

Surviving the Shift: A Practical Handbook for Night Shift Healthcare Workers

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HONR 499: Senior Honors Thesis

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Fall 2024

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Project Overview

“Surviving the Shift: A Practical Handbook for Night Shift Healthcare Workers” is a comprehensive guidebook that provides information and guidance to those struggling with the lifestyle of night shift. It serves to highlight the adversity that healthcare workers face while working night shift. While examining extensive, peer-reviewed research, I focused on eight problematic topics associated with working night shift including sleep disruptions, diet and nutrition, exercise, gastrointestinal problems, cardiovascular disease, type 2 diabetes, hormonal imbalances, and social isolation. To select these topics, I familiarized myself with general research on night shift and compiled a list of the recurring issues workers face. In my digital guidebook, I introduced each topic, included scientific research, and defined important terms and concepts. Additionally, I critically analyzed the role of night shift in amplifying these common problems. By interpreting this scientific information as it related directly to night shift workers, I formulated a list with several tips to combat the negative impacts. At the close of my guidebook, I provided benefits of night shift, a sample 24-hour routine, as well as an interview with a registered nurse. Through all of this research and construction of my Honors Thesis, I determined that the underlying culprit for most of the physical and mental issues linked to night shift is the disruption to the body’s circadian rhythm.

Significance of the Topic

This topic stood out to me due to the growing importance of night shift work in healthcare. Shift work is essential in today's world, and it is reported that 12% to 13% of the workforce in North America falls on a rotating or regular night shift schedule. Night and day shifts, although immensely different, are of equal importance. Oftentimes, the sacrifices night shift workers take to care for patients while the majority of those around them sleep are overlooked. The glaring issue responsible for the adverse health effects is the misalignment in circadian rhythm. It is widely known that shift work takes a toll on one's sleep schedule. The key issue, more importantly, lies in the misalignment between the body's natural circadian rhythm and the timing of the sleep/wake cycle (James, 2017). Nearly every metabolic function, such as hormonal processes, cognitive performance, and heart rate variability, is influenced by circadian timing which is controlled by light exposure (Boivin et al., 2022).

During my research, sleep disruption stuck out as a major factor that amplifies other health concerns. I referenced studies that reviewed how the circadian rhythm controls sleep and other metabolic processes and utilized them to scientifically bolster claims made by night shift workers. Since shift workers operate on opposite schedules, they often experience low quality sleep or none at all, leading to diminished metabolic, mental, and nervous system health (Salamon, 2023). For example, night shift workers often struggle to maintain a healthy diet due to unavailability of nutritious meals, lack of time, and hormonal disruptions (Bonnell et al., 2017). A recent study found that 27% of night shift healthcare workers lack sufficient time to eat during shifts lasting over eight consecutive hours, and nearly one-fifth report not having time to drink (Bouillon-Minois et al., 2022). This is certainly an issue and needs to be addressed in order to maintain and support the health of these essential night shift workers. In

turn, these sleep disruptions are associated with an increased risk of chronic health conditions, including cardiovascular diseases, diabetes, obesity, and mental health disorders such as anxiety and depression. Most of my research involved exploring literature reviews, as I found these to be applicable and comprehensive. For example, I referenced a study that analyzed the relationship between gastrointestinal disorders and shift work and ultimately found a link between the two (Knutsson & Bøggild, 2010). Furthermore, I was interested in discovering how exercise should be incorporated in night shift schedules. As a Health and Exercise Science major, I was able to draw on previous knowledge during my research on this topic. Not only is it crucial to understand when and what kind of exercise best suits night shift employees, but it was glaring in my research that exercise can lessen many of the negative problems such as depression, low self-esteem, and stress. It can also decrease night shift's amplifying impact on the risk for conditions such as cardiovascular disease or obesity (Mahindru et al., 2023).

From an occupational perspective, fatigue and cognitive impairment caused by night shift work can lead to reduced job performance, errors, and accidents, particularly in high-stakes professions like healthcare. Furthermore, these effects can extend beyond the workplace to influence the well-being of workers' personal lives and families. By understanding these negative effects, workers can implement strategies to mitigate them, optimize their shift schedules, and spread the awareness to those around them. This knowledge is essential for promoting healthier, safer, and more sustainable working conditions for night shift employees.

