

Eating Behaviors and Physical Activity among Registered Nurses in Riverside County

by

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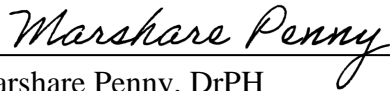
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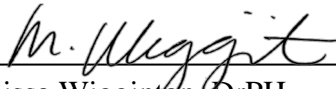
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## Abstract

Nurses are critical to the United States healthcare system, as there are more than 3.8 million registered nurses. Supporting the well-being of nurses is fundamental since they are frequently in contact with patients and work daily to improve the health of patients. The purpose of this study was to determine if there was a relationship between health habits and working as an RN within Riverside County, California. A total of 174 participants completed the Nurses' Health Survey consisting of 24 questions. Participants were asked demographic questions that included gender, age, ethnic background, height, weight, hospital affiliation, and work setting. A weak positive correlation was found between the number of years of employment as an RN and BMI ( $\rho(148) = .203, p = .014$ ), indicating a significant relationship between the two variables. No significant relationship was found between perceived stress level and fast food consumption ( $\chi(1) = .068, p = .79$ ). No significant relationship was found between the amount of vigorous physical activity and shift work among RNs working in Riverside County ( $\chi(1) = .000, p = .99$ ). The results of these findings have public health implications for implementing health-promoting activities for nurses.

*Keywords: obesity, eating behaviors, physical activity, nurse, shift work*

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## **Introduction**

### **Obesity**

Recent reports have projected that by 2030 half of all adults (115 million adults) in the United States will be obese (U.S. Department of Health and Human Services [USDHHS], 2017a). Obesity is defined as a body mass index (BMI) of 30 or higher (Marlow, 2012). It is one of the leading causative factors of many illnesses and deaths in the U.S. (CDC, 2014). Obesity predisposes individuals to the development of many chronic diseases, such as diabetes, hypertension, respiratory system diseases, coronary heart disease, cerebrovascular disease, and cancer (Yıldırım & Uskun, 2018). Furthermore, because of its association to many health problems and increased prevalence, obesity is often referred to as a public health epidemic (Marlow, 2012).

According to the American Academy of Family Physicians (AAFP), 39.6% of adults in the U.S. are considered obese with the percentage increasing each year throughout all 50 states (Devitt, 2018). In California, Riverside County is the fourth largest county with an estimated population of 2.5 million people, and current projections are estimated to reach 4.7 million people by 2050 (U.S. Census Bureau, 2019). In 2019, the obesity rate for the State of California was 25.8%, but the County of Riverside had a higher obesity rate of 32.2% (Riverside County Health Coalition, 2019). In addition, Riverside County was compared to 100 of the most populated metro areas throughout the U.S. using 19 key health indicators of weight-related problems (McCann, 2020). Alongside San Bernardino, Riverside County ranked above all the other most populated counties in California as having more overweight and obese individuals (McCann, 2020). Obesity-related medical treatments are



costing the nation approximately \$190.2 billion a year and an annual productivity loss around \$4.3 billion due to work absenteeism (McCann, 2020).

### **Eating Behaviors**

In recent years, there has been increasing evidence that certain food intake is related to the prevalence of obesity (Popkin & Gordon-Larsen, 2004). Evidence showed that the majority of the U.S. population eat a diet high in saturated fats, refined foods, and sugar, but low in fiber (Popkin & Gordon-Larsen, 2004). The American diet consists primarily of fast food, which has been associated with poor dietary intake and increased risk of obesity (Rosane, 2018). Fast foods consist of highly processed meats, refined carbohydrates, saturated and trans fatty acids, sodium, and cholesterol, and are poor in dietary fiber and essential nutrients (Bahadoran, Mirmiran, & Azizi, 2016). Furthermore, the prevalence of obesity increases consistently with visiting fast food restaurants (Bahadoran et al., 2016). Between 2013 and 2016, 36.6%, or approximately 84.8 million adults, consumed fast food on any given day (Fryar, Hughes, Herrick, & Ahluwalia, 2018). According to the USDHHS (2017a), about 90% of Americans eat more sodium than is recommended for a healthy diet. U.S. adults consume an average of 3,400 milligrams of sodium per day, which is well above the federal guideline of 2,300 milligrams per day (USDHHS, 2017a). By reducing the amount of sodium that Americans eat by 1,200 milligrams per day, up to \$20 billion in medical costs could be saved each year on heart disease, stroke, and other vascular diseases (USDHHS, 2017a). Fast foods consist heavily of sodium, and if focusing on just reducing sodium intake can save up to \$20 billion, switching to healthy foods overall can save more than \$100 billion in

diseases such as heart attacks and strokes (Settembre, 2019). Moreover, the 2016 California Health Interview Survey (CHIS) showed that the percentage of adults who consumed fast food within a week in Riverside County was 72.4%, which was significantly worse than the average of 65.6% for all California counties (Strategic Health Alliance Pursuing Equity Riverside County, 2020).

