavior. (Nooriani et al., 2019). The HBM posited that participation in health-promoting behaviors of nurses are influenced by factors such as perceived barriers to unhealthy eating, resulting susceptibility to certain

health problems, benefits associated with health-promoting behaviors, and the self-efficacy or confidence that one can make a positive change.

The TPB maintained that both control of behavior and motivation are needed to attain the desired achievement. Six concepts of the TPB characterize an individual's actual control over the behavior (LaMorte, 2019b). Attitude is the extent to which the individual has a positive or negative evaluation of the health-promoting behavior and a contemplation of the outcome of carrying out the behavior. Behavioral intention is the extent to which the individual is motivated to perform the health-promoting behavior. Subjective norms are the extent to which the individual believes that peers or people of importance to the individual agree with the health-promoting behavior. Social norms are customary codes of behavior in a group of people. Perceived power is the extent to which the individual perceives the presence of factors that assist or delay the health-promoting behavior. Perceived behavioral control is the extent to which the individual perceives the ease or difficulty of performing the health-promoting behavior. More detail on the theoretical framework was presented in Chapter 2.

Nature of the Study

The research method used was a quantitative, secondary data analysis using logistic regression analysis. The logistic regression made it possible to predict the values of the dependent variable from information gained from the independent variable. It was performed on dichotomous dependent and independent variables (Wagner, 2017). Rudestam and Newton (2015) defined secondary data analysis as data that have been collected by other researchers. Secondary data are generally better quality and less costly

than data that has been collected firsthand. One of the disadvantages of secondary data is that the accuracy of the data collected cannot be guaranteed because the researcher had no control over how it was collected. Another disadvantage is that using data collected by other researchers can be risky and may not contain all measures needed to address the research questions directly (Rudestam & Newton, 2015). The data were collected from the NHS3 (2019a) and analyzed using logistic regression to measure the relationship between the independent variable (12-hour shifts) and the dependent variable (unhealthy eating habits/obesity rates).

Definitions

Acute care registered nurses: Nurses who care for patients with acute illnesses or injury or exacerbation of chronic diseases where declining conditions may occur rapidly (Registered Nursing.org, 2020).

BMI: Body mass index is weight in kilograms divided by the square of height in meters – (CDC, 2020a).

Obesity: “weight that is higher than what is considered as a healthy weight for a given height” and defined as a BMI ≥ 30 kg/m². (CDC, 2020a).

Obesity rates: Prevalence of obesity from data collected by ongoing public health surveillance (CDC, 2020b)

Shift work: A continuous period of duty where nurses provide care in various increments of time to ensure a continuity of care over a period of 24 hours (Rosa et al., 2019).

Unhealthy eating habits: Patterns of behavior that are detrimental to the physical health of an individual (Unhealthy habit, n.d.).

Assumptions

An assumption for this study was that nurses have provided honest and truthful answers for the NHS3 database. It is assumed that the data collected from a national survey dataset have been accurately recorded and consist of nationally representative samples. Another assumption was that nurses desire to be within normal weight and eat healthy (Boo & Froelicher, 2013).

Scope and Delimitations

The design I chose for this study was a quantitative secondary data analysis. A cross-sectional survey method was considered using Internet-based surveys and/or personal interviews but was not selected because of the vast amount of data available, the ease of access, and less time involvement with secondary data analysis. The theories chosen were the HBM, which offers a way to understand individual health-related behaviors and the TPB, which suggests that the more an individual believes in the ability to perform an intentional behavior, the more likely they are to persist and succeed. The more positive the individual's attitude is toward the behavior change, and the more capable the individual feels about performing the behavior change, the stronger the behavioral intent is (Ajzen, 2012). Orem's self-care deficit theory, which is defined as an individual's ability to care for self, was considered but was not chosen because, in this theory, an individual's variables are not considered (Health Research Funding.org, 2020).

Participants for this study were nurses or nursing students from the United States and Canada, as this is the population that was been recruited by the NHS3 (Bao et al., (2016). This study was focused on the health and nutritional status of nurses, and the goal was to determine if there is a relationship between working 12-hour shifts and unhealthy eating/obesity rates of acute care nurses.

Limitations

A limitation of this study may be that as secondary data analysis, the accuracy of the data collected cannot be guaranteed because the researcher has no control over how it was collected. Another limitation is that using data collected by other researchers can be risky and may not contain all measures needed to address the research question(s) directly (Boo & Froelicher, 2013). The researcher who is collecting the data is not the same individual who collected the data and, as such, may not be aware of the context of the data collection process that may be important in the interpretation of specific variables included in the dataset. Important details may be missed in a large amount of documentation that may be present in large-scale surveys such as the NHS3 (Chen & Phillips, 2014).

Significance

Insights from this study will help nurses be aware of how working 12-hour shifts affect their healthy lifestyle choices, which can contribute to obesity and chronic disease in the nursing workforce (Nichols et al., 2016). Practical application of this awareness includes the ability of nurses to make healthier food choices by being mindful of what they eat and reinforces positive eating habits and the need to take time for self by taking a

meal break and/or brief meditation break away from the unit just the same as encouraging a family member to take a break from a loved one's bedside. Positive social change can occur when there is an increase in the health and well-being of nurses as the quality and nature of patient care may be affected by the lack of participation in health-promoting behaviors such as healthy eating, physical activity, and adequate rest (Ross et al. 2019).

Summary

There is an increase in overweight and obese nurses who work 12-hour shifts. It is essential that nurses learn about the relationship between working long hours and unhealthy eating. They may lack self-awareness of unhealthy eating. Contributing factors include irregular eating times, lack of time to eat a healthy meal, and lack of access to healthy foods while at work. Nurses may be less likely to encourage healthy lifestyle behaviors to their patients when they do not engage in healthy lifestyles themselves. In Chapter 2, I present the literature review that helped establish the relevance of the stated problem and review the theoretical foundations, propositions, and hypotheses.

Chapter 2: Literature Review

Introduction

There are more than 3.8 million registered nurses (RNs) in the United States. Nursing is considered the most significant healthcare profession in the nation (Smiley et al., 2018). Nurses know what equates healthy behavior, but many are overweight or obese. The role of a nurse who works 12-hour shifts and the associated responsibilities decreases having the time available to take a lunch break and having access to healthy food choices. The chances of giving in to the free food (often unhealthy) brought in by thankful family members increases. Eating junk food (comfort food) is often used to deal with stress and exhaustion of working long hours (Horton Dias & Dawson, 2020). The purposes of this quantitative study were to determine if there is a relationship between (a) working 12-hour shifts and the eating habits (unhealthy vs healthy) of acute care registered nurses, and (b) working 12-hour shifts and the obesity rates of acute care registered nurses.

Studies conducted in the United States reported an obesity range of 23% to 61.4% (Keele, 2019). This increase in body weight increases the risk for preventable health conditions such as type 2 diabetes, stroke, hypertension, and heart disease (Ku et al., 2019). A common belief is that nurses are role models for their patients, yet there are inconsistencies in the attitudes of nurses between being role models for their patients and engaging in healthy lifestyles themselves (Keele, 2019). If nurses are more cognizant about why individuals make decisions to engage in health-promoting behavior, they may be more likely to promote and engage in this behavior themselves (Hidalgo et al., 2016).

In this chapter I discussed the literature search strategy by outlining the search engines and keywords used. I then reviewed the theoretical foundations used in the study including the histories, usefulness, and limitations of each model. Also included in this section were the theoretical propositions/hypotheses, the rational choice of theory, and a description of how and why the selected theories related to this study. The concepts related to this study were defined and descriptions of how the concept had been applied and discussed in previous research was reflected upon. Finally, a review and synthesis of the literature was conducted.

Literature Search Strategy

I conducted systematic searches relating to the influences of 12-hour shifts, and the unhealthy eating habits of acute care nurses using the Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed, Medline, and PsychInfo databases. I searched the databases for articles that were published between 2016 and 2020 using keywords such as *nurse/nurses' AND shift work AND nutrition OR diet OR food OR nourishment OR food intake OR eating healthy AND United States OR America OR USA OR US*. These terms were identified by using medical subject headings (MESH) with assistance from a specialized nursing librarian. Most of the articles obtained were from peer-reviewed journals. Other suggestions for related articles were found based on items saved in this writer's Mendeley library.

