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Diet and Health Implications of Night Shift Nursing

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ABSTRACT

The nursing profession is heavily saturated with long hours and night shifts. Oftentimes new nurses spend months to years working on the night shift which influences biological processes such as the circadian rhythm. Their eating habits, digestion, sleep, and metabolism are all affected. Using the platform Google Forms, night shift nurses from the past and those currently working the night shift were questioned on their night shift experience, focusing on their diet and dietary habits. After the data collection was analyzed in Google Sheets, I drew conclusions and found trends among the participants. There were forty participants due to method limitations, but the participants showed many negative implications of being a night worker. In order to evaluate multiple perspectives from the participants, there were two groups of participants. The first consisted of nurses currently working the night shift, and the second group had nurses that have worked the night shift in the past but no longer do. Current night shift nurses were negatively impacted the most, but to my surprise, there were still dietary implications for those who do not work the night shift currently. For the most part, both groups of participants' diets and overall health had declined; something needs to be done to help those helping us.

Diet and Health Implications of Night Shift Nursing

My research project's objective is to answer the question: "To what extent does night shift nursing affect diet and health?" To answer this question, I created and distributed a questionnaire to collect and analyze the responses of previous and current night shift nurses. This questionnaire will provide data regarding experience, weight, age, diet, exercise, family commitments, and other factors contributing to the overall project goal: to evaluate the diets and health of night shift nurses. Out of nursing school, new nurses are generally the people to take on the night shift, for anywhere from a few months to several years (Johnston, 2015). This includes a large number of people each year who transfer from the societal norms of working and functioning during the day to virtually changing their lifestyle to "live" at night. Both new nurses and seasoned nurses have reported increased cravings for caffeine, sugar, and snacks during their shifts at night in a study done to evaluate night shift nurse eating habits (Gifkins J, et al., 2018). Many of the experienced nurses in the aforementioned study said that with a high workload came less time to eat nutritious meals, and meals were oftentimes skipped.

National Public Radio (NPR) conducted and cast an interview between reporter Allison Aubrey and Elizabeth Jacobs PhD., an emergency room doctor. This was an interview about the diet that Dr. Jacobs upheld during the night shift. Dr. Jacobs mentioned that it is challenging to keep up with a healthy diet because she constantly fuels herself on caffeine and sugar to stay awake during the nighttime (Aubrey, 2005). The long shifts also make for a scary drive home when completely exhausted. This interview affirms that doctors, nurses, and all kinds of healthcare workers are constantly trying to take care of patients and that they do not have the time to nourish themselves with the proper fuel to keep them moving. Dr. Jacobs' story, along with many other night-shift workers, inspired me to conduct my study to assess the diets of night shift nurses. This study could warn many employers, hospitals, and workers of the damage night shift has on diet. It is also a beneficial resource for those interested in the medical field who may need to work the night shift for years.

The goal of this research is to find trends among nurses and be able to recognize the frequency of responses and understand the medical reasons for a deteriorating diet and weight gain when working as a night shift nurse. I hypothesize that current night shift nurses will have worsened diets and health than their day shift counterparts. This is connected to the science of the circadian rhythm; the biological processes that occur in a 24 hour period. According to a peer-reviewed article, “Seeing the Light," these processes include physical, mental, and behavioral components. A person’s circadian rhythm is primarily controlled by light and dark in their surroundings. For instance, humans customarily sleep when it is dark and are awake during the day when it is light outside (Bloom, 2002). When the circadian rhythm is thrown off by sleeping during the day and being awake at night, eating habits and digestion are directly affected. Changes in the natural light-dark circadian rhythm can not only affect eating habits and digestion but can also long term negatively impact health and cause chronic conditions, including obesity and diabetes along with sleeping disorders and mental health implications (Circadian Rhythms, n.d.). Diabetes and obesity are health problems that are strongly influenced by the foods being consumed, when foods are being eaten, and what kinds of food choices are accessible and realistic. By working the night shift, a person’s circadian rhythm is thrown off and can heighten the possibility of minor diet issues to chronic illnesses. This is a very real and significant danger for all who pursue a night shift saturated career as nurses must commonly do.