Steps in the Creative Process

I chose this topic for my Honors Thesis because I am deeply interested in healthcare and the duties of those working in this field. As a current healthcare worker and aspiring physician assistant, I will likely work night shifts in my future career, and I feel well-equipped to do so with the knowledge I have gained from completing this thesis. Furthermore, the detriments of night shift are glaring in the current world, and I strived to uncover the truth and acknowledge the sacrifices night shift workers take to care for and serve patients. Importantly, I was inspired by my older sister who is a registered nurse. Like most every new graduate nurse, she began her career working night shift. As I watched her navigate the ups and downs of her work, I realized there is a rich importance in understanding and appreciating the work that not many are willing to do.

As I decided what format to present my thesis in, I chose to display my research in the form of a creative digital guidebook rather than a research paper. A guidebook-style project serves as an effective bridge between strict, scientific information and digestible ideas that are relevant to the general public. I also wanted to intertwine visuals and figures into my writing to make it engaging. I found that a visual format was more engaging yet still professional and informative.

Beginning my creative process, I first needed to identify my target audience: night shift healthcare workers. I considered their knowledge level and reflected on their perspectives as much as possible. I then conducted extensive research on night shift in general. I ensured to choose subtopics that were pertinent yet common amongst this population. After compiling my research on each subject, I summarized the key concepts into an outline form. This helped me to decipher and filter through the most important information

to input into my digital guidebook. Along with this, I included ways to combat the proposed issue at the end of each subtopic to reiterate that there are remedies that workers can implement. Throughout my thesis, I made sure to use an active voice and explain topics in concise yet thorough writing. Furthermore, I incorporated photos, cartoons, and videos to make the format visually appealing. I also added colors, fonts, and keyword-rich headings to catch the eye and engage readers' attention.

One hindrance I ran into while completing my Honors Thesis was how to encapsulate such complex and elaborate subjects into a page or two. The human body is vastly intricate, and the biological processes within it are multifaceted. Condensing an entire research review into a small paragraph was challenging, and it took patience and perseverance to seamlessly convey this. As I continued working, I developed a pattern to my research and the method in which I displayed it on my visual guidebook. I aimed to deliver the most relevant information in a way that links it to night shift specifically. Not all research studies had connecting information regarding night shift or particular solutions to the problems. This forced me to think critically and interpret the findings as they related to my specific thesis.

Relevance to Current Challenges

This Honors Thesis will serve not only myself but other healthcare workers as well. Although my target audience is mainly night shift healthcare workers, this thesis is also beneficial to those working a normal schedule. With the growing prevalence of night shift, it is crucial that the entire care team understands the different implications and experiences between day and night shift. As I have gained more knowledge on the true responsibilities of night shift workers, I have noticed that the problems and risks associated with night shift are often ignored. With social isolation, increased risk of health problems, and overall lack of sleep, people working these shifts are prone to putting themselves and their patients at risk. The broader context of my Honors Thesis serves to address these problems and provide comprehensive, scholarly research that can be utilized in the everyday lives of night shift workers. My goal was to bring these issues to light and acknowledge the hard work and struggles of working night shift. While developing my project, I sought to answer how people working night shift can stay healthy, happy, and efficient at their job.

It is obvious that night shift work is accompanied by a host of health problems such as cardiovascular disease and type 2 diabetes. These conditions become more prevalent in the current world with every passing year, so it is imperative to acknowledge the further increased risk night shift employees face. A recent scientific study found that shift work increased the risk of coronary heart disease (CHD) morbidity by 26% and increased the risk of CHD and cardiovascular disease mortality by about 20% (Torquati et al., 2018). With cardiovascular disease being the leading cause of death in the United States, we cannot overlook the risk factors associated with night shift work. This is especially relevant considering the fact that type 2 diabetes can further increase the risk for cardiovascular

disease. In female workers, the disrupted circadian rhythm can heavily impact hormone levels, unfortunately leading to a heightened risk of breast cancer or changes in reproductive abilities (Davis et al., 2012).