Theoretical Foundation

Even though most nurses are aware of the results of being obese/overweight, many do not follow a healthy diet and exercise regularly. The psychological factors of

motivation to engage in unhealthy behaviors by nurses need to be studied and understood. Major elements of health-related behaviors are attitudes, beliefs, and anticipations of future outcomes (Ho & Sun, 2016). Behavior-related beliefs can be learned through socialization. The theoretical foundations for my study were the HBM and the TPB.

The HBM originated in the early 1950s as a tool for the United States public health services to predict health-promoting behaviors. The HBM has core concepts that seem to explain or mediate the effects that demographic variables have on these patterns of health-promoting behavior with the ability to be changed through education (Abraham & Sheeren, 2005). Five core concepts contribute to the probability of the health-promoting behavior being followed (LaMorte, 2019a).

1. *Perceived susceptibility* - the extent to which the individual feels at risk of suffering from the condition.
2. *Perceived severity* – extent to which the individual feels the seriousness of the condition and what the related consequences are.
3. *Cues to action* – the extent to which the individual feels motivated to adopt a health-promoting behavior.
4. *Perceived benefits* – the extent to which the individual feels the course of action is beneficial.
5. *Perceived barriers* – the extent to which the individual feels a hindrance to following the course of action.

Individual opinions of the perceived susceptibility to disease and the perceived seriousness of disease are affected by demographic variables (sex, race, ethnicity, age), psychosocial variables (social class, personality, peer pressure), and structural variables (knowledge concerning the disease, prior exposure to the disease). These, in turn, affect the perceived threat of disease which can influence the cues to action (the influence of mass media campaigns to promote health behavior change, advice from others, magazine or newspaper articles, personal experience of family member or friend). Modifying factors (demographic variables, psychosocial variables, structural variables) influence the perception of benefits when the perceived barriers to change have been identified and increase the probability that the recommended health behavior change will be made (Rosenstock, 1974).

Limitations of the Health Belief Model

The HBM does not explain an individual's beliefs, attitudes, or other factors that influence the health-promoting behavior. It does not explain habitual behaviors that prompt individuals to decide to accept a recommended change. Use of the HBM does not demonstrate social acceptability nor does it justify economic or environmental factors that promote or exclude health-promoting behaviors. The assumption is made that everyone has access to the same amount of information on health-promoting behavior and that everyone is motivated to make the change. As the HBM does not suggest a strategy for health-related change, it should be combined with other models that suggest strategies for change thus making it more useful (Jones et al., 2014; Lamonte, 2019a). Abraham and Sheeren (2005) posited that although the HBM has offered a practical

theoretical framework to be able to identify modifiable beliefs that predict health-related behaviors for more than 50 years, it does not include perceptions that are prevailing predictors of behavior. It also does not show the importance of intent to change behavior or the influence that the approval of others may have on the behavior change.

The TPB originated in the early 1980s and was called the theory of reasoned action (TRA). This theory was used to predict the intention of an individual to participate in a specific behavior. Ajzen (2012) suggested that the TRA was unable to address those behaviors over which an individual had little choice in decision making and so the TPB was designed to achieve this purpose. The TPB maintains that both control of behavior and motivation are needed to attain the desired achievement. Six concepts of the TPB characterize an individual's actual control over the behavior (LaMorte, 2019b).

1. *Attitudes* – the extent to which the individual has a positive or negative evaluation of the health-promoting behavior and a contemplation of the outcome of carrying out the behavior.
2. *Behavioral intention* – the extent to which the individual is motivated to perform the health-promoting behavior.
3. *Subjective norms* – the extent to which the individual believes that peers or people of importance to the individual agree with the health-promoting behavior.
4. *Social norms* – customary codes of behavior in a group of people.
5. *Perceived power* – the extent to which the individual perceives the presence of factors that assist or delay the health-promoting behavior.

6. *Perceived behavioral control* – the extent to which the individual perceives the ease or difficulty of performing the health-promoting behavior. The addition of this construct was added to the original, and the name of the theory was changed to the TPB.

The more an individual believes in the ability to perform an intentional behavior, the more likely they are to persist and succeed. The more positive the individual's attitude is toward the behavior change and the more capable the individual feels about performing the behavior change, the stronger the behavioral intent is. Ajzen (2012) posited that when using the TPB there are three explanations of how human action is guided. Behavior beliefs are defined as beliefs that are readily available about the behavior's likely outcomes and the evaluation of these outcomes Normative beliefs are defined as beliefs that are readily available about the expectation and action of the behavior and the motivation to conform to the behavior. Control beliefs are defined as beliefs that are readily available about the presence of influences that may assist or hinder the behavior performance and the perceived power these influences hold (Ajzen, 2012).

Limitations of the Theory of Planned Behavior

The TPB acts on the belief that the individual has the opportunity and resources available to be successful in the health-promoting behavior no matter what the intention. Economic or environmental factors that may affect an individual's intention to perform a health-related behavior are not taken into consideration, nor does it factor in other variables such as mood or past experiences. The TPB does not include the concept that

behavior can change over time, nor does it account for the length of time between intent to act and behavioral change (Jones et al., 2014; LaMorte, 2019b).

Theoretical Propositions/Hypotheses

Jones et al. (2014) conducted a systematic review to identify interventional studies where the HBM was used as a theoretical basis for designing behavior change interventions. The authors sought to review the impact and success of studies that had used the HBM as the theoretical basis to create an intervention to improve adherence to health behaviors. Findings from the study showed that a measurement of health beliefs should be incorporated in the design of future studies to determine whether the behavior changes occur because of cognitions that are targeted. Ho and Sun (2016) compared health belief models that explain the association of making decisions with the intention for and engagement in the reduction of obesity/overweight self-care behavior. The TPB assumes that attitudes, perceived behavioral control, and subjective norms are significant predictive factors of an individual's intent to engage in health-promoting behavior. Psychological motives are among the primary predictors for deciding whether or not to participate in health-promoting behaviors. The authors concluded that the TPB concepts of subjective norms, attitudes, perceived control, and intentions are effective in motivating individuals to engage in the behavior.

Three factors impact personal factors of health-promoting behavior: (a) the perceived barriers and benefits that are related to health-promoting behaviors, (b) the customs and support provided by relationships with peers, (c) environmental or situational relationships (Ross, et al., 2019). The standards and morals of the work

environment had both positive and negative effects on participation in health-promoting behavior. Lack of motivation and levels of fatigue were also named as barriers to participation. Guidry et al. (2019) posited that without an understanding of the severity of the adverse outcome, individuals will not participate in health-promoting behaviors. The use of HBM helps to explain how adopting the health-promoting behavior can decrease the susceptibility and severity of an illness or health issue, can help discuss the barriers and benefits, outline a plan for self-efficacy and cues to action.

Saghafi-Asl et al. (2020) investigated the effects of the HBM concepts on college students' weight management behaviors. Conclusions drawn from the study were that strong predictors of some health behaviors include perceived benefits, threat or perceived severity, and self-efficacy. Iranagh et al. (2016) sought to determine how an HBM based intervention would affect the nutritional behavior of elderly women. Results showed that the HBM concepts of perceived severity, perceived barriers, perceived benefits, and self-efficacy can be used as an effective construct for developing health promoting behaviors in elderly women.