Night shift work is known to lessen the secretion of melatonin, a hormone that regulates the body's sleep and works alongside the circadian rhythm, which can be harmful to a person’s sleep and overall health. Melatonin is released by the pineal glands during the night to essentially make a person feel fatigued and help them to fall asleep. When being exposed to lights and activity at night, melatonin is not secreted at the levels it is meant to be (Living & Coping With Shift Work Disorder, 2020). Long-term effects of night shift work cause “Shift Work Disorder” and it negatively impacts metabolism, heart health, diet, and nutrition, and being constantly out of sync with the circadian rhythm while not secreting melatonin at the proper rate. Sleep deprivation and physical burnout are found in every one of two healthcare workers including nurses (Stewart & Arora, 2019). This means that 50% of nurses experience health problems caused by the night shift.

There is a drastic increase in calories consumed by night shift nurses which plays a role in a poor diet leading to obesity, according to a study done in Poland on current night shift nurses and midwives; they found that the night shift workers consumed more carbohydrates, sucrose, fatty acids, and they had higher cholesterol than day workers did (Peplonska, B., Kaluzny, P., & Trafalska, E., 2019). This is due to the fact that night shift workers need to consume extra amounts of calories to stay awake and productive during the time they would normally spend recharging and resting their bodies. In fact, one in four nurses is said to be obese, meaning that 25% of nurses are overweight and struggling to keep a healthy lifestyle (Donnelly, 2017). The most common barriers to a healthy diet and lifestyle are working the night shift, long hours, and family commitments (Heidke, P, et al., 2020).

My research is different from other studies because usually the work being done focuses on the people in that situation currently, in this case, only work on current night shift nurses has been done. No one has synthesized data from both the current nurses and the nurses that used to work the night shift. This range of people will provide sufficient information and data on how being a night shift nurse versus not being one anymore affects diet. I hypothesize that the nurses who no longer work the night shift will likely have a different perception and experience than those currently working the night shift. They will be able to provide information on how their diets have transfigured after working the night shift. Not only will this range provide me with data from current night shift nurses but it will include previous night shift workers and that is the distinction between my work and the previous works like that of those cited above.

Methods

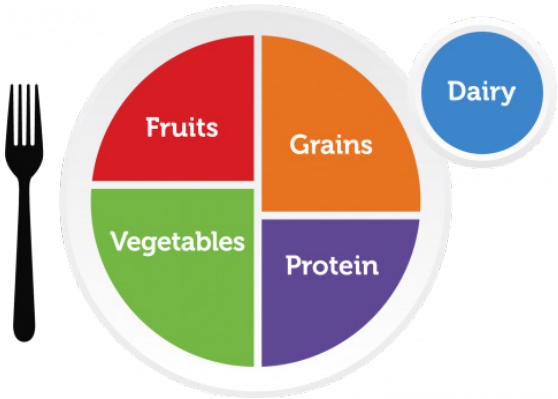
The research question was addressed through a digital questionnaire. The platform Google Forms was utilized to collect data from participants anonymously in a fashion in which the participants were able to interact, write their own responses, or choose an answer that best represents how they would respond. This allowed for a form of self-report,