Aside from physical ailments, night shift employees are often plagued by mental health disorders and depressive feelings. I was not shocked to read that workers often do not get a true day off, as they spend most of their free days recovering from lack of sleep. I was surprised, however, to learn that there are exponentially more workplace or commuting accidents. Workers with shift work sleep disorder are 300% more likely to be involved in a crash or near-crash (Vitale et al., 2015). This is a glaring statistic that is not adequately recognized. Night shift workers, and healthcare workers in general, have important roles as caretakers. However, what I wished to convey in my project was that these employees need to be cared for as well. It is easy to overlook the issues and chalk them up to the expected stress of the career, but the issues are much more complex than that. Separation and asynchrony between the employee and their family or social life triggers disunity and strife between the work-life balance (Silva & Costa, 2023).

Impact and Personal Growth

Not only did my Honors Thesis allow me to increase my knowledge on the topic of night shift work, but it also inspired me to raise awareness regarding the adversity workers face. Even though I was familiar with the pressures of healthcare work, I did not fully understand the scope of the sacrifices made by those working night shift until constructing my project. Through my research and design, I deepened my understanding of the challenges faced by night shift workers and the necessity of advocating for their well-being. I gained insight into the societal and systemic factors that contribute to the challenges of night shift work. If more time was allotted for the project, one thing I would have included was how institutions or workplaces can realistically incorporate these strategies into their employee development programs. This would be beneficial because it could serve as a buffer between workers and management and bring awareness to the health of employees. Most importantly, this project helped me appreciate the importance of self-care and resilience for those in demanding work environments. I gained a deeper respect for night shift workers and better understand how they can be supported in their careers and personal lives. Personally, I became more mindful of my own health habits and how they are influenced by work schedules and stress.

Creating this project has also transformed my personal growth as a student. I learned how to synthesize research from multiple disciplines, including healthcare, psychology, and sociology, into a coherent and meaningful analysis that can be utilized by many. Also, I learned the importance of time management, as I balanced in-depth research with other academic and personal responsibilities. My thesis challenged me to stay disciplined and motivated over an extended period, a skill I will carry into future endeavors. I have done

many science-based projects in my college career, but this project stretched me to deepen my efforts and assume a different approach to my research. I developed strong critical thinking skills by analyzing complex data and contrasting different perspectives on the issue.

Additionally, I also became more adept at articulating complex ideas clearly and concisely through various formats of writing. By analyzing common issues and creating solutions to them, I practiced critical and creative thinking that I can draw back on in my future academic career. Overall, this thesis journey instilled in me a sense of purpose and confidence in my ability to contribute meaningfully to my chosen field.

SURVIVING THE SHIFT

A PRACTICAL HANDBOOK FOR NIGHT SHIFT HEALTHCARE WORKERS



Claire Clothier



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WELCOME TO THE NIGHT SHIFT

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As the sun sets and the world quiets down, healthcare facilities hum to life in a different way. Night shift workers have a unique set of challenges they are faced with, some of which threaten the draw of the pay differential.



This guidebook aims to provide an evidence-based framework for addressing the complexities involved with night shift healthcare work. It examines the physiological and psychological effects of disrupted sleep patterns, such as increased risk of fatigue-related errors, impaired cognitive function, and long-term health consequences. Additionally, it explores strategies to manage these risks effectively, including optimizing sleep hygiene, nutritional interventions, and techniques to sustain mental focus during extended hours of wakefulness.



In these pages, we'll tackle some key questions:

-How do you keep your physical and mental health resilient under constant pressure?

-What can you do to enhance your focus during long, quiet hours?

-How do you find time to recover and recharge when the demands never stop?

THE PROBLEM

Healthcare employees operating at night are exposed to unique challenges impacting their physical, mental, and emotional well-being.

Working outside the conventional nine-to-five routine disrupts the body's circadian rhythm. It can lead to chronic sleep deprivation, which is ultimately linked to increased stress and a host of health problems.



Furthermore, night shift workers are at a higher risk of workplace incidents and personal injury. It is crucial to understand how the demands of night shift work threaten the safety of both patients and providers.