Rationale for Choice of Theories

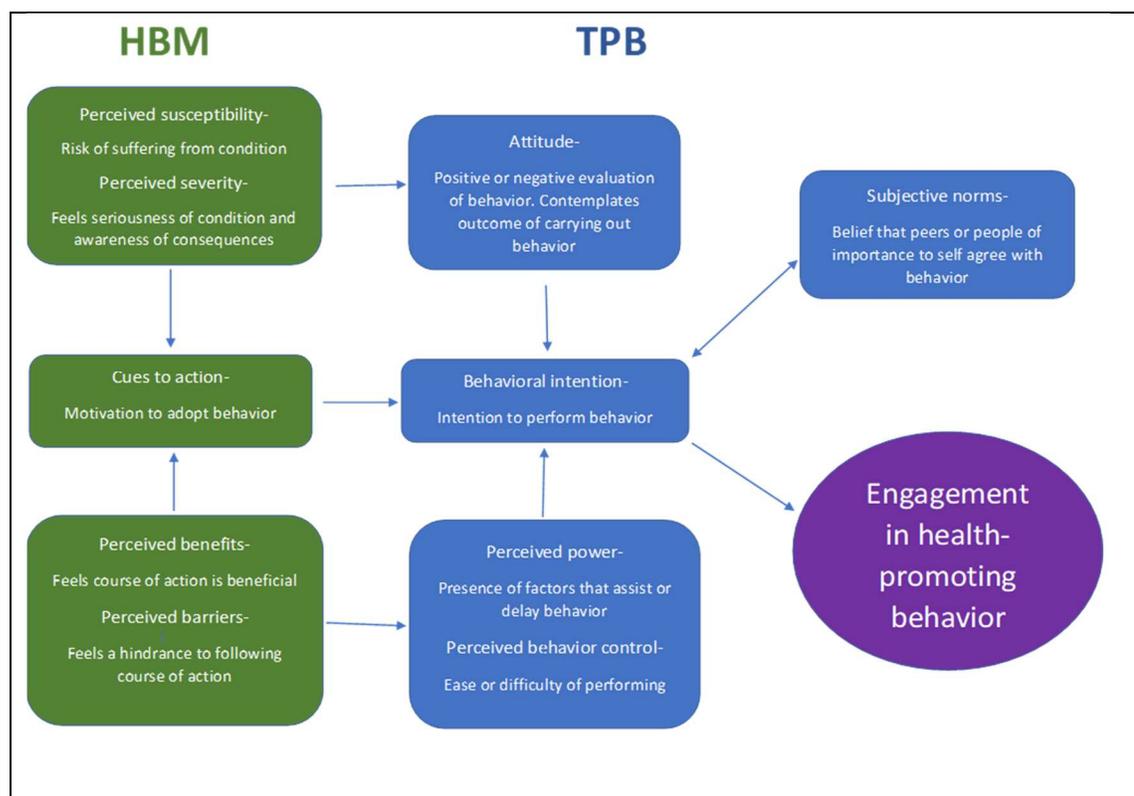
The HBM guides the individual to define the condition, the seriousness of the condition, and the risk of suffering from the condition. The use of the HBM can motivate individuals to adopt health-promoting behavior by recognizing the course of action is beneficial while being aware of perceived barriers. The TPB acts on the HBM by evaluating the positive or negative outcome of carrying out behavior. It allows individuals to understand factors (age, gender, ethnicity, race, personality, social class,

peer pressure, prior knowledge of the condition, etc.) that assist or delay the behavior; thus, the individual is more likely to proceed with the behavior (See Fig. 1).

Use of the HBM determines that participation in health-promoting behaviors of nurses is influenced by factors such as perceived barriers to unhealthy eating, resulting susceptibility to certain health problems, benefits associated with health-promoting behaviors, and the self-efficacy or confidence that one can make a positive change. Use of the TPB determines that attitudes and behavioral intentions of nurses are influenced by subjective and social norms and that they must embrace their perceived power and perceived behavior control to make the health-promoting changes necessary to decrease the unhealthy eating habits and number of obese nurses.

Figure 1

Relationship of the Health Belief Model and the Theory of Planned Behavior as a Predictor of Engagement in Health-Promoting Behavior



Literature Review Related to Key Variables and/or Concepts

Dietary changes and unhealthy eating habits have been reported by nurses who work 12-hour shifts. Gifkins et al. (2018) reported that nurses are expected to deal with the exhaustion of working 12-hour shifts and to maintain their health and wellbeing to be able to give quality care to their patients. The authors provided discussion on the variability of workloads and diverse nursing roles in different areas. Food patterns of nurses were influenced by high work demands and perceived inability to take scheduled breaks. The selection of food, intake of food, and hydration were negatively affected as well. Limitations of using this case study approach include using self-reported data that

may be influenced by the respondent's personality. There may also have been a difference in workloads or perceptions of workload depending on experience level of nurses.

A qualitative, descriptive study was conducted using individual interviews from 16 nurses and two focus groups with five nurses for a total sample size of 21 ($n = 21$) Registered Nurses (RN's) that worked 10 – 12 hour shifts in a South Carolina hospital. The goal of the study was to study perceptions of influence and personal experience on making healthy food choices while work their shift. Thematic analysis using the Theoretical Domains Framework revealed concepts most relevant to nurses working shifts included (a) decision processes, attention, and memory; (b) environmental resources and setting; (c) identity and professional/social role; (d) social influences; (e) regulation of behavior; and (f) emotions. The four major themes that emerged were: (a) roles and responsibilities of nurses decreased an individual's control over taking adequate time to eat; (b) free food from leadership, physicians or patient family members which usually consisted of cookies, pizza, and doughnuts; (c) the hospital environment did not always offer healthy choices; and (d) working in shifts made it difficult to make healthy choices. Both day and night shifts were represented in this study which provided an understanding of unhealthy food choices from both shifts. The average body mass index (BMI) of the samples was 28.4 which showed that nurses were overweight. As this study consisted mainly of white nurses, there may have been some cultural bias noted. (Horton Dias & Dawson, 2020).

Monaghan et al. (2018) conducted a study of female nurses in New Jersey using semi structured interviews that were based on the Social Ecological Model. The interviews concentrated on public policy, organizational, interpersonal, and individual factors that affected intake. Thematic analysis revealed: (a) occupational characteristics; (b) unhealthy food influences; (c) hesitating to take breaks; and (d) industry and organizational policies. Findings showed that nurses do not take regular meal breaks during their shifts and often rely on sugary, high-fat foods to get them through. A barrier to healthy eating was noted in the fast food, pizza, cookies, and other items that were donated by patient families. These foods were readily available and a quick option. As it takes time to form habits and routines, nurses had to have been working in their current hospital for at least 1 year to be eligible for the study. This study was limited by its small sample size ($n = 20$) and consisted of all women. The authors suggested further research using a quantitative study of a larger population of nurses to identify similar themes.

An integrative, systematic review was conducted by Nicholls and coauthors (2016) to characterize barriers and facilitators to healthy eating for nurses. Participants included in the study were nurses, student nurses, ward assistants, and nursing assistants. The study design was an integrative mixed method review. Databases searched were CINAHL, PROQUEST Health and Medicine, MEDLINE, PsycInfo, and Science Direct. Keywords used in the study were: *systematic review, workplace, nurses, obesity, diet, overweight, barriers, facilitators, literature review, and integrative review*. Inclusion criteria was papers published in English between 2000-2016. Included papers consisted of 21 qualitative and 5 quantitative studies. A social-ecological framework was used to

identify barriers and facilitators to healthy eating that was found in the studies. Thematic analysis was used to determine the emerging themes. Healthy eating behavior involves (a) the timing and frequency of eating; (b) what constitutes a meal; (c) food ingredients; and (d) the amount of high energy or low-quality snacks consumed. Results revealed that long and stressful working hours contributed to unhealthy eating habits such as skipping meals, eating on the run, and eating junk food. Inadequate food storage and preparation areas, limited access to healthy food or lack of time to wait in line for food were also reported as barriers to healthy eating. Both positive and negative influences were noted as conversations about diet and exercise encouraged healthy eating, but nurses also encouraged each other to eat junk food. Nurses also lacked motivation to eat healthy or lose weight. A limitation of this study was the self-selection of participants in many studies with a large variation of response rates thus questioning the possibility of recruitment bias. As many questionnaires used in the studies were not validated or standardized, measurement bias was also possible.

In a cross-sectional study, Aslam et al. (2018) posited that one of the most neglected health problems across the world is obesity. The aim of their study was to find out how prevalent glucose tolerance and obesity is among nurses working in a tertiary care hospital. The study compared 290 female nurses working in a hospital in Delhi aged 20 – 60 years to 206 similarly aged females from the general population that were from the same area. There were three categories of BMI: (a) $\geq 23\text{kg/m}^2$ as overweight; (b) $\geq 25\text{kg/m}^2$ as obese; and women with a waist circumference of ≥ 80 cm as centrally obese per criteria for Asian Indians. Study results showed that obesity was found in four out of

every five nurses that worked in a hospital compared to three out of every five females from the general population. The authors attributed the results to exposure to prolonged working hours, unhealthy eating patterns, and work stress.