### **Physical Activity**

Eating a healthy diet and participating in regular physical activity is essential for a person's overall health and well-being (Healthy People, 2020a). Even without a healthy diet, regular physical activity has been shown to produce long-term benefits, such as preventing obesity and chronic diseases (USDHHS, 2017b). Being moderately active for 150 minutes per week or vigorously active for 75 minutes per week reduces fat; controls weight; promotes strong bone, muscle, and joint development; and relieves stress (USDHHS, 2017b). Regular physical activity can improve the overall health and quality of life, regardless of having a chronic disease or disability (Healthy People, 2020b). According to the USDHHS (2017b), however, more than 80% of adults do not meet the guidelines for both muscle-strengthening and aerobic activities with less than 5% of adults participating in 30 minutes of physical exercise per day.

Moreover, not getting enough physical activity costs money. Approximately \$117 billion in annual healthcare costs are associated with inadequate physical activity (USDHHS, 2018). To combat the obesity epidemic, champions need to be selected to be the voice of change and lead the way by demonstrating healthy behaviors, such as increased physical activity. The health of the nation can be

transformed by supporting champions or a champion group as they advocate and persistently promote innovations for a healthier America (Blake & Chambers, 2012).

## **Nurses**

Nurses are healthcare professionals who consistently exceed in providing exceptional care with high ethical standards (Larson, 2017). Nurses are critical to the United States healthcare system as there are more than 3.8 million registered nurses (RNs) in the nation, making nursing the largest division in the healthcare profession (American Association of Colleges of Nursing [AACN], 2019b). RNs are in high demand in both acute care and community settings with projected employment rates to grow 15% between the year 2016 to 2026; this is faster than the average increase for all occupations (AACN, 2019b). With more nurses coming into the workforce, the well-being of nurses is fundamental as they daily work to improve the health of patients.

Furthermore, ranked as the most trusted profession, even over physicians, nurses have immense potential to lead healthcare changes as role models, educators, and advocates (Healthy Nurse Healthy Nation [HNHN], 2020). Nurses spend much of their time at the bedside of patients, much more than physicians and hospital administrators; therefore, they have the time to form relationships not only with the patient but with the patient's family members as well (The University of New Mexico, 2016). Seen as the most trusted profession in healthcare, nurses have the advantage to provide innermost insight to patients that other healthcare professionals may lack.

Wilson, Chen, and Wood (2019) demonstrated how nurse champions improved the quality of life and outcomes for patients across different clinical settings. The implementation of a nurse champion model not only improved nurses' diabetic knowledge and skills but also improved the health outcomes of diabetic patients, such as the reduction in hemoglobin A1C levels, decrease in blood pressure, decrease in microalbumin, improved hypoglycemic outcomes, decreased readmission rates, and greater weight loss in patients with type two diabetes (Wilson, Chen, & Wood, 2019). These findings demonstrated when nurses are a champion group, they can significantly influence others.

According to the American Nurses Association (ANA), if all 3.8 million nurses were to lead healthier lives it would positively benefit those around them, such as their family, co-workers, and patients, thereby, promoting a healthier nation (HNHN, 2020). However, nursing is a physically demanding occupation. Nurses are often on their feet all day frequently transporting patients from bed to bed and are often forced to do more work with less help due to understaffing (Landis, 2017). A shortage of nurses has led to chronic overtime as hospitals cannot afford to leave floors severely understaffed (Landis, 2017).

Compared to the average American, nurses are more likely to be overweight and report higher levels of stress (HNHN, 2020). Research showed that nurses have a 30% less nutritious diet, 5% higher BMI, undergo 2.8 times more stress, and get 10% less sleep than the average American (AACN, 2019a). Also, it has been found that nurses are not meeting the recommended physical activity level of 150 minutes of moderate-to-vigorous exercise per week (Reed et al., 2018). Again, being the most

trustworthy profession, nurses must be able to model health-promoting behaviors to their patients.

### **Shift Work and Health**

According to the Centers for Disease Control and Prevention (2014), approximately 25% of American employees view their job as the number one stressor in their life. Problems at work are more strongly associated with complaints about health than other life stressors, such as family and financial problems (CDC, 2014). Furthermore, according to the American Institute of Stress (2019), numerous studies confirmed that occupational stress is the leading source of stress for American adults, which has been progressively increasing over the past few decades.

In addition, approximately 15 million Americans work full time in shift work, such as night shifts, rotating shifts, or other arranged irregular schedules (CDC, 2018). Shift work is recognized as work hours that fall outside of the typical 9:00 a.m. to 5:00 p.m. workday, and the length of each shift can differ, ranging from six to 12 hours (Flahr, Brown, & Kolbe-Alexander, 2018). In a meta-analysis that included 28 published studies examining the relationships between shift work patterns and obesity, night shift work was associated with a 29% increased risk of becoming overweight or obese (Sun et al., 2018). Increased prevalence of obesity was also significantly associated with healthcare employment (Luckhaupt, Cohen, & Calvert, 2014).

Due to the nature of the profession, nurses are faced with a variety of stressors, such as handling high workloads, working long hours, working holidays, communicating with patients and their visitors, communicating with physicians and

other nurses, and dissatisfaction with wages and benefits (Keykaleh et al., 2018). In the healthcare system, 24-hour care throughout the week is required in order to provide essential care to patients, so many nurses are locked into 12-hour shifts to ensure that this care is provided (Ferri et al., 2016). A study conducted by the ANA showed that 35% of nurses reported rarely or never taking a meal break during their shifts (Witkoski & Dickson, 2010). According to Sun et al. (2018), the meta-analysis conducted revealed that nurses with the longest duration of shift work (years of shift work, 6.83-38.00 years) had 1.37 times higher risk of having a BMI greater than 25 kg/m<sup>2</sup> than those with the shortest duration of shift work (years of shift work, 0.08-3.00 years).