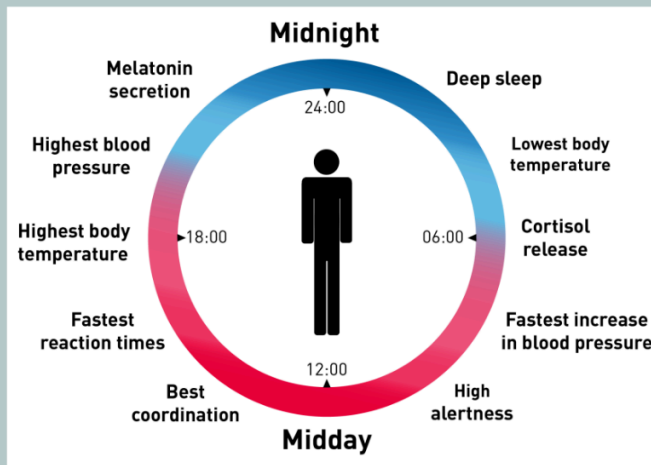
Compared to day shift healthcare workers, night shift workers have a 30% higher risk of making medical errors or having accidents on the job.

Understanding the toll that night shifts take on healthcare workers is necessary for acknowledging the broader implications on both workforce sustainability and patient outcomes.

CIRCADIAN RHYTHM

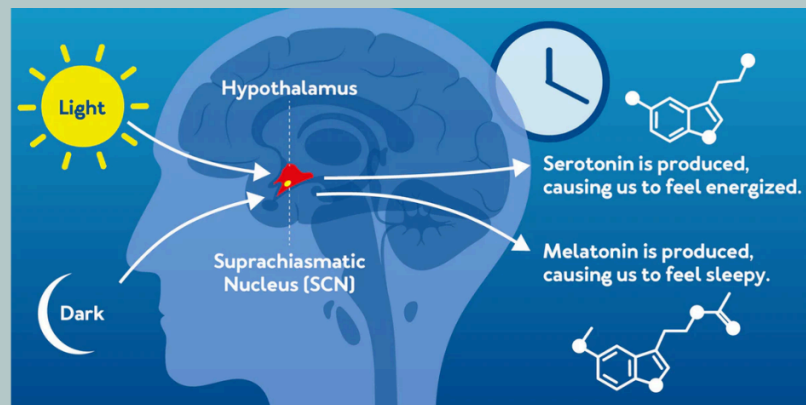
AKA "THE BODY'S INTERNAL CLOCK"

It is widely known that shift work takes a toll on one's sleep schedule. The key issue, more importantly, lies in the misalignment between the body's natural circadian rhythm and the timing of the sleep/wake cycle (James, 2017).



Circadian rhythm is the body's internal 24-hour clock that regulates various physiological processes including the sleep/wake cycle, hormone release, and metabolic processes. It does so by responding to environmental light changes.

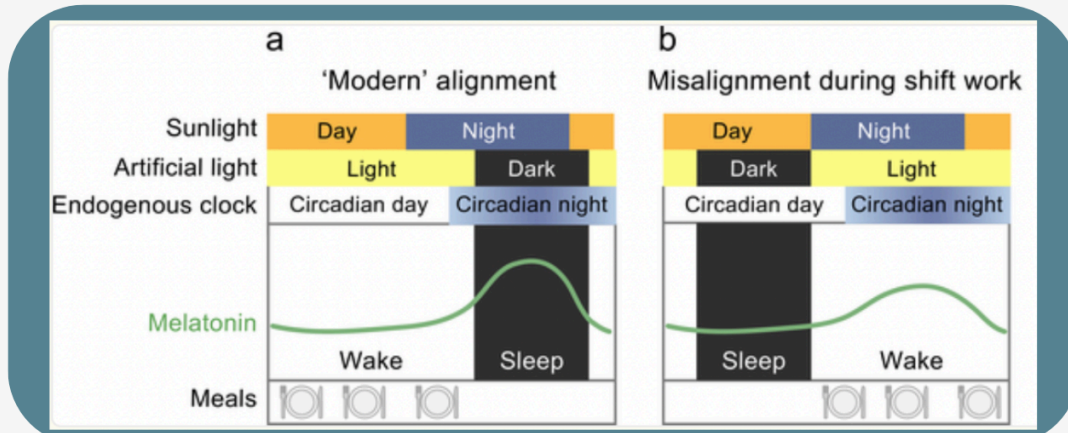
The master regulator of this system is the suprachiasmatic nucleus (SCN) located in the hypothalamus of the brain. It coordinates and properly times secretion of hormones like melatonin or serotonin to stimulate or inhibit sleep.