A cross-sectional survey design was used to look at Australian nurses' health and health-related behaviors and the potential health risk. Participants of the study were recruited with the use of electronic cross-sectional surveys that recruited 5041 nurses through professional networks and nurses' associations. Mean age of the nurses was 48 (standard deviation (SD) = 11.4) years, with more than half being 50 years of age or older. The mean working week was 34.3 hours but 39.8% worked more than 40 hours. Over half (61%) of the nurses were overweight (31.3%) or obese (29.7%). Nurses at older ages were significantly more likely to be overweight or obese ($p < 0.001$). Study findings showed that nurses were at a high risk of developing non-communicable diseases (NCD) such as diabetes and cardiovascular disease because of poor diets and physical inactivity. The workplace was found to be a potential barrier to healthy behaviors. The authors discussed limited capacities to store and reheat food from home. Having limited time for meals made it difficult to run to the cafeteria, get food, and have enough time to eat it. Vending machines which generally carry junk food and unhealthy choices in the cafeteria or café also contributed to unhealthy eating. Limitations of this study were the self-reported surveys and self-selected samples (Perry et al., 2018).

Ross, et al. (2019) conducted a qualitative content analysis of survey responses to discover what nurses perceive as barriers to healthy behavior. Study participants included all registered nurses that worked at the National Institutes of Health Clinical Center and

within the other 26 centers and institutes. The final sample size was 349 nurses. Thematic analysis revealed: (a) unsupportive versus supportive individuals; (b) negative versus positive roles models; (c) lack of time/overwork; (d) unhealthy food culture; and (e) outside commitments. Keywords listed: *exercise, workplace, time factors, physical fitness, health behavior, health promotion, lifestyle, nurses, diet, organizational culture, self-care, and qualitative research*. Individuals have personal factors that directly affect health-promoting participation according to Pender's health promotion model. Three factors mediated the effect of personal factors on health-promoting behavior (a) perceived barriers and benefits associated with health-promoting behaviors; (b) norms and support provided by personal relationships; and (c) situational or environmental factors. They found that even with the training nurses received on how to maintain a healthy lifestyle, the obesity rates of nurses in the United States ranged from 23% to 61.4%. Nurses reported diets that were of poor quality (53% - 61%) and inadequate physical activity (60% - 74%). The authors deducted that these numbers reflected unhealthy eating patterns related to working long hours and lack of coverage to take meal breaks. Nurses reported not being able to leave their units to take a full meal break because of feeling guilty asking someone else to cover their patients. Also mentioned was a lack of healthy options that were reasonably priced in the cafeteria. The authors mentioned most of the research in this area is *who* does or does not participate in health-promoting activity while very few studies research *why* nurses participate or do not participate in health-promoting self-care. Limitations included the use of anonymous

surveys which could cause deception and bias and that findings could not be validated because the study was cross-sectional in nature.

A secondary analysis of nationally representative cross-sectional data was conducted by Schneider et al. (2018) to evaluate Scottish nurses' health-related behaviors compared to other occupations. The total sample size of this study was $n = 18,820$ of which 471 (3%) were nurses, 433 (2%) were other healthcare professionals, 813 (4%) were unregistered care workers, and 17,103 (91%) were in non-healthcare occupations. The authors noted nurses would be expected to have healthier lifestyles because of the education received on caring for the ill and on health promotion. Findings were that nurses did not meet the daily requirement for intake of fruits and vegetables. Access to healthy food in the workplace was lacking and that shift work had a negative influence on dietary habits. Nurses who had unhealthy eating habits were less likely to promote healthy eating habits to their patients or that patients are less likely to accept the advice. Strengths of this study included the use of secondary data which had been collected by qualified researchers and the lack of need of participant involvement as the data collection was already complete. Added reliability and validity is provided for this study because the Scottish Health Survey is a nationally representative survey when compared with other studies that combine data from different sources. Limitations were an insufficient cohort of nurses to be able to estimate health-related behavior for a single year and not all variables were consistent across years because of changes in government guidelines and aggregation of survey years. There is also a potential for underreporting of unhealthy behavior by nurses because of the risk of social bias acceptability.

Previous research has shown that working 12-hour shifts negatively affects eating habits and increases the obesity rates of nurses (Horton Dias & Dawson, 2020; Ku et al. , 2019; Power, 2018). However, what has not been studied is nurses' awareness and ability to adopt healthy eating habits while working 12-hour shifts to maintain a healthy lifestyle.

Summary

About 80% of nurses that work in a hospital compared to three out of every five females from the general population are obese (Aslam et al., 2018). Studies show that working 12-hour shifts contribute to poor dietary habits of nurses who work in the hospital and placed nurses at an increased risk of illness and obesity. Nurses are viewed as healthy role models by the public, and effective strategies are needed to improve the health and well-being of nurses who work 12-hour shifts. However, nurses' awareness and ability to adopt healthy eating habits while working 12-hour shifts to maintain a healthy lifestyle may be lacking (Power, 2018). This goal of this study was to determine if there is a relationship between working 12-hour shifts and unhealthy eating habits and obesity rates of acute care nurses and to find the strength of the relationship.

In chapter 3, I present the research design and rationale for the study, the methodology to be used to gather the data, the data analysis plan, threats to internal and external validity, and ethical procedures.

Chapter 3: Research Method

Introduction

The purpose of this quantitative study was to determine the effect of 12-hour shifts on the eating habits (unhealthy vs. healthy) of nurses and how working 12-hour shifts creates barriers and facilitators to lifestyle change and health promotion. I examined secondary data that described the health and nutritional status of nurses to help address the crucial need to improve nurses' health.

In this chapter, I reviewed the research design and rationale by briefly stating the study variables, identifying the research design and how it related to the research questions, and defining and stating the target population and size. I then described how participants were recruited, how informed consent was provided, and how data was collected. Because this study was a secondary data analysis, the procedures for recruitment, participation, and collection of data were explained. The method for acquiring access to the data was discussed with the inclusion of the permission letter (Appendix A). For each variable, I explained the operational definition, how each variable was measured, how the variable scores were calculated, what the scores represented, and then provided an example. The data analysis plan outlined the software used for analyses, restated the research questions and hypotheses as outlined in chapter 1, reviewed the statistical tests used to test the hypotheses, and described how results were interpreted. In addition, threats to internal and external validity (if any) were addressed. Lastly, ethics procedures were discussed, which included agreements to gain access to data, the treatment of human participants, and how the data was be treated.

Research Design and Rationale

The research method I used was a quantitative, secondary data analysis using logistic regression to analyze my data. The independent variable (IV) was 12-hour shifts, and the dependent variable (DV) was eating habits (unhealthy vs. healthy). The use of logistic regression in this study helped to identify if there was a relationship between working 12-hour shifts and the unhealthy eating habits of acute care nurses. It also helped determine if there was a relationship between working 12-hour shifts and if nurses were obese or not.

Secondary data analysis was defined as data that had been gathered by other researchers for various reasons. The process included locating the site of the secondary data, obtaining permissions and passwords if needed, becoming familiar with the download format or system by which data was extracted, downloading the data, and using statistical software to access and analyze the downloaded data (Rudestam & Newton, 2015). As this study was conducted using data from The Nurses' Health Study [NHS] (2019a), I needed to obtain permission to access the data.

Methodology

I conducted a quantitative study by using logistic regression to measure the relationship between the independent variables and the dependent variables.

Population

Since its beginning in 1976, the NHS has included more than 280,000 participants (Nurses' Health Study, 2016a). The NHS third cohort (NHS3) includes male and female licensed practical/vocational nurses (LPN/LVN's), registered nurses (RN's), and nursing

students between the ages of 19-46 from the United States and Canada. Currently, there are more than 45,000 participants with the goal of recruiting being 100,000 participants (Nurses' Health Study 3, 2019b).

Sampling and Sampling Procedures

The NHS 3 was begun in 2010. This study is a longitudinal cohort study, and each study follows its participants throughout their lifetimes. Its purpose is to study the impact of dietary patterns, environment, lifestyle, and nursing occupational exposures on women's and men's health. Inclusion criteria are > 18 years of age, born after 1965, living in the United States or Canada, RN or LPV/LVN, male or female, nursing student, and willing to complete an online questionnaire periodically. The NHS 3 uses purposive sampling by the selection of a specific population that is most useful to the purpose of the research (nurses and nursing students) and voluntary response sampling by sending participants questionnaires that include questions on health status and many aspects of life. Snowball sampling is used when participants recruit other nurses to join the study (Nurses' Health Study 3, 2019b).