meaning the participants were able to share exactly what they wanted in the different fields of the questionnaire, instead of just choosing a multiple choice answer. Participants must be or have been a night shift nurse in order to be eligible for the research. I created the process of distribution before sending out the finalized questionnaire; I had personal connections with a few of the nurses but none of them received a different email or introduction to the study. Each potential participant that received the opportunity to participate was sent an email, introducing myself as the researcher and a glimpse into the research that I would be conducting. This email included necessary information like who would qualify for the study, the estimated amount of time it would take to complete the questionnaire, and a basic overview of the topics I was researching. After a short debriefing of the questionnaire and myself, there was a link titled "Nursing Questionnaire." This link directed the participants directly to the Google Forms questionnaire, where they found a consent form. If they chose to give consent, they were taken to the 25 questions that made up the entirety of the questionnaire. If they chose not to consent, they were immediately directed to submit without seeing any of the contents inside the questionnaire. The participants were made aware that participation included one session and would take anywhere from 5-15 minutes. The questionnaire was distributed through personal connections, and they were then asked to forward the questionnaire to any nurses they knew or worked with. This distribution process was derived from limitations when contacting local hospitals to access nurse email addresses. Two hospitals were contacted. Human resources from the first hospital denied me access to any hospital email addresses or personal contact information for any of their nursing staff. The second hospital did not reply, therefore I was unable to use mainstream distribution for the questionnaire. This was a serious limitation that made collecting emails for distribution much more difficult. Thankfully, many of the nurses that participated contributed to furthering the sample size by forwarding the email and attached questionnaire to their coworkers. Utilizing personal connections and snowball sampling was the method of choice because of the limitations regarding distribution. Snowball sampling is a method in which current participants can forward or recruit new participants (Naderifar, Goli, & Ghaljaei, 2017). In this instance, the participants were prompted to send me any emails they had of other nurses or to forward the email with others. The only resources necessary for the potential participants were a computer or electronic device that allowed Google Forms, access to email, and the internet. The makeup of the questionnaire asked questions about experience, specialty, age, food habits, family information, and more, with a focus on diet and lifestyle overall. There were no restrictions based on age, demographics, or seniority. As far as the questions themselves, the questionnaire consisted of nine multiple-choice questions, fourteen free-response questions, and two checkbox responses, for a total of 25. There was no human contact involved between the participants and the researcher, therefore there was no risk of contributing to the spread of COVID-19. There was no compensation monetary or otherwise involved with participating in the research. In an effort to maintain anonymity, I was not able to see who chose to participate nor any specific person's response. Another reason the questionnaire was the method of choice was the ability to get responses from human participants who have felt the full extent and experience of being a night shift nurse. The choice to include both current and previous night shift nurses made my research different from previous studies. It not only evaluated how night shift nurses' diets are, but it also explored the before and after to attain maximum data and have reflections to compare the current night shift nurses to those who had experienced it in the past, and how working the night shift is different from working other shifts. The intended sample size for this study was at minimum thirty to abide by the general statistical rule, but I hoped for near 100 responses. The questionnaire contained different sections of inquiry. Refer to the Appendix for each of the questions asked. Background information included questions based on age, experience, specialty, and social status. Career information covered years of experience, typical schedule information, length of shifts, when the participants slept during the day, how their schedule affected personal relationships, and asked for a reflection based on how they felt a lack of sleep affected their job performance. The last section was Diet and Lifestyle, including usual snacks, a reflection of how healthy they feel they eat, exercise information, when shopping for fresh groceries occurs, what kinds of foods are accessible in break rooms, a reflection of how their diet has changed before and after working as a night shift nurse, how often fruits and vegetables were incorporated into a daily diet, a reflection of how working at night affected food choices, sugar intake, weight changes, and sleeping patterns before and after becoming a night

shift nurse. Several of these questions were developed with the purpose to compare individual responses with national standards, such as the U.S. Department of Agriculture's "MyPlate" diagram, as shown in Figure 1 below.

Figure 1.