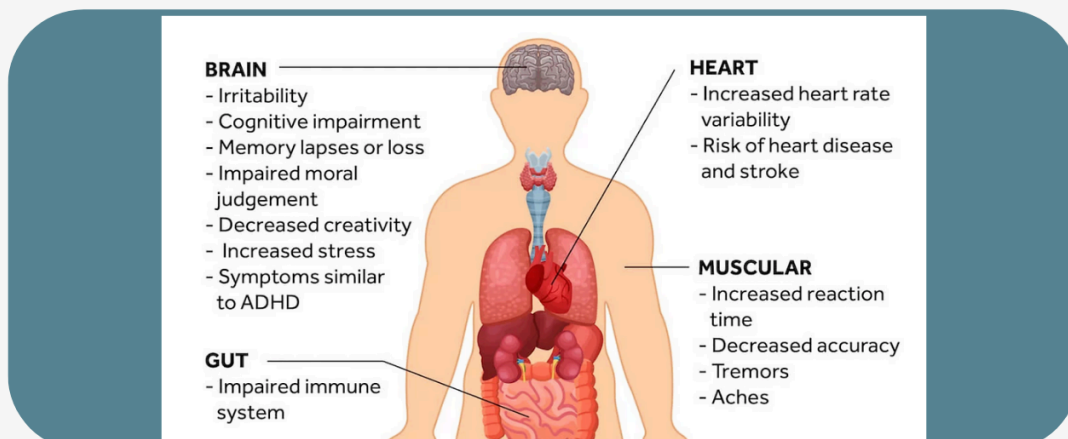
Cortisol, a vital hormone that responds to stress and metabolic processes, is greatly impacted by circadian misalignment. Abnormal cortisol levels can increase inflammation, heightening risks for chronic conditions like diabetes, certain cancers, and heart disease.

It is important to remember that these effects build off of each other. One disruption in the circadian rhythm can cause numerous other hormonal disruptions that affect digestion, endocrine function, immunity, and metabolism.

SLEEP DISRUPTIONS⁶



Under normal conditions, melatonin is released at night to induce sleep. Night shift workers experience abrupt changes to the natural sleep/wake cycle that can lead to a cycle of sleep deprivation and hormonal imbalance.



Normally, the circadian rhythm promotes alertness during the day and reduces it at night. However, night shift workers are awake when their circadian drives are low. This sleep/wake cycle is crucial for replenishing the body. Low quality or lack of sleep induced by night shifts can lead to diminished metabolic, mental, and heart health.

To combat this, workers should:

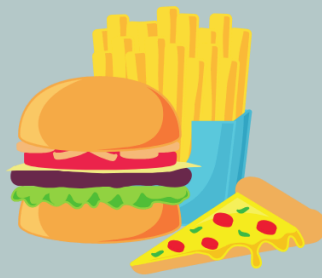
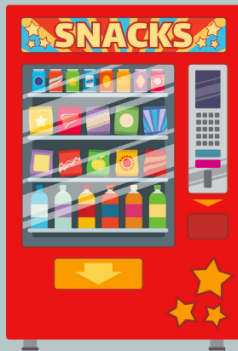
- Try to maintain a consistent sleep schedule
- Go to bed and wake up at the same time every day, even on days off if possible
- Create a sleep-conducive environment (blackout curtains, earplugs, noise machines)
- Reduce light exposure as much as possible until able to get to sleep at home
- Limit caffeine intake and avoid intake at least four to six hours before bed

DIET & NUTRITION ⁷

Shift workers, especially those on rotating schedules, have been found to snack more frequently and consume fewer healthier foods. The unavailability of preferred foods in the workplace, a lack of time, and a reduced desire to eat at night explain these findings.