Furthermore, a study conducted by Gu and colleagues (2015) found that night shift work increased the risk of death from any cause by 11% for nurses who worked for more than five years compared to nurses who never worked night shift (Gu et al., 2015). A higher frequency of Circadian Rhythm Sleep-Wake Disorders has been identified among night shift nurses as well as maladaptation syndrome to shift work, which is characterized by sleep deprivation, gastrointestinal disorders, and increased risk of cardiovascular diseases (Ferri et al., 2016). Night shift nurses have an increased risk of being overweight and suffering from obesity due to the nature of their work schedule (Sun et al., 2018). A disturbance of the “natural” circadian rhythm interrupts metabolic rates even when optimum hours of sleep are reported per night (Williams, 2017). Therefore, the combination of chronic sleep deprivation and circadian disruption experienced by night shift nurses results in slower resting metabolic rates (Williams, 2017). Also, nurses reported eating more to cope with

stress, and eating more foods that are high in sugar in order to stay awake (Wong et al., 2010).

The lack of access to healthy eating facilities during graveyard hours has also been shown to contribute to disruptive eating patterns among night shift nurses. Nurses may be forced to seek food from outside sources that give preference to convenience over nutritional value, such as fast food restaurants that are open 24-hours (Williams, 2017). The predominant reason for attaining fast food was due to the accessibility and convenience (Anderson, Lyon-Callo, Fussman, Imes, & Rafferty, 2011). Furthermore, night shift work generally decreases the opportunity for physical activity (Atkinson, Fullick, Grindey, & Maclaren, 2008). Many night shift nurses are unable to maintain a regular exercise regimen since they face many problems, such as fatigue after a stressful and long night's work (Phiri, Draper, Lambert, & Kolbe-Alexander, 2014). In a cross-sectional study that randomly selected from the California Board of Registered Nursing list, night shift nurses were significantly less likely to perform regular muscle-strengthening physical activity (OR = 0.44, 95% CI: 0.25–0.77) compared to day shift nurses (Nam & Lee, 2016). Combined with disruptive sleep cycles and poor nutrition habits, night nurses have been shown to fall victim to obesity and other underlying health concerns.

### **Purpose of the Study**

The purpose of this study was to determine if there was a relationship between health habits and working as an RN within Riverside County, California. More specifically, the relationships between BMI, physical activity, and fast food consumption among day and night shift nurses was examined.

## **Research Questions**

The project was guided by the following research questions:

1. Is there a relationship between the number of years of employment as an RN working in Riverside County and BMI?
2. Is there a difference in perceived stress level and fast food consumption among RNs working in Riverside County?
3. Is there a difference in the amount of physical activity between day shift and night shift RNs working in Riverside County?

## **Hypotheses**

It was hypothesized that there is a relationship between the number of years of employment as an RN and BMI. The second hypothesis was that there is a difference in perceived stress level and fast food consumption. The third hypothesis was that there is a difference in the amount of physical activity between day shift and night shift RNs.



## **Method**

### **Design**

A cross-sectional study design was used to examine the relationship between health and nutritional habits and shift work among RNs in Riverside County. The Institutional Review Board (IRB) at California Baptist University approved this research study under an exempt status on April 17, 2020 (see Appendix A).

### **Procedures**

Questions from the Healthy Nurse, Healthy Nation survey were used and adapted for this study's survey, which was named the Nurses' Health Survey (see Appendix B). The Nurses' Health Survey was distributed to RNs working throughout Riverside County between May and June of 2020. The Nurses' Health Survey consists of 24 questions that include demographic questions asking about gender, age, ethnic background, height, weight, hospital affiliation, and work setting. The Nurses' Health Survey takes approximately 10 minutes to complete and was administered online using Qualtrics. Three options were available to access the survey: (1) participants were sent a link to their email to access the online survey; (2) multiple links were posted on the Healthy Nurse Healthy Nation platform and on Facebook with the link to the survey; and (3) participants were offered a QR code to scan using their smart device during face-to-face interactions.

When an individual opened the survey, a consent form appeared on the first page. The consent form described the nature of the study, contact information of the researcher, and the confidentiality of the responses. The voluntary nature of participation was further described, including a discussion of the participant's right to

decline or withdraw from participation at any time. Only those adults 18 years and older who provided consent were eligible to participate in the study.

An incentive was used to encourage participation. The participants were offered the chance to be placed into a drawing for \$50.00 after finishing the survey. The participants received a survey code after finishing the survey and were instructed to send the survey code via email to the researcher to be entered into the drawing. The survey data from Qualtrics was uploaded into the Statistical Analysis Software Package (SPSS) version 25 for analysis and placed into a password protected file.