U.S. Department of Agriculture: My Food Plate Diagram



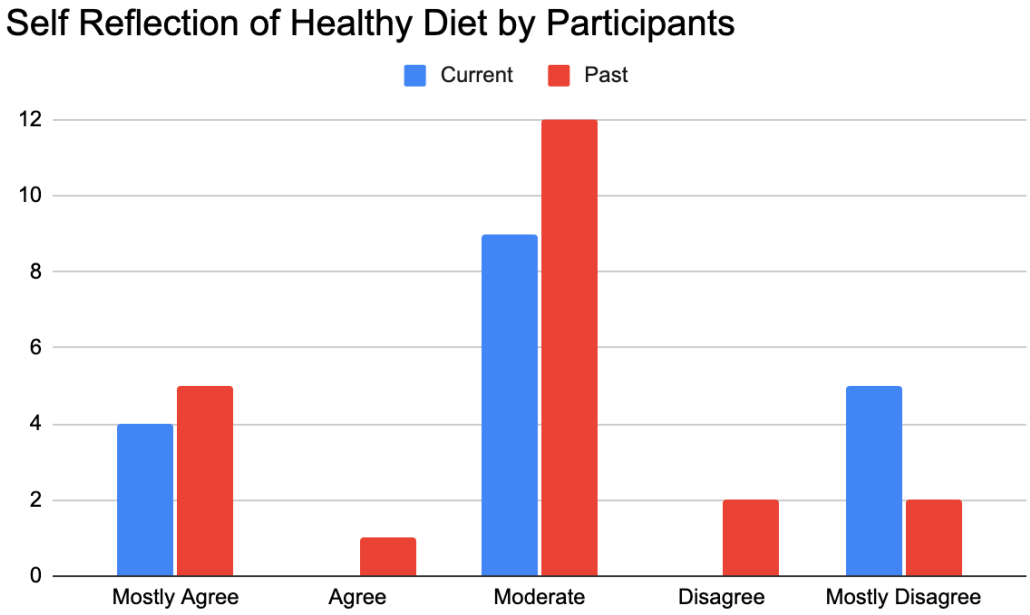
After the results and data collection finished, the data was directly converted into a Google Sheet. This allowed for viewing all the results in one spreadsheet to analyze and review data.

Results and Analysis

A Chi-Square test was optimal in order to evaluate the differences between the previous night shift nurses and the current ones. As I had two groups of participants, past and current nurses, it was important to analyze them together with the Chi-Square test. The Chi-Square calculator allowed me to collect the P-Value for each data set from the questionnaire questions (Chi-Square Calculator, 2021). The P-Value is the probability of an event occurring based on specific and set components. I chose the most important questions from the questionnaire to evaluate. As there was a method limitation regarding the number of participants and how the questionnaire was distributed, there were 43 respondents. Three of said respondents happened to not be a nurse or because of snowball sampling, participants sent the email and questionnaire to someone who was not eligible for the study. Therefore, there were a total of 40 plausible responses from the participants.

Figure 2

Would you say that you eat healthily?



This graph shows the participant's responses to the question "Would you say you eat healthily?" This was a Likert-scale formatted question, asked to evaluate the self-reflection of the nurses from both the past and current night shift groups. Likert-scale formatted questions range from "mostly agree to mostly disagree" or scales such as that which provide a range of answers instead of the popular "yes or no" multiple choice option (Darity Jr., 2008). Overall, the majority of participants chose "moderate" in both groups. The choices "agree" and "disagree" had the least amount of responses, and they were only from past night shift nurses. More current night shift nurses, as represented by the blue bar, chose "mostly disagree" as compared to the "mostly agree" option. Meanwhile, the past night shift nurses represented by the red bar chose the "mostly agree" rather than the "mostly disagree" option. Figure 2 shows that the majority of current night shift nurses reported having moderate to poor diets, and the majority of past night shift nurses had a moderate to satisfactory diet. The Chi-square test reported a P-Value of 0.346. While this result is not statistically significant, the results are trending in the direction that current night shift nurses have worsened diets than the past night shift nurses.

Figure 3

Has the amount of sugar intake in your diet increased since working the night shift?