A study conducted in 2022 revealed that compared to day shift workers, water consumption by night shift workers decreased by 16.7%. Furthermore, night shift had 8.7% lower carbohydrates, 17.6% proteins, and 18.7% lipids (Bouillon-Minois, 2022).

When you are tired, it is easy to reach for energy drinks or quick snacks high in carbohydrates rather than whole meals with lasting protein.



Not only this, but meal options are limited during these hours. This lack of selection often forces workers to eat snacks from vending machines, fast food, or simply no food at all.

As the body's circadian rhythm is disrupted, hormones like insulin, ghrelin, and leptin, which regulate blood sugar and appetite, are also disrupted.

Take a look at what happens when this schedule becomes misaligned:

- Ghrelin increases, stimulating hunger
- Leptin decreases, reducing satiety
- Insulin sensitivity and secretion decrease, leading to decreased glucose tolerance
 - This in turn can lead to an increased risk of type 2 diabetes and other metabolic disorders

To combat this, workers should:

- Plan and prepare balanced meals: lean proteins, complex carbohydrates, healthy fats to stay full for longer
- Stay hydrated and avoid excessive caffeine consumption during the shift
- Establish a consistent eating schedule to support circadian alignment: before, during, and after the shift

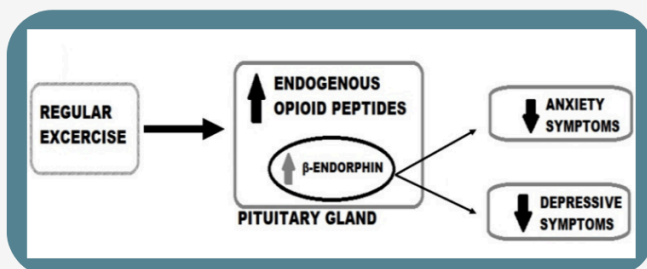
EXERCISE

One glaring issue for many night-shift workers is how to incorporate exercise into their daily routines. It can be difficult to muster the energy to exercise before or after a stressful shift, especially when not all exercise programs and gyms are accommodating of shift work.

Light- and moderate-intensity exercise has been proven to increase cognitive performance, vigilance, and reaction time compared to high-intensity exercise.



MENTAL HEALTH IMPROVEMENTS



Extensive research has proven that exercise reduces stress, promotes better quality sleep, and improves mental health. Regular physical activity lowers cortisol secretion, a major hormone responsible for stress. It also boosts mood by stimulating beta-endorphin secretion.

Improving workers' mental health and self-esteem will promote better workplace engagement and motivation to remain working long-term.

PHYSICAL HEALTH IMPROVEMENTS

Exercise reduces systemic inflammation throughout the body, and it lowers the risk of cardiovascular disease, type 2 diabetes, cancer, and osteoporosis. It does so by increasing HDL-to-LDL ratios, reducing blood pressure, and enhancing endothelial cell functions.



Night shift workers are at a higher risk for these diseases due to chronic stress and metabolic imbalance. All of these factors stem from a disrupted circadian rhythm.

IDEAS TO IMPLEMENT:



1. Stay physically active during your shift

- When you have a quick break, go for a walk around the unit to get your body moving
- Stand when you're charting and do some light stretching
- Take the stairs instead of the elevator

2. Find a community or buddy

- Grab a colleague and walk or do a light workout together
- Encourage each other and reframe fitness as self-care

3. Find the best time of day that works for you to exercise

- Before the shift, exercise boosts energy and alertness, reduces stress, and improves mood
- After the shift, exercise releases stress accumulated during work and promotes better sleep
 - Ex: 30-45 minutes of moderate cardio and 15-20 minutes of strength training

4. Keep it up on your off days

- It may be tempting only to prioritize sleep, but try to exercise in your free time
- Ex: 45-60 minutes of varied and enjoyable exercise