### **Participants**

The participants in this study were male and female adults aged 18 years and older working as RNs in Riverside County. Nurse managers were contacted via an email that asked them to share the survey link with their nurses. Participants were also recruited by the researcher at the front entrances of the hospitals. Those who were approached in-person were shown a QR code to be scanned by their smart device. Of note, the nurses at Riverside Community Hospital were undergoing a strike in front of the hospital at the time of in-person recruitment. A total of 174 people consented to take and complete the survey. For this study, the responses of 150 participants were analyzed. This was done to specifically focus on participants who are RNs as well as to compare between day shift and night shift RNs.

Using G\*Power software, version 3.1.9.7, based upon a power of 80%, alpha level of .05, and a medium effect size, the minimum required sample size to conduct a Spearman correlation was estimated at 88 participants and to conduct a Chi-square test of independence was estimated at 87 participants. The Spearman correlation was

found to have the largest minimum required sample size at 88. The study sample size of 150 surpassed the estimated minimum required to perform the statistical tests.

### **Independent Variables**

There were three independent variables in this study. This included number of years of employment as a nurse, stress level, and shift work. The first independent variable, the number of years of employment as a nurse, was measured by the Healthy Nurse, Healthy Nation survey question, “How many years have you worked as a nurse?” The participants manually typed in the number of years they have worked.

The second independent variable, stress level, was measured by the question, “How much ‘stress’ (eg. frustrated, angry, nervous) have you felt in the last week?” Based on the survey administered by the Healthy Nurse Healthy Nation evidence-based program, the responses for this question were “1 = No to Low Stress” and “2 = Moderate to High Stress” (Healthy Nurse Healthy Nation, 2020).

The third independent variable, shift work, was measured by the question, “At my main job (somewhere you spend at least 60% of your time) my work schedule is:”. The responses included “1-Day,” “2-Evening,” “3-Night,” and “4-Rotating (e.g. day/evenings, day/evenings/nights, etc.).” The responses “2-Evening” and “4-Rotating (e.g. day/evenings, day/evenings/nights, etc.)” were omitted from the dataset to focus specifically on the comparison of day and night shift nurses.

### **Dependent Variables**

The three dependent variables in this study were BMI, fast food consumption, and physical activity. The first dependent variable, BMI, was measured by the questions, “What is your height in feet and inches?” and “How much do you weigh in

pounds?” For the first question, the participants had the option to choose between 3’0” through 7’11” using a drop-down menu with increments of one inch. For the second question, the participants entered their weight in pounds manually. Using the responses of standard height and weight, the USDHHS BMI calculator was used to determine the participant’s BMI (USDHHS, 2020).

The second dependent variable, fast food consumption, was measured by the question, “How many meals a week do you eat food from a fast food chain, cafeteria, or similar establishment?”. The responses included five options, “0”, “1-2”, “3-4”, “5-6”, and “7 or more.” The responses were collapsed and recoded into “1-Low” and “2-High.” Responses “0” and “1-2” were recoded into “1-Low” while responses “3-4,” “5-6.” and “7 or more” were recoded into “2-High” based on a study published in the *European Journal of Public Health* examining unhealthy eating habits (Borraccino et al., 2016).

The third dependent variable, physical activity, was measured by the question, “On average, how many times per week do you do vigorous aerobic workouts (where conversation may be difficult because of a large increase in breathing and heart rate)?” The responses included “0,” “1,” “2,” “3,” “4,” “5,” “6,” “7,” “8.” Responses “0,” “1,” and “2” were recoded into “1-No to Low” while responses “3” through “8” were recoded into “2-Moderate to High” based on the Yale Physical Activity Survey (Portegijs et al., 2019).

### **Data Analysis**

A Spearman correlation was performed to answer the first research question and determine if there was a relationship between the number of years of employment

as an RN and BMI. A Chi-square test of independence was conducted to answer the second research question and explore the difference in perceived stress level and fast-food consumption. Lastly, a Chi-square test of independence was conducted to answer the third research question and examine the difference in the amount of physical activity between day shift and night shift RNs.

## Results

The purpose of the study was to determine if there was a relationship between health habits and working as an RN within Riverside County, California. It specifically examined the relationships between BMI, physical activity, and fast food consumption among day and night shift nurses.

### Demographics

A total of 174 RNs completed the Healthy Nurse, Healthy Nation survey. However, only the responses of 150 participants were analyzed to focus on the comparison between day shift and night shift RNs. The majority of respondents were female ( $n = 122$ , 81.3%). Of the 150 participants, 33% ( $n = 50$ ) classified themselves as White or Caucasian and 30.0% ( $n = 45$ ) classified themselves as Hispanic or Latino. The average age of participants was 37 years old with majority ( $n = 105$ , 70.5%) falling into the 26 to 39 age range category. The average BMI of the participants was 27.0 with 64.9% being overweight ( $n = 58$ ) or obese ( $n = 38$ ). Most respondents worked at Riverside Community Hospital ( $n = 66$ , 44.0%) and at Riverside University Health System Medical Center ( $n = 51$ , 34.0%). The largest number of participants reported working in the Emergency Department (40.3%). Most of the participants reported experiencing stress, with 79.0% reporting moderate to high stress and more than half reported low fast-food intake (53.7%). Also, most of the participants reported no to low amounts of physical activity (68.0%). See Table 1 for demographics of the participants.