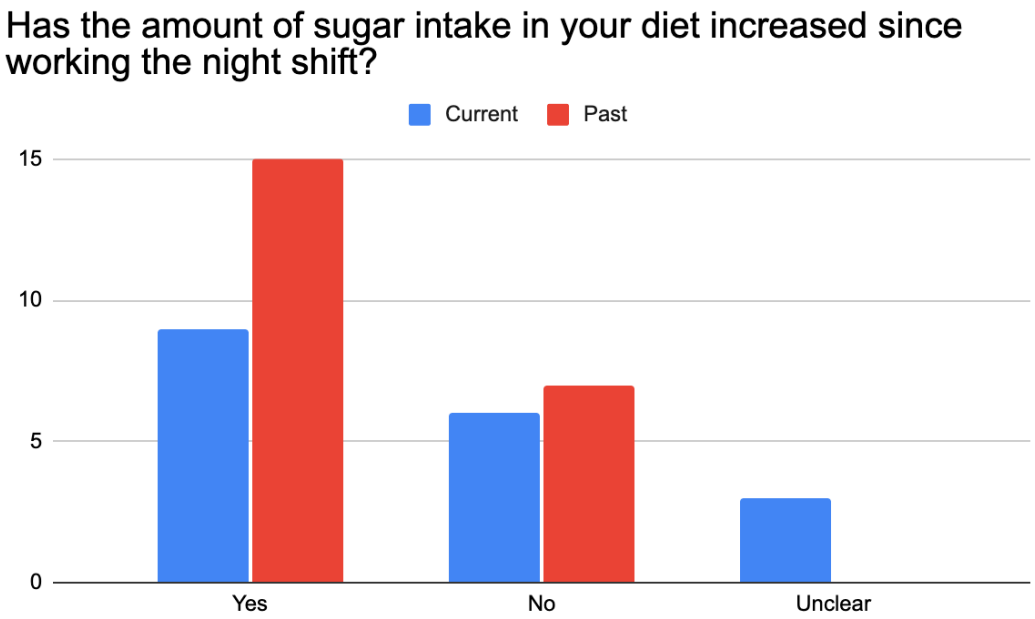
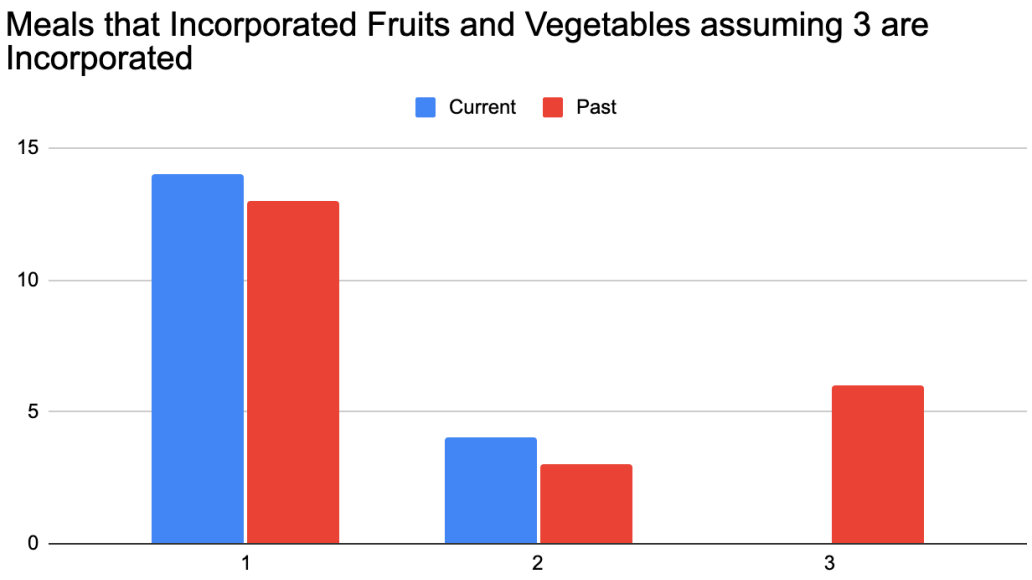


Figure 3 shows the participants' responses when asked about sugar intake. The "unclear" option was included in the graph because this question allowed for free response. A few participants from the current night shift nurses group did not answer the question in a way for me to group them into a "yes" or "no" for the organizational process. Both groups reported that their sugar intake had increased, more than that it had not. When the Chi-square test was run on this data set, the P-Value came out to be 0.121, meaning this is not significant. Although the majority of both groups reported an increase in sugar intake, there were only 40 participants, and this limitation may be a reason for the lack of statistical significance.