The sample size of the NHS is 45,000 (N=45,000). As this is a substantial sample size, the results may be statistically significant but may result in minimal differences or a type I error. In order to determine if the results are not only statistically significant, I conducted a power analysis using a 2-tailed logistic regression. With an odds ratio of 1.3, an α level of 0.05, and a power level of 0.8, the required sample size was 721.

Procedures for Recruitment, Participation, and Data Collection

I used data from a secondary source, so no recruitment procedures were necessary. It was important, however, to be aware of how the data were collected by the NHS and to examine how participant recruitment and participation was conducted. It was also necessary to have a thorough understanding of the dataset's strengths and weaknesses (Cheng & Phillips, 2014).

The NHS3 is a convenience study in which busy nurses can participate as it is entirely online. Data are collected using wearable devices, smartphones, and apps. Over five years, 100 participants are randomly chosen each year (Nurses' Health Study, 2016b). The NHS welcomes new associations and tries to make the process of obtaining the data as smooth as possible. Investigators are required to fill out a form (Appendix A) asking about the details of the association (Nurses' Health Study, 2019a). There was a fee associated with data retrieval, so I pursued a grant.

IRB review and approval was required before any collection of data occurred. A list of documents and partner organization documentation specifically required for that study's data sources was emailed from the IRB office. After the preparation of the necessary documents and proposal approval by the IRB, I began the collection of data.

The NHS3 (2019a) required submission of a proposal (included in Appendix A). Once approval was granted the NHS3 asked for confirmation of intent to proceed with data collection access. An invoice for the contribution fee along with a data use agreement (DUA) for accessing the limited data set was sent. A legal signing authority from my institution signed the DUA and returned to the NHS3 for countersignature. I

also completed Collaborative Institutional Training Initiative (CITI) human subjects training and submitted a completion report. With completion of the above listed requirements, a login to their UNIX server was provided with links to the intranet. Data access and data analyses was conducted on the secure server.

Instrumentation and Operationalization of Constructs

The independent variable (IV) for the first research question was *12-hour shifts*, and the dependent variable (DV) was *eating habits* (unhealthy vs healthy). I wanted to determine if there was a relationship between the numerical variable of working 12-hour shifts and unhealthy eating habits of acute care nurses. Eating habits were measured at the nominal level of 1 = yes, or 2 = no. For the second research question, the IV was *12-hour shifts*, and the DV was *obesity rates* for the population of acute care nurses. Obesity is defined as a BMI of $>30 \text{ kg/m}^2$. For this question, I determined if there was a relationship between the numerical variable of working 12-hour shifts and the obesity rates of acute care nurses. This variable was also measured at the nominal scale of 1 = yes, or 2 = no.

Data Analysis Plan

The data were analyzed using statistical analysis and data visualization software (SAS). The research questions and hypotheses of this study were as follows:

RQ1: What is the relationship between working 12-hour shifts and eating habits (unhealthy vs healthy) of acute care nurses?

H_{01} : There is no relationship between working 12-hour shifts and eating habits (unhealthy vs healthy) of acute care nurses.

H_{a1} : There is a relationship between working 12-hour shifts and the eating habits (unhealthy vs healthy) of acute care nurses.

RQ2: What is the relationship between working 12-hour shifts and obesity rates of acute care nurses?

H_{02} : There is no relationship between working 12-hour shifts and obesity rates of acute care nurses.

H_{a2} : There is a relationship between working 12-hour shifts and obesity rates of acute care nurses.

I analyzed data for both research questions using logistic regression. This test was used to determine the relationship between unhealthy eating habits or obesity and working 12-hour shifts.

The logistic regression is used to predict the values of the dependent variable from information gained from the independent variable. It was performed on dichotomous dependent and independent variables (Wagner, 2017).

Threats to Validity

The accuracy of the data collected, and the reliability of responses received from the NHS3 may be a threat to the external validity of the study because confirmation of the reliability of the data is not possible in secondary data analysis. However, the purpose of recruiting nurses for the study was that nurses have knowledge about health and are more reliable in providing complete and accurate information.

Internal validity is threatened when it is unsure whether the dataset is accurate and has the required variables. The exportation of the data may be concerning if exportation

programs are not compatible, which can lead to inaccurate data. The effectiveness of using the data for the research questions may be a concern, as is the accuracy of the results if the dataset is inaccurate.

I showed construct validity with the application of the nominal ranking scale of 1 = yes, or 2 = no. I determined the consistency between the data and hypothesis after the data were exported and then decided if the theories chosen sufficiently explained the results.

Ethical Procedures

The Nurses' Health Study required investigators to fill out a form (Appendix A) before gaining permission to access the data. The assumption is made that previously collected data was done so ethically. This study was approved by the Walden University Institutional Review Board (06-16-21-0725327) before any data collection began.

Summary

The collection of secondary data analysis allowed for the rapid and inexpensive access to the dataset and had few ethical concerns. I used regression analysis to determine if there was a relationship between the variables, and correlation helped measure the strength of the relationship between the variables. I conducted a power analysis to determine if the results were not only statistically significant but also clinically significant.

In chapter 4, I present the results of my study.

Chapter 4: Findings

Introduction

The purposes of this quantitative study were to determine if there is a relationship between: (a) working 12-hour shifts and the eating habits (unhealthy vs. healthy) of acute care nurses, and (b) working 12-hour shifts and the obesity rates of acute care nurses. The research questions for this study were:

RQ1: What is the relationship between working 12-hour shifts and eating (unhealthy vs. healthy) eating habits of acute care nurses?

H_01 : There is no relationship between working 12-hour shifts and eating (unhealthy vs. healthy) eating habits of acute care nurses.

H_a1 : There is a relationship between working 12-hour shifts and eating (unhealthy vs. healthy) eating habits of acute care nurses.

RQ2: What is the relationship between working 12-hour shifts and the obesity rates of acute care nurses?

H_02 : There is no relationship between working 12-hour shifts and the obesity rates of acute care nurses.

H_a2 : There is a relationship between working 12-hour shifts and the obesity rates of acute care nurses.

In this chapter, I will describe the time frame for this secondary data collection as well as how participant recruitment and participation were conducted. Baseline descriptive and demographic characteristics of the sample will be presented. I will then describe how representative the sample is of the population of interest to determine

external validity. Descriptive statistics that appropriately characterize the sample will be reported. Statistical assumptions as appropriate will be evaluated. I will report statistical analysis findings to include exact statistics and associated probability values, confidence levels around the statistics as appropriate, and effect sizes as appropriate. Lastly, tables and figures will be included to illustrate results.

Data Collection

Enrollment for NHS3 began in 2010 and is ongoing and includes more than 40,000 male and female nurses and nursing students. Data were collected by use of wearable devices, smartphones, and through apps. I had hoped to be able to import the SAS files used by NHS3 and use SPSS to analyze the data. However, it was decided by the collaborators at NHS3 that a limited data set containing the information needed to achieve the purpose of this study would be created and analysis would be done in system used by NHS3, so the results were obtained using Statistical Analysis Software (SAS).

The study population was comprised of 10,600 nurses and nursing students who actively worked in nursing. As the focus of the study was nurses working 12-hour shifts, those who worked less than 20 hours per week were excluded. My sample size was 8988. The sample group was comprised of nurses and nursing students as was the population of the NHS3, thus external validity was maintained.

I had originally planned to measure eating habits at the nominal level of 1 = yes, or 2 = no. However, in the data set, I found that the cardiovascular disease (CVD) health metrics for diet are based on the AHA primary score ranging from 20 (low), 40 (median), to 50 (high). Therefore, I used this original ranking to measure diet.

Results

I addressed two research questions in this study. The results of the binary logistic regression are presented in this section. The following research questions were tested.

Research Question 1: What is the relationship between working 12-hour shifts and eating (unhealthy vs. healthy) eating habits of acute care nurses?

H_01 : There is no relationship between working 12-hour shifts and eating (unhealthy vs. healthy) eating habits of acute care nurses.

H_a1 : There is a relationship between working 12-hour shifts and eating (unhealthy vs. healthy) eating habits of acute care nurses.

Shiftwork was defined as those working more than 12-hour day, evening, or night shifts. Of the sample population, those who worked more than 20 hours per week but did not work a specified number of hours a day were coded as “shiftwork=0” (6991 or 77.7%). Those who worked less than 12 hours a day were coded as “shiftwork=1”(1154 or 12.8%). Those who worked 12 hours or more a day were coded as “shiftwork=2” Only 843 (9.4%) nurses and nursing students of the sample size of 8988 worked 12-hours or more in a shift (see Table 1).

Table 1

Work Hours

Cumulative shiftwork			Cumulative	
	Frequency	Percent	Frequency	Percent
12 hour shift unknown	6991	77.78	6991	77.78
Worked < 12 hours	1154	12.84	8145	90.62
Worked > 12 hours	843	9.38	8988	100.00

The CVD health metrics for diet are based on the AHA primary score ranging from 20 (bad diet), 40 (median), to 50 (high). A bad diet is coded as “baddiet_lt20=1” resulting in a total frequency of 1256 (14%) of the sample population while the rest of the sample population (7732 or 86%) had good diet scores (see Table 2).

Table 2

Type of Diet

baddiet_lt20	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Med/High diet	7732	86.03	7732	86.03
Bad diet	1256	13.97	8988	100.00

Odds ratio estimate was 1.09 times (95% CL 0.89 – 1.33). However, there was no statistical significance ($p = 0.39$), so the null hypothesis was retained.

Research Question 2: What is the relationship between working 12-hour shifts and the obesity rates of acute care nurses?

H_0 2: There is no relationship between working 12-hour shifts and the obesity rates of acute care nurses.

H_a 2: There is a relationship between working 12-hour shifts and the obesity rates of acute care nurses.

To investigate the second research question, shiftwork was used with the same population (N=8988). The numbers for shiftwork remain the same (Table 1). To determine obesity, Body mass index (BMI) scores were used. BMI was described as “less than 25 then BMI =1 or normal”, “25 – 30 then BMI = 2 or overweight”, and greater than

30 then BMI = 3 or obese”. The response variable used was “bmi3”. Of the total respondents, 27% or 2401 were considered obese.

Odds ratio was 0.92 times (95% CL 0.78 – 1.08). However, there was no statistical significance ($p = 0.32$), so the null hypothesis was retained.

Summary

I used binary logistic regression to analyze the sample of 8988 nurses and nursing students from a limited data set from the NHS3. I examined the two research questions and hypotheses to determine if there was an association between 12-hour shifts and diet, and 12-hour shifts and obesity. I was unable to reject the null hypothesis of each question as there was no statistical significance shown.

In Chapter 5, I will discuss the results of my findings, limitations of the study, and recommendations for future research along with implications for social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Nurses face many health and safety risks and associated workplace fatigue with working 12-hour shifts in the acute care setting. The role of a nurse who works 12-hour shifts and the associated responsibilities decreases having the time available to take a lunch break and having access to healthy food choices. The chances of giving in to the free food (often unhealthy) brought in by thankful family members increases while working these shifts. Eating junk food (comfort food) is often used to deal with stress and exhaustion of working long hours (Horton Dias & Dawson, 2020).

Data have been and continue to be collected by the HealthyNurse® Survey that indicate needed improvement in the health of nurses by increasing physical activity, adopting healthy eating habits, and getting more rest (Healthy Nurse, Healthy Nation, 2019). When nurses, physicians, and other health care workers do not engage in healthy lifestyle behaviors, they may be less likely to encourage healthy lifestyle behaviors to their patients (Hidalgo et al., 2016). Finding out why nurses eat unhealthy meals, are physically inactive, and do not get adequate rest when they know the health risks associated with these factors have not been widely studied (Ross et al., 2019). The purposes of this quantitative secondary data analysis were to determine if there is a relationship between: (a) working 12-hour shifts and the eating habits (unhealthy vs healthy) of acute care registered nurses, and (b) working 12-hour shifts and the obesity rates of acute care registered nurses.

Interpretation of the Findings

The results of my first research question indicated that although insignificant, there is a relationship between 12-hour shifts and unhealthy eating which are consistent with the findings by Horton Dias and Dawson (2020) that showed the stress and exhaustion of working 12 hours is often relieved by eating junk food (comfort food) and treats brought in by family members. In another study, Monaghan et al. (2018) revealed that nurses do not take regular meal breaks and often rely on sugary, high-fat foods to make it to the end of their shift. Aslam, et al. (2018) posited that potential barriers to healthy eating in the workplace include limited capacities to store and reheat food from home and unhealthy food choices in vending machines and in hospital cafeterias. Keele (2019) showed inconsistencies in the attitudes of nurses between engaging in healthy eating habits and being role models for their patients. Keele's showed that many nurses believe that role modeling is an individual choice not a professional responsibility and that they should be viewed as having the same challenges as others in adopting healthy lifestyle choices. In the second research question, the relationship between 12-hour shifts and obesity was not significant. Han et al. (2011) showed that higher physical exertion of 12-hour shifts may reflect job-related exercise which could reduce obesity among nurses. However, Ross et al. (2019) showed that approximately 42% of nurses in the United States are obese although this study included a broad variety of shifts. Unhealthy eating behaviors and low levels of physical activity have contributed to high obesity rates in nurses (Power, 2018).

Although not statistically significant, my study results show that behavioral change is indicated. Nurses' awareness and ability to adopt healthy eating habits while working 12-hour shifts to maintain a healthy lifestyle may be lacking (Power, 2018). The Health Belief Model (HBM) has been used as a tool for predicting health-promoting behaviors and can be used to explain or mediate the effects that demographic variables have on health-promoting behavior patterns with the ability to be changed through education (Abraham & Sheeren, 2005). The TPB can be used to predict an individual's intention to participate in a specific behavior (Ajzen, 2012).

Limitations of the Study

There are several limitations to this study. One limitation with using secondary data is that the accuracy of the data collected cannot be guaranteed because I had no control over how it was collected. Although there is evidence of reliability and validity of data collected by the NHS3, some participants may have over-reported or under-reported their responses. Another limitation is that although the dataset supplied included confounders such as age, gender, ethnicity, years of nursing education, years of working, and smoking status, I used only bad diet and obesity. Another limitation of this study was the use of a binary logistic regression, which was appropriate for this study but limits the ability to test the relationship between categorical variables such as age or gender and quantitative outcomes.

Recommendations

Further studies on how often nurses go without eating or eating on the run during their shift because of perceived inability to take scheduled breaks because workloads or

perceptions of workloads and experience of nurses may play a role in food selection, intake, and hydration. Workplace barriers such as lack of space to store and reheat food could be investigated. Nurses who work the night shift have less access to food than day shift nurses so a qualitative study may be warranted. An analysis of variance (ANOVA) can be used to test the relationship between 12-hour shifts and unhealthy eating habits or obesity using gender, culture, age, and educational levels as comparison groups to test for statistical significance.

Implications

Although the study results were not statistically significant, there was evidence that working 12-hour shifts did impact diet and obesity. The findings of this study provide evidence for health professionals to examine their eating habits and modify healthy eating behaviors to maintain a healthy lifestyle. Nurses need to prioritize their own health and well-being to be better able to ensure the health and well-being of their patients. Healthcare employers can develop or modify healthy eating choices in the cafeteria and offer health promoting programs to their employees. By first learning to care for self, nurses can affect positive social change by playing an active role in reducing health disparities in their patients.

Conclusion

A common belief is that nurses are role models for their patients, yet there are inconsistencies in the attitudes of nurses between being role models for their patients and engaging in healthy lifestyles themselves (Keele, 2019). This study has shown that there is a positive, although not statistically significant, association between working 12-hour

shifts and unhealthy eating habits of acute care nurses. Furthermore, the results have revealed a relationship between working 12-hour shifts and obesity rates of acute care nurses. If nurses are more cognizant about why individuals make decisions to engage in health-promoting behavior, they may be more likely to promote and engage in this behavior themselves (Hidalgo et al., 2016). Nurses often place the wellness, health, and safety of their patients before their own. They may also lack awareness of the need to care for self to be able to provide the best care to patients (American Nurses Association, 2017). These study findings may help develop the addition of easy access to healthy food choices for employees and health promoting programs in the workplace.