**Table 1***Demographic Description of Sample of RNs in Riverside County, CA (n = 150)*

Variable	n	$\bar{x}$	%
<b>Gender</b>			
Male	28		18.7%
Female	122		81.3%
<b>Race/Ethnicity</b>			
White or Caucasian	50		33.3%
Black or African-American	14		9.3%
Asian	19		12.7%
Hispanic or Latino	45		30.0%
Native Hawaiian or Other Pacific Islander	4		2.7%
Other Race-Including Multi-Racial	18		12.0%
<b>Age</b>			
18 - 25	5		3.4%
26 - 39	105		70.5%
40 - 59	31		20.8%
60 and Older	8		5.4%
<b>Body Mass Index</b>			
Underweight	2		1.4%
Normal weight	50		33.8%
Overweight	58		39.2%
Obese	38		25.7%
Average Body Mass Index		27.0	
<b>Hospital</b>			
Desert Regional Medical Center	1		0.7%
Eisenhower Medical Center	1		0.7%
Kaiser Permanente Medical Center	21		14.0%
Loma Linda University Medical Center Murrieta	1		0.7%
Riverside Community Hospital	66		44.0%
Riverside University Health System Medical Center	51		34.0%
Two or More Hospitals	8		6.0%

## Major Findings

### *Research Question 1*

A Spearman correlation was performed to determine if there was a relationship between the number of years of employment as an RN and BMI. A weak positive correlation was found ( $\rho(148) = .203, p = .014$ ), indicating a significant relationship between the two variables. As years of employment increases, BMI also increases.

### *Research Question 2*

A Chi-square test of independence was performed to examine the relationship between perceived stress level and fast-food consumption. No significant relationship was found between perceived stress and fast-food consumption ( $X^2(1) = .068, p = .79$ ) (see Table 2). Perceived stress is not associated with fast food consumption among RNs working in Riverside County.

**Table 2**

*Relationship between Perceived Stress Level and Fast-Food Consumption among RNs working in Riverside County (n = 150)*

Variable	Perceived Stress Level		Adjusted OR (95% CI)
	No to Low	Moderate to High	
Fast Food Consumption			
Low	16 (10.7%)	64 (42.7%)	.900 (.408 – 1.987)
High	15 (10.0%)	54 (36.0%)	

*Note.* N = Total Number, % = Valid Percent; OR, odd ratio; CI, confidence interval. Chi-square test of independence was used to calculate the relationship between perceived stress level and fast-food consumption among RNs working in Riverside County.  $p = .794$



### ***Research Question 3***

A Chi-square test of independence was performed to examine the relationship between the amount of vigorous physical activity and shift work among RNs working in Riverside County. It was hypothesized that day shift RNs do more vigorous activity than night shift RNs. No significant relationship was found between the vigorous physical activity and shift work ( $X^2(1) = .000, p = .99$ ) (see Table 3).

**Table 3**

*Relationship between Vigorous Physical Activity among Day Shift and Night Shift*

*RNs working in Riverside County (n=150)*

Variable	Shift		Adjusted OR (95% CI)
	Day	Night	
Vigorous Physical Activity			
No to Low	53 (35.3%)	49 (32.7%)	.995 (.501 – 1.977)
Moderate to High	25 (16.7%)	23 (15.3%)	

*Note.* N = Total Number, % = Valid Percent; OR, odd ratio; CI, confidence interval. Chi-square test of independence was used to examine the relationship between vigorous physical activity among day shift and night shift RNs working in Riverside County.  $p=.989$

## Discussion

### Summary of Major Findings

This study revealed a significant positive association between the number of years of employment as an RN working in Riverside County and BMI. The results from this study align with the results of the meta-analysis conducted by Sun et al. (2018) that revealed nurses who worked 6.8 to 38.0 years had a higher risk of having a BMI greater than 25 kg/m<sup>2</sup> compared to nurses who worked 0.1 to 3.0 years. Working as a nurse has been significantly associated with increased prevalence of obesity (Luckhaupt et al., 2014). Research showed that nurses have a 5.0% higher BMI and 30.0% less nutritious diet than the average American (AACN, 2019a). Nurses were also found not to be meeting recommended weekly physical activity levels (Reed et al., 2018). More than half of the RNs in this study were overweight or obese (64.9%) with an average BMI of 27.0. Accordingly, the relevant literature supported the evidence that nurses are more likely to be overweight and suffer from obesity (Healthy Nurse, Healthy Nation, 2020).

There was no significant association between perceived stress level and fast food consumption among RNs working in Riverside County. More specifically, increased stress was not associated with fast-food consumption. The results from this study contradict Wong's (2010) findings that showed nurses reported eating fast food to cope with stress. The lack of association in this research may have been due to the study being conducted during the coronavirus disease 2019 (COVID-19) global pandemic. Being an essential worker during a global pandemic may have led to increased stress levels in general. Nursing is an occupation that faces multiple

stressors daily. Research conducted by the AACN (2019a) found that nurses undergo 2.8 times more stress compared to the average American. Results from this study illustrated that most of the RNs reported experiencing stress with 79.0% of respondents reporting moderate to high stress. Therefore, working as a nurse during a global pandemic may have exacerbated their baseline stress levels.