Figure 4

How many meals during a 24 hour period involve fruits and vegetables? (Assuming 3 meals are incorporated)



The graph shows the participants' responses to the question in Figure 4. Not a single current night shift nurse reported incorporating fruits and vegetables into three meals a day. The U.S. Department of Agriculture recommends that for each meal, fruits and vegetables take up at least half of your plate (What is MyPlate, 2011). The majority of current night shift nurses, specifically 14 participants, chose the option one meal a day, meaning one meal included fruits and vegetables. Two of the current night shift nurses chose that they ate two meals a day. For the past night shift nurses, thirteen reported eating one meal a day, three participants reported two meals a day, and six participants reported incorporating fruits and vegetables in three meals a day. Figure 4 shows how unbalanced the current night shift nurses' daily meals are, and provides evidence that while both groups of participants do struggle to incorporate fruits and vegetables, current night shift nurses have a harder time adding in these integral components in their meals. The article "Most Americans don't Eat Enough Fruits and Vegetables" from the Harvard Medical School, of *Harvard Health Publishing*, warns that not eating enough of these foods leads to heart disease, diabetes, and a variety of different cancers (Most Americans don't Eat Enough Fruits and Vegetables, 2018). The diets reported by participants overall did not include enough of the fruits and vegetables meaning possible implications of cancer, heart disease, and diabetes are at much higher risk.

Participants were chosen to illustrate the responses of those who represent many nurses. Participant number four reported having a very unhealthy diet when asked how healthily they felt they ate. This was a Likert scale formatted question, and participant number four chose "mostly disagree" meaning they felt they had the worst diet and dietary habits. Participant number seven disclosed that they ate for convenience rather than for health. Number seven also proclaimed they lost over 60 pounds after leaving the night shift. Number seven felt their motivation had increased when eating during the day and that their metabolism did better. Participant number seven also prioritized exercising five days a week after leaving the night shift because of their extra energy and boost in metabolism. Participant number twenty lost 32 pounds after leaving the night shift and included that they were able to snack less because of the reduced cravings. Number twenty said that the foods accessible to them were "sweets" and "junk foods." Participant number ten reported an increase in sugar because they craved chips, candy, and pop. Number ten, a current night shift nurse, said that they never wanted salad or vegetables because they had cravings for warm, filling, and unhealthy foods.

Participant number three, a past night shift nurse, even said that their job performance was worse, they had a slower recall, they were very forgetful, irritable, tired, and filled up on carbohydrates full of calories. Number three also reported a decrease in the amount of sleep they got when on the night shift, before the night shift they got eight to twelve hours of sleep after they were only able to get four to eight. Participant number three said that their diet was horrible, and they said they felt like "garbage" and that they were "gross." Participant number twenty-three, also a past night shift nurse, had an extreme decrease in the amount of time they were able to sleep. They went from sleeping eight to twelve hours to only sleeping one to four hours in a twenty-four-hour period. Number twenty-three said, "eating at 3 am is not healthy." They felt the night shift impacted their food choices in a very negative way. The hospital cafeteria was closed at night, therefore, they were forced to either bring their own food or get take out. Participant number twenty-three said that take-out was often the easiest and most convenient method for feeding themselves during the night shift.

Participants four, seven, twenty, ten, three, and twenty-three represent nurses across the board. These nurses have reported horrifying experiences that greatly changed their quality of life and their overall health. As I only had 40 participants total, statistical significance was hard to come by, but the evidence suggests that the night shift negatively impacts the health and diets of many nurses. As these personal testimonies are a glance of the bigger picture, more needs to be done to help night shift nurses.