References

- Abraham, C. & Sheeran, P. (2005). The Health Belief Model. *Cambridge Handbook of Psychology, Health, and Medicine*. 2. 97-102. 10.1017/CBO9780511543579.022.
- Albert, N. M., Butler, R., Sorrell, J. (2014). Factors related to healthy diet and physical activity in hospital-based clinical nurses. *Online Journal of Issues in Nursing*, 19 (3), 1-19. <https://doi.org/10.3912/OJIN.Vol19No03Man05>
- American Nurses Association. (2017). *American Nurses Association Health Risk Appraisal: Executive Summary*. Retrieved from https://www.nursingworld.org/~4aeceb/globalassets/practiceandpolicy/work-environment/health--safety/ana-healthriskappraisalsummary_2013-2016.pdf
- Aslam, M., Siddiqui, A., Sandeep, G., & Madhu, S. V. (2018). High prevalence of obesity among nursing personnel working in tertiary care hospital. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 12(3), 313–316. doi: 10.1016/j.dsx.2017.12.014
- Ajzen, I. (2012). The theory of planned behavior. In Van Lange, P., Kruglanski, A., & Higgins, E. *Handbook of theories of social psychology: volume 1*(Vol. 1, pp. 438-459). SAGE Publications Ltd doi: 10.4135/9781446249215.n22
- Baillie, L., & Thomas, N. (2019). Changing from 12-hr to 8-hr day shifts: A qualitative exploration of effects on organising nursing care and staffing. *Journal of Clinical Nursing*, 28(1–2), 148–158. <https://doi.org/10.1111/jocn.14674>
- Bao, Y., Bertoia, M. L., Lenart, E. B., Stampfer, M. J., Willett, W. C., Speizer, F. E., & Chavarro, J. E. (2016). Origin, methods, and evolution of the three nurses' health

studies. *American Journal of Public Health*, 106(9), 1573–1581.

<https://doi.org/10.2105/AJPH.2016.303338>

Boo, S. & Froelicher, E. (2013), Secondary analysis of national survey datasets. *Japan Journal of Nursing Science*, 10: 130-135. doi:10.1111/j.1742-7924.2012.00213.x

Centers for Disease Control and Prevention. (2020a). *Overweight and obesity*. Retrieved from <https://www.cdc.gov/obesity/adult/defining.html>

Centers for Disease Control and Prevention. (2020b). *Data and statistics*. Retrieved from <https://www.cdc.gov/obesity/data/index.html>

Cheng, H. G., & Phillips, M. R. (2014). Secondary analysis of existing data: opportunities and implementation. *Shanghai archives of psychiatry*, 26(6), 371–375. DOI:10.11919/j.issn.1002-0829.214171

Creswell, J. W., Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods* (5th ed.). Thousand Oaks, CA: Sage.

Frankfort-Nachmias, C. & Leon-Guerrero, A. (2015). *Social statistics for a diverse society*. (7th Ed). Thousand Oaks, CA.: Sage Publications.

G*Power: Statistical Power Analyses 3.1, (2020). Retrieved from <https://www.psychologie.hhu.de/arbeitsgruppen/allgemeine-psychologie-und-arbeitspsychologie/gpower.html>

Gifkins, J., Johnston, A., & Loudoun, R. (2018). The impact of shift work on eating patterns and self-care strategies utilised by experienced and inexperienced nurses. *Chronobiology international*, 35(6), 811–820.

<https://doi.org/10.1080/07420528.2018.1466790>

Guidry, J., Carlyle, K. E., LaRose, J. G., Perrin, P., Messner, M., & Ryan, M. (2019).

Using the health belief model to analyze instagram posts about zika for public health communications. *Emerging Infectious Diseases*, 25(1), 179-180.

<https://dx.doi.org/10.3201/eid2501.180824>.

Han, K., Trinkoff, A. M., Storr, C. L., & Geiger-Brown, J. (2011). Job stress and work

schedules in relation to nurse obesity. *Journal of Nursing Administration*, 41(11),

488–495. <https://doi-org.ezp.waldenulibrary.org/10.1097/NNA.0b013e3182346fff>

Health Research Funding.org. (2020). Dorothea Orem self-care deficit nursing theory

explained. Retrieved from [https://healthresearchfunding.org/dorothea-orem-self-](https://healthresearchfunding.org/dorothea-orem-self-care-deficit-nursing-theory-explained/)

[care-deficit-nursing-theory-explained/](https://healthresearchfunding.org/dorothea-orem-self-care-deficit-nursing-theory-explained/)

Healthy Nurse Healthy Nation. (2019). *Year two highlights 2018-2019*. Retrieved from

http://www.healthynursehealthynation.org/globalassets/all-images-view-with-media/about/2019-hnhn_highlights.pdf

Hidalgo, K. D., Mielke, G. I., Parra, D. C., Lobelo, F., Simões, E. J., Gomes, G. O.,

Florindo, A, Bracco, M., Brownson, R., Pratt, M., Ramos, L. & Hallal, P.C.

(2016). Health promoting practices and personal lifestyle behaviors of Brazilian health professionals. *BMC Public Health*, 16(1), 1–10.

<https://doi.org/10.1186/s12889-016-3778-2>

Ho, R. T. K., & Sun, X. Y. (2016). Overweight/obesity-related attitudes and self-care

behaviours: Evaluation and comparison of the protection motivation model and theory of planned behaviour. *Journal of Pacific Rim Psychology*, 10.

DOI: <https://doi.org/10.1017/prp.2015.5>

- Horton Dias, C., & Dawson, R. M. (2020). Hospital and shift work influences on nurses' dietary behaviors: a qualitative study. *Workplace Health & Safety*. <https://doi.org/10.1177/2165079919890351>
- Huye, Molaison, Downey, Landry, Crook, & Connell. (2017). Development of a nutrition education program for the Mississippi communities for healthy living nutrition intervention using the diffusion of innovations theory. *Journal of Human Sciences and Extension*, (3), 16. Retrieved from https://docs.wixstatic.com/ugd/c8fe6e_5adacaec92214d589748af1c3f46d74f.pdf
- IBM Corp. Released 2020. *IBM SPSS Statistics for Windows, Version 27.0*. Armonk, NY: IBM Corp.
- Iranagh, J. A., Rahman, H. A., & Motalebi, S. A. (2016). Health belief model-based intervention to improve nutritional behavior among elderly women. *Nutrition Research and Practice*, 10(3), 352–358. <https://doi.org/10.4162/nrp.2016.10.3.352>
- Jones, C. J., Smith, H., & Llewellyn, C. (2014). Evaluating the effectiveness of health belief model interventions in improving adherence: a systematic review. *Health Psychology Review*, 8(3), 253–269. <https://doi.org/10.1080/17437199.2013.802623>.
[Epub 2013 Jun 12.](#)
- Keele R. (2019). To role model or not? Nurses' challenges in promoting a healthy lifestyle. *Workplace Health & Safety*. 67(12):584-591.
doi:10.1177/2165079919828738

- Ku, B., Phillips, K. E., & Fitzpatrick, J. J. (2019). The relationship of body mass index (BMI) to job performance, absenteeism, and risk of eating disorder among hospital-based nurses. *Applied Nursing Research, 49*, 77-79
- LaMorte, W. (2019a). *The health belief model*. Retrieved from <http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories2.html>
- LaMorte, W. (2019b). *The theory of planned behavior*. Retrieved from <http://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories3.html>
- Love-Hate Relationship: Nurses & the 12-Hour Shift. (n.d.). Retrieved from <https://www.amnhealthcare.com/latest-healthcare-news/love-hate-relationship-nurses-the-12-hour-shift/>
- Monaghan, T., Dinour, L., Liou, D., & Shefchik, M. (2018). Factors Influencing the Eating Practices of Hospital Nurses During Their Shifts. *WORKPLACE HEALTH & SAFETY, 66*(7), 331–342. <https://doi.org/10.1177/2165079917737557>
- Nicholls, R., Perry, L., Duffield, C., Gallagher, R., & Pierce, H. (2017). Barriers and facilitators to healthy eating for nurses in the workplace: an integrative review. *Journal of Advanced Nursing, 73*(5), 1051–1065. <https://doi.org/10.1111/jan.13185>
- Nooriani, N., Mohammadi, V., Feizi, A., Shahnazi, H., Askari, G., & Ramezanzade, E. (2019). The effect of nutritional education based on health belief model on nutritional knowledge, health belief model constructs, and dietary intake in

hemodialysis patients. *Iranian journal of nursing and midwifery research*, 24(5), 372–378. doi: 10.4103/ijnmr.IJNMR_124_18

Nurses' Health Study. (2016a). Retrieved from <https://www.nurseshealthstudy.org/>

Nurses' Health Study. (2016b). *History*. Retrieved from

<https://www.nurseshealthstudy.org/about-nhs/history>

Nurses' Health Study 3 [NHS3]. (2019a). For researchers. Retrieved from

<https://www.nhs3.org/for-researchers/>

Nurses' Health Study 3. (2019b). Who can join? Retrieved from

<https://www.nhs3.org/join/who-can-join/>

Perry, L., Xu, X., Gallagher, R., Nicholls, R., Sibbritt, D., & Duffield, C. (2018).

Lifestyle health behaviors of nurses and midwives: The 'fit for the future' study.

International Journal of Environmental Research and Public Health.

<https://doi.org/10.3390/ijerph15050945>

Power B. (2018). Supporting nurses to adopt healthy eating behaviours. *Nursing standard*

(*Royal College of Nursing (Great Britain) : 1987*), 33(9), 56–61.

<https://doi.org/10.7748/ns.2018.e11188>

Reed, D. (2014). Healthy eating for healthy nurses: nutrition basics to promote health for

nurses and patients. *OJIN: The Online Journal of Issues in Nursing*.

<https://doi.org/10.3912/OJIN.Vol19No03Man07>

Registered Nursing. (2020). *What is acute care nursing?* Retrieved from

<https://www.registerednursing.org/answers/what-acute-care-nursing/>

- Rosa, D., Terzoni, S., Dellafiore, F., & Destrebecq, A. (2019). Systematic review of shift work and nurses' health. *Occupational Medicine (Oxford, England)*, *69*(4), 237–243. <https://doi-org.ezp.waldenulibrary.org/10.1093/occmed/kqz063>
- Rosenstock, I. M. (1974). Historical origins of the health belief model. *Health Education Monographs*, *2*(4), 328–335. <https://doi.org/10.1177/109019817400200403>
- Ross, A., Touchton-Leonard, K., Perez, A., Wehrlen, L., Kazmi, N., & Gibbons, S. (2019). Factors That Influence Health-Promoting Self-care in Registered Nurses: Barriers and Facilitators. *Advances in Nursing Science*, *42*(4), 358–373. <https://doi.org/10.1097/ANS.0000000000000274>
- Roth, G. A., Abate, D., Abate, K. H., Abay, S. M., Aabaft, C., Abbasi, N., ... Murray, C. J. L. (2018). Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017. *The Lancet*, *392*(10159), 1736–1788. [https://doi.org/10.1016/S0140-6736\(18\)32203-7](https://doi.org/10.1016/S0140-6736(18)32203-7)
- Rudestam, K. E., & Newton, R. R. (2015). *Surviving your dissertation: A comprehensive guide to content and process* (4th ed.). Thousand Oaks, CA: Sage
- Saghafi-Asl, M., Aliasgharzadeh, S., & Asghari-Jafarabadi, M. (2020). Factors influencing weight management behavior among college students: An application of the Health Belief Model. *PLoS ONE*, *15*(2), 1–15. <https://doi.org/10.1371/journal.pone.0228058>
- Schneider, A., Bak, M., Mahoney, C., Hoyle, L., Kelly, M., Atherton, I. M., & Kyle, R. G. (2019). Health-related behaviours of nurses and other healthcare professionals:

A cross-sectional study using the Scottish Health Survey. *Journal of Advanced Nursing*, 75(6), 1239–1251. <https://doi.org/10.1111/jan.13926>

Shridhar, G., Rajendra, N., Murigendra, H., Shridevi, P., Prasad M, Mujeeb, MA., Arun, S., Neeraj, D., Vikas, S., Suneel, D., and Vijay, K. (2015). Modern diet and its impact on human health. *Journal of Nutrition and Food Sciences*. 5(6). p. 430.
doi: 10.4172/2155-9600.1000430

Smiley, R.A., Lauer, P., Bienemy, C., Berg, J.G., Shireman, E., Reneau, K.A., & Alexander, M. (2018). The 2017 National Nursing Workforce Survey. *Journal of Nursing Regulation*, 9(3), supplement (S1-S54).

Souza, R. V., Sacramento, R. A., de Almeida, J. C., & Canuto, R. (2019). The effect of shift work on eating habits: A systematic review. *Scandinavian Journal of Work, Environment & Health*, 45(1), 7–21. <https://doi:10.5271/sjweh.3759>

Sulat, J. S., Prabandari, Y. S., Sanusi, R., Hapsari, E. D., & Santoso, B. (2018). The validity of health belief model variables in predicting behavioral change: A scoping review. *Health Education*, 118(6), 499–512. <https://doi.org/10.1108/HE-05-2018-0027>

Unhealthy Habit. (n.d.) *Segen's Medical Dictionary*. (2011). Retrieved from <https://medical-dictionary.thefreedictionary.com/Unhealthy+Habit>

Wagner, W. (2017). *Using IBM® SPSS® statistics for research methods and social science statistics*. (6th ed.). Thousand Oaks, CA: SAGE Publications

Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques*. (2nd ed.). SAGE Publications.

World Health Organization (2016). *International statistical classification of diseases and related health problems 10th revision (ICD-10)-WHO Version for ;2016.*

Retrieved from <https://icd.who.int/browse10/2016/en#/E66.9>

World Health Organization. (2017). *10 Facts on obesity.* Retrieved from

<https://www.who.int/features/factfiles/obesity/en/>

World Health Organization (2019a). *Obesity.* Retrieved from

<https://www.who.int/topics/obesity/en/>.

Appendix A: External Collaboration Request

1.1 What is the cost of using questionnaire data?

Please appreciate that collecting and maintaining all the questionnaire data from these cohorts is quite expensive. Thus, we ask investigators using cohort data to help cover basic computing and proposal processing costs for maintaining the data and systems.

The minimum fee is

\$2000 for non-trainee investigators (regardless of institution) for the first year and ~

\$1500/year for each additional year to cover computing costs.

\$1700 for students / trainees with documentation of status (regardless of institution) for the first year and ~ \$1500/year for each additional year to cover computing costs.

The actual costs for each project may vary depending on the scope of the project.

Investigators will get access to all NHS / NHS II questionnaire data with the payment of requested costs.

1.6 What is the process for getting access to the data?

Submit the proposal

In 2-3 weeks, you will hear back about whether the proposal was approved or not. If approved, you will also be asked to confirm that you will proceed with the next steps to get access to the data.

Once we receive confirmation that you will proceed with the next steps, we will 1) send an invoice for the costs (see above), 2) send a data usage agreement (DUA) for accessing the “limited data set”; the DUA must be signed by a legal signing authority for your

institution (we will countersign and send back) and 3) request completion of a CITI human subjects training completion report.

When all of the 3 requested items are received, we will prepare paperwork for you to get a login to our UNIX server. This process may take 1-2 weeks.

We will provide links to our intranet with documentation of data and analysis tools.

Investigators will access the data directly on our secure server and also conduct analyses on our server.

External Collaboration Request

Name *

Please include your full name

Your answer

Email *

Your answer

Institution & Address *

Your answer

Proposal Title *

Your answer

Study Population(s) *

NHS1

NHS2

GUTS

NHS3

Is this Proposal Part of a Larger Consortium Project?

Choose

Is the Consortium Approved as Part of the NCI Cohort Consortium?

Choose

Background: Scientific Significance *

Your answer

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Statement of Hypothesis and Specific Aims*

Your answer

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Are You Writing a Grant Proposal to Fund this Work? *

Choose

Do You Already Have Funding to Cover this Work? *

Yes/ NIH

Yes - from a non-NIH funding source

No

Pending

Study Design *

Your answer

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Exposure(s) *

Your answer

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Outcome(s) *

Your answer

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Covariates Needed for Analysis *

Your answer

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Additional Information

I confirm that I understand that as an approved external collaborator for secondary data analysis, I will be charged a contribution fee (minimum of \$2000 for non-trainees and \$1300 for trainees for the first year) and that the actual total fee may depend on the scope of the work. *This fee will cover basic computing and infrastructure costs for maintaining the data and systems (although the actual costs for each project will depend on the scope of the project, the first year minimal cost is \$2000 for non-trainee investigators and \$1300 for students / trainees with documentation of status; for each additional year, the fee is \$1500 for non-trainee investigators and \$800 for students / trainees).*

Yes

N/A -- I am writing a grant for new data collection (e.g., biomarker studies) or I am not doing secondary data analyses, or I already have access to data or I am part of a funded consortium project etc.