5. Join the Healthy Nurse, Healthy Nation® (HNN)

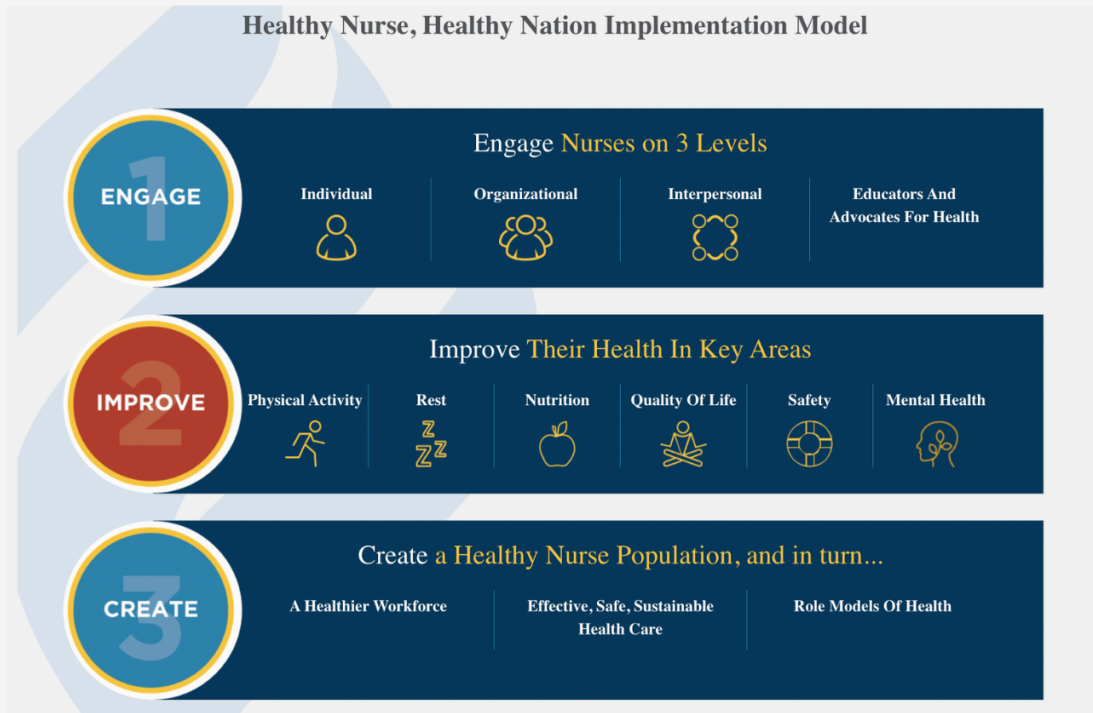
- A program of the American Nurses Association Enterprise designed to promote the well-being of nurses
- They provide information on physical activity, rest, nutrition, quality of life, safety, and mental health
- Join a blog, challenge, or post on their commitment wall to connect with other nurses

MORE ABOUT HEALTHY NURSE HEALTHY NATION

leading the way to better health

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Although HNN primarily targets nurses, other healthcare workers can benefit from their information. Their online platform is free to join and offers blogs, reports, discussion boards, and countless ways for workers to engage with each other.



HNN delivers spotlights on nurses who share tips on exercise, sleep, diet, and mental health.

REST: Aundrea Mills, BSN, RN, MHL

Aundrea prioritizes her bedtime routine by reading and disconnecting from electronics at least 30 minutes before bed.

“I’ve educated myself about sleep and how prioritizing it (regardless of shift) impacts our overall well-being.”



Nicole Vienneau, MSN, RN, NC-BC

Whether it’s cycling, resistance training, high-intensity interval training, yoga, or stretching, Nicole loves it all.

“Movement helps me get into my body and offers me space in my mind to be creative.”

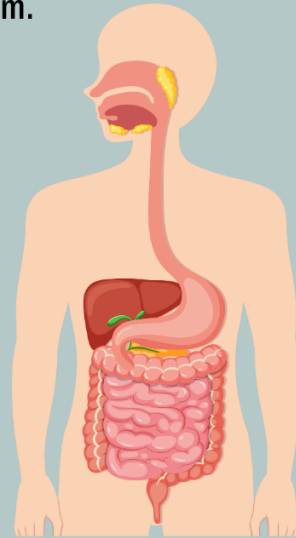


GASTROINTESTINAL PROBLEMS

Additionally, night shift workers report more gastrointestinal (GI) problems triggered by a disrupted circadian rhythm.

The body's circadian rhythm is an important regulator of:

- Digestive enzyme and acid secretion
- Absorption of nutrients
- Motility and peristalsis (involuntary muscle contractions to push food through the GI system)
- Immunologic barrier and the gut microbiome (helps control digestion and enhances immune system)



Typically, gut motility is higher during the day and lower at night.

Since shift workers eat at night, they have slower digestion, which can lead to symptoms such as bloating, constipation, or discomfort.



Disruptive sleep patterns can heighten the risk of GI problems like gastroesophageal reflux disease (GERD), irritable bowel syndrome (IBS), decreased intestinal immunity, and even increased risk of GI cancers.



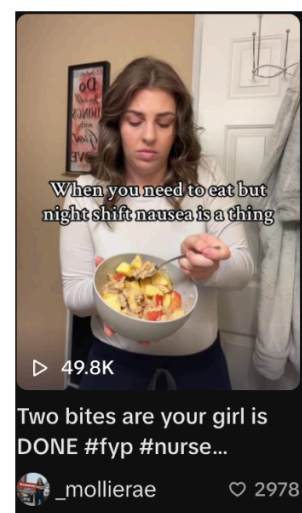
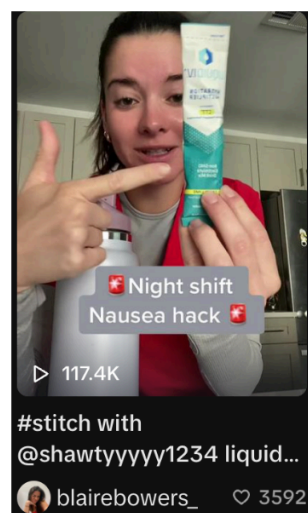
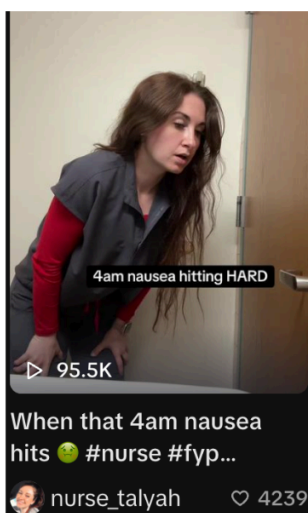
To combat this, workers should:

- Reduce stomach acidity by keeping nutritious food in the stomach frequently
- Limit spicy/fatty foods that are irritating or can cause heartburn
- Choose foods high in fiber and protein to promote motility and microbial health
- Stay hydrated to help reduce constipation and aid in digestion/absorption of food
- Do some light exercise to enhance motility

NIGHT SHIFT NAUSEA



It can be difficult to want to eat when you are experiencing nausea, so here are some tips for when you are plagued with what healthcare workers term “night shift nausea”:



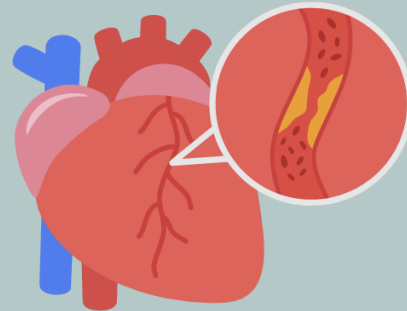
- **Try eating at a different time**
 - What works for one person might not work for you; it takes trial and error
- **Drink ginger tea or chew ginger to help alleviate nausea**
 - Its compounds can block serotonin receptors in the GI tract to reduce nausea
- **If possible, turn on bright lights during your shift**
 - Light exposure is a major influence on the GI/circadian rhythm
- **Sip water and avoid excessive caffeine intake**
 - Water with electrolytes can help relieve lightheadedness
- **Carry over-the-counter medications if necessary**
 - Medications like Dramamine help with nausea, and antacids help with heartburn

CARDIOVASCULAR DISEASE