Also, in this study more than half of the respondents reported low fast food intake (53.7%). Although there are state laws that mandate meal breaks in California, a study conducted by the ANA sampling over 13,000 nurses found that 35% reported going without adequate meal or rest breaks (Witkoski & Dickson, 2010). The busyness of working as a nurse during a global pandemic may have reduced the ability of the nurses to take adequate meal breaks even more than before and may have decreased potential fast-food intake. The lack of association in this research may have also been due to how the respondents define fast food. According to Bahadoran et al. (2016), there is no agreement on the definition of fast food. This leaves what constitutes being fast food up to the perception of the respondents, which was a limitation in previous studies (Dave, Jeffery, & Ahluwalia, 2019).

There was no significant association between the amount of physical activity between day shift and night shift RNs working in Riverside County. These results contradict the study done by Nam and Lee (2016) that demonstrated night shift nurses were significantly less likely to perform physical activity compared to day shift nurses. The results from this study are also incongruent with the claims of Phiri et al. (2014) that found night shift nurses are not maintaining physical activity levels compared to day shift nurses. One possible explanation for this discrepancy is that the

nurses in general are not exercising regardless of their shift schedule. In this study more than half of the nurses (68.0%) did no to low amounts of physical activity, which aligns with the study done by Reed et al. (2018) that showed nurses are not performing the recommended 150 minutes of moderate-to-vigorous exercise per week. Again, this study was conducted during the COVID-19 global pandemic. Exercise rates may have declined for the overall population due to the statewide order mandating that gyms and other workout facilities be closed.

### **Public Health Implications**

Several public health implications for clinical practice and workplace interventions can be drawn from this study. Nurses are knowledgeable and understand the importance of health-promoting activities, such as physical activity, healthy eating, and stress management (Ross et al., 2017). However, the knowledge that nurses possess is not translating into proactive measures to care for themselves (Ross et al., 2017). Research showed that nurses who participate in self-care are more likely to pass on the benefits of healthy choices and activities to their patients (AMN Healthcare, 2020).

A study conducted by Power, Kiezebrink, Allan, and Campbell (2017) used the Theoretical Domains Framework (TDF) to explore the determinants affecting nurse's physical activity and eating behaviors. Thirteen of the 14 domains in the TDF were found to influence nurses' physical activity and eating behaviors (Power, Kiezebrink, Allan, & Campbell, 2017). This study classified barriers and enablers into the TDF domains, which has provided the opportunity to identify behavior change techniques for targeting the determinants, such as how staff shortages

exacerbated time constraints nurses experience that impacts their ability to take adequate breaks (Power et al., 2017). As leaders, nurse managers and administrators can support nurses' efforts and decrease barriers to leading healthier lifestyles.

Implementing strategies to ensure proper staffing can allow for adequate meal and rest breaks for nurses. An occupational health nurse can serve as a consultant to nurse managers to optimize scheduling techniques (Witkoski & Dickson, 2010). Nurse managers and administrators can advocate for policy strategies that consider prohibiting unhealthy foods in large proportions and endorse healthy options in vending machines as well as in the hospital cafeteria. Administration can also offer free snacks to the nurses, which consist of seasonal fruits and/or whole grains, making it a healthier alternative to vending machines (Zapka, Lemon, Magner, & Hale, 2009).

Even though there was no significant association between perceived stress level and fast food consumption in this study, it is vital that the levels of stress decrease in nurses since 79.0% of respondents reported moderate to high levels of stress. The Healthy Nurse, Healthy Nation (HNHN) initiative uses grand challenge methodology and other frameworks to positively impact the health behaviors of nurses (Gould, Carpenter, Farmer, Holland & Dawson, 2019). The HNHN campaign provided a web platform that inspires action and connects nurses with each other as well as employers (Ross et al., 2017). Nurse managers and administrators should offer initiatives for the nurses to join the monthly challenges offered by the HNHN and promote their completion. A link to the HNHN comprehensive health assessment survey should be sent out to the nurses to provide a baseline for their physical

activity, nutritional habits, and stress levels, which they can compare to the national average and the ideal standards (HNHN, 2020).

### **Limitations**

There are several limitations in this study. The first limitation was the under-representation of the hospitals located within Riverside County. Respondents reported working at only six of the 36 hospitals listed, and 74.0% of respondents reported working at two of the six hospitals. The limited number of hospitals did not allow for equal representation of the population of nurses working within Riverside County.

Another limitation of this study was that the participants may have experienced recall bias. Several questions in the Nurses' Health Survey asked the participants to recall events or experiences within the last week. The participants may not have remembered the accurate number of times they experienced stress, were physically active, and consumed fast food.

A third limitation was the timing of this study with history as a threat to internal validity. History is an unrelated event that can influence the results of a study, and the longer the time lapse the more likely it is to become a threat (Flannelly, Flannelly, & Jankowski, 2018). The participants completed the Nurses' Health Survey during the COVID-19 pandemic, which was not intended when the study was first conceived, and the effects of the pandemic have extended past the completion status of the survey. Researchers from the University of North Carolina Chapel Hill and Harvard Medical School conducted a nationwide internet survey during the last two weeks of May 2020 that assessed the emotional impact of COVID-19 on the American adult population (Palsson, Ballou, & Gray, June 2020). Results from the

survey showed that 55.0% of Americans reported being more stressed compared to in January 2020, and that 90.7% reported experiencing emotional distress related to the pandemic (Palsson, Ballou, & Gray, June 2020). As a result, self-reported stress within the participants may have been inflated by the COVID-19 pandemic. Also, the nurses at Riverside Community Hospital were undergoing a strike at the time of in person recruitment, which was focused on the issues of understaffing and the lack of personal protective equipment to protect from COVID-19. Therefore, the participants that attended the strike may have had increased stress levels from their baseline.

A fourth limitation to this study is the Nurses' Health Survey that was administered to the participants. The survey did not include questions asking about the number of times participants did anaerobic exercises to compare to the aerobic exercise questions that were asked. The American College of Sports Medicine (ACSM) defined aerobic exercise as activity that uses large muscle groups and is any type of cardiovascular conditioning, such as running, cycling, and swimming (Patel et al., 2017). The ACSM defined anaerobic exercise as intense bursts of energy done in short durations and is independent from the use of inhaled oxygen as an energy source, such as jumping, sprinting, and heavy weight lifting (Patel et al., 2017). The lack of including questions asking about anaerobic exercise levels may have limited the answering pool of the participants as well as the COVID-19 pandemic limiting options in exercising.

Also, the question, "How much 'stress' (eg. frustrated, angry, nervous) have you felt in the last week?" may not have properly assessed the amount of stress of the participants since the responses for this question only included "1-No to Low Stress"

and “2-Moderate to High Stress.” A Likert-type would have better assessed stress levels, such as the American Psychological Association’s 10-point stress scale proportion (American Psychological Association, 2014).

Additionally, even though BMI is a useful measure of being overweight or obese, it does have some limits. One limit to using BMI is that it may overestimate body fat in those who have a muscular build, such as athletes (USDHHS, 2020). BMI may also underestimate body fat in elderly people and others who have lost muscle mass (USDHHS, 2020). Using another measurement, such as waist-to-hip ratio, may help to further assess overweight and obesity levels.

### **Future Directions**

Future research should include annual surveys to support longitudinal research in order to identify variable patterns over time that may help in better understanding the health behaviors of nurses. Future research should also include waist-to-hip ratio measurements as another indicator for being overweight or obese. Another suggestion is to survey nurses from all hospitals within Riverside County to attain an equal representation of the population of nurses. Irrefutable evidence demonstrated that engaging in regular physical activity offsets the adverse health effects of overweight and obesity (Reed et al., 2018). Therefore, future research should promote and implement physical activity interventions for nurses working in Riverside County.



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## Appendix A: IRB Approval

**RE:** IRB Review  
**IRB No.:** 077-1920 EXM

**Project:** Eating Behaviors and Physical Activity among Registered Nurses in Riverside County

**Date Complete Application Received:** 4/15/20  
**Date Final Revision Received:** N/A

**Principle Investigator:** Ms. Melissa De Leon  
**Co-PI:** N/A  
**Faculty Advisor:** Dr. Marshare Penny

**College/Department:** CHS

**IRB Determination:** Exempt Application **Approved** – Faculty research using anonymous survey questionnaires; no minor participants; no more than minimal risk/risk appropriately mitigated; no deception utilized; acceptable consent procedures and documentation; acceptable data protection procedures. Data collection may begin, in accordance with the final submitted documents and approved protocol.

**Waiver of Documentation of Consent:** Per 45 CFR 46.117, the IRB has approved the request to waive the documentation of informed consent (e.g., no participant signatures will be collected, though participants do receive a copy of the consent information) because the signature of the participant would be the only linking record to the data that may harm the participant if released OR because the research is no more than minimal risk to participants and involves no procedures for which written consent is normally required outside a research context OR because the research is being conducted in a cultural context in which signing forms is not a normal/acceptable practice.

**Future Correspondence:** All future correspondence about this project must include all PIs, Co-PIs, and Faculty Advisors (as relevant) and reference the assigned IRB number.

**Approval Information: (Expiration: Full Review Only)** Approval is granted for one year from date below. If you would like to continue research activities beyond that date, you are responsible for submitting a Research Renewal Request with enough time for that request to be reviewed and approved prior to the expiration of the project. In the case of an unforeseen risk/adverse experience, please report this to the IRB immediately using the appropriate forms. Requests for a change to protocol must be submitted for IRB review and approved prior to implementation. At the completion of the project, you are to submit a Research Closure Form.

**Researcher Responsibilities:** The researcher is responsible for ensuring that the research is conducted in the manner outlined in the IRB application and that all reporting requirements are met. Please refer to this approval and to the IRB handbook for more information.

**Date:** 4/17/2020

Appendix B: Nurses' Health Survey

1. Which hospital are you affiliated with? Select up to two that collectively represent where you spend at least 50% of your time.

- Angel View
- Betty Ford Center
- Circle City Hospital
- Corona Regional Medical Center
- Corona Regional Rehabilitation Hospital
- Desert Regional Medical Center
- Eisenhower Medical Center
- Extended Care Hospital of Riverside
- General Hospital
- Hemet Valley Healthcare Center
- Hemet Valley Medical Center
- Inland Urgent Care of Sun City
- Inland Valley Regional Medical Center
- John F Kennedy Memorial Hospital
- Kaiser Permanente Riverside Medical Center
- Kaiser Permanente Moreno Valley Medical Center
- Kindred Hospital Riverside
- Knollwood Center

- Knollwood Hospital
  - Loma Linda University Medical Center Murrieta
  - Menifee Valley Medical Center
  - Mission Valley Medical Center
  - Mount Rubidoux Convalescent Hospital
  - North Perris Medical Center
  - Palm Terrace Care Center
  - Palo Verde Hospital
  - Parkview Community Hospital Medical Center
  - Rancho Springs Medical Center
  - Riverside Center for Behavioral Medicine
  - Riverside Community Hospital
  - Riverside University Health System – Arlington Mental Health Facility
  - Riverside University Health System Medical Center
  - San Geronio Memorial Hospital
  - Scripps Clinic
  - Sun City Convalescent Center
  - Telcare Riverside County Psychiatric Health Facility
  - Other, please specify:
-

2. Which of the listed work settings most closely describes your own? Select up to two that collectively represent where you spend at least 50% of your time.

- Academia (University or College)
- Acute / Critical Care
- Addictions
- Administration
- Ambulatory care / Outpatient clinic
- Anesthesia
- Cardiology
- Case management
- Correctional facility
- Critical care
- Emergency department
- Forensics
- General practice
- Genetics / Genomics
- Gerontological nursing
- Government or Veterans Health Administration
- HIV / AIDS care
- Holistic
- Home health

- Hospice
- Infusion
- Intensive care unit
- Medical / surgery
- Military
- Neonatal
- Neurology
- Obstetrics
- Occupational health
- Oncology
- Orthopedics
- Pain management
- Palliative Care
- Pediatrics
- Perinatal
- Perioperative
- Plastic surgery
- Post anesthesia
- Primary care
- Private practice

- Psychiatric / Mental Health
  - Public health
  - Radiology / Imaging
  - Rehabilitation
  - Research
  - Respite care
  - Retired
  - Student
  - Transplant care
  - Veteran's Health / IHS / USPHS
  - Women's health
  - Wound care
  - Other, please specify:
- 

3. What is your home zip code?

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4. Complete the following sentence: I am \_\_\_\_\_.

- A Registered Nurse (RN)
  - An Advanced Practice Registered Nurse (APRN)
  - A Licensed Practical Nurse or Licensed Vocational Nurse (LPN/LVN)
  - A Student Nurse (pre-RN licensure)
  - Other, please specify:
- 

5. How many years have you worked as a nurse?

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6. What is your gender?

- Male
- Female
- Other

7. What is your year of birth?

---

8. What is your ethnic background? Select all that apply.

- White or Caucasian
  - Black or African-American
  - Asian
  - Hispanic or Latino
  - Native Hawaiian or Other Pacific Islander
  - American Indian or Alaskan Native
  - Other, please specify:
-

9. What is your height in feet and inches? For example, if you are 5 feet and 4 inches, then select 5'4".

▼ 3'0" ... 7'11"

10. How much do you weigh in pounds?

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11. At my main job (somewhere you spend at least 60% of your time) my work schedule is:

- Day
- Evening
- Night
- Rotating (e.g. day / evenings, days / evenings / nights, etc.)

12. Before the COVID-19 pandemic began, combining all my paid employment, I typically work this many hours per week:

- < 20 hours per week
- 20-40 hours per week
- 41-60 hours per week
- > 60 hours per week

13. Since the COVID-19 pandemic, combining all my paid employment, I typically work this many hours per week:

- < 20 hours per week
- 20-40 hours per week
- 41-60 hours per week
- > 60 hours per week

14. In my primary work role, the usual length of my scheduled shift hours are:

- < 8 hours
- 8 hours
- 10 hours
- 12 hours
- > 12 hours

15. In my current work environment, healthy food choices are available to me during my work hours (e.g. fruits, vegetables, whole grains).

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

16. In my current work environment, the cost for healthier food choices are more expensive than other food choices.

- Strongly Agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

17. On average, how many times per week do you do light or moderate aerobic workouts (where you are still able to maintain a conversation)?

▼ 0 ... 15

18. How many minutes per time?

▼ 0-15 ... 75-90

19. On average, how many times per week do you do vigorous aerobic workouts (where conversation may be difficult because of a large increase in breathing and heart rate)?

▼ 0 ... 15

20. How many minutes per time?

▼ 0-15 ... 75-90

21. How many servings of fruits and vegetables do you typically eat per day?

- 0
- 1
- 2
- 3
- 4
- 5+

22. How many servings of whole grains (eg. oatmeal, quinoa, wheat bread) do you typically eat per day?

- 0
- 1
- 2
- 3
- 4
- 5+

23. How many meals a week do you eat food from a fast food chain, cafeteria, or similar establishment?

- 0
- 1-2
- 3-4
- 5-6
- 7 or more

24. How much "stress" (eg. frustrated, angry, nervous) have you felt in the last week?

- No to Low Stress
- Moderate to High Stress