Conclusion

Throughout the research process, the results have shown that while many kinds of nurses have diet struggles, night shift nurses have the disadvantages of long hours, night shift, and having an overall stressful profession that all impact diet and health. While aiming to research night shift nurses, much information about day shift and other shifts was included in the data collection. Not only do the night shift nurses struggle as I hypothesized, but many nurses do, and this can be due to the stress of the job as well as the challenging factors previously discussed. After a critical analysis of the data, I have concluded that night shift nurses have worsened diets and health as compared to other shifts. The results show that the current night shift nurses have increased levels of sugar, worsened diets, and do not consume enough nutritious fruits and vegetables to maintain a healthy lifestyle. To answer the research question prompted: Night shift nursing shows trends of negative implications in the diet realm of a person's life.

Overall limitations of my research included lack of access to any medical testing on participants, as I am a student researcher in high school, I did not have the ability to run any tests. I could not test BMI, weigh the participants, collect bloodwork, or conduct any sort of human contact medical testing. If I was able to assess the participant's health in such a way, there would be less room for error and bias. The data collected in my implemented method was self-reflection-based and left room for error in the data collection. If a participant wanted to fabricate or lie about their answer choice, they were able to do so. Medical testing would be a more efficient way of evaluating health and diet because of its accuracy and validity.

Nurses will always be needed around the clock in the medical field; although there are negative implications of working the night shift, it is a necessary evil. Hospitals may now see a new perspective on the dietary damage their nurses endure due to these findings, and therefore might consider reducing hours to promote a healthier lifestyle. As previously discussed, long hours and the night shift combined are extremely detrimental to the nurses. Reducing the hours that each individual works would allow for them to rest more and not be awake at night as long, therefore reducing the harmful effects of changing the natural light-dark circadian rhythm. Because there is so much work to be done as a nurse, there is seemingly not enough time to prepare and consume healthy meals; the findings suggest that adding to the nursing staff would be beneficial, promoting self-care and individual health. The struggles shown with nutrition intake and inability to eat healthily shown by the Figures above suggest that having more nursing staff may allow for dietary ease in an individual. Having more nurses work each night shift would decrease the emergent situations an individual has throughout the night. As many reported, they were constantly pulled from their breakroom to a patient emergency and were unable to have full meals. The quick and unhealthy snacks were the only foods they

were able to fit in. If hospitals had more nurses on each shift, especially overnight, there would less work and less responsibility for each individual. Meaning they would have more time to nourish themselves in between tasks, have the time to prepare or make food for themselves, and have time to rest or use the restroom. These may sound like normal tasks, but because of the constant urgency associated with nursing, nurses oftentimes were unable to do these tasks. Therefore, having more nurses work the night shift, or shortening the hours for the night shift nurses would perhaps allow for them to take the time to care for themselves and improve their overall health.

Future work in the field could include a combination of a questionnaire and medical testing. As I was only able to study the nurses through a questionnaire platform, I was limited to the responses digitally, and I was unable to perform medical testing of any kind. Bloodwork tests and cholesterol tests would pair well with future work on night shift nurses' diets and bodies. This would further the validity and importance of the experiments being done to evaluate how the night shift truly affects human bodies and their biological processes. As medical testing was a limitation for me, future researchers that have access to the resources to perform such tests can utilize those resources. It would be beneficial to hospitals, employers, and nurses around the world, to provide facts to encourage better health.

When the research journey began, I wanted to read first-hand stories of real night shift nurses, but so much more had been discovered in the process. Night shift nurses do have worsened diets and have a hard time maintaining a healthy lifestyle. Not only that, but past night shift nurses and those who have moved to other shifts were able to report that their health had improved after working the night shift. With the range of perspectives in the sample population, I was able to explore the differences between the perspectives of the current and past night shift nurses. As the majority of the nurses overall had a harder time with their diet because of their occupation, the night shift nurses reported having an especially difficult time. Hopefully, this study will be able to help those saving lives daily, and nightly. The goal of this research journey was to evaluate and study nurses as I have aspired to be one for years. Nurses heal and help people every day, and these findings can help them heal their bodies and aid them in helping themselves while continuing to help others.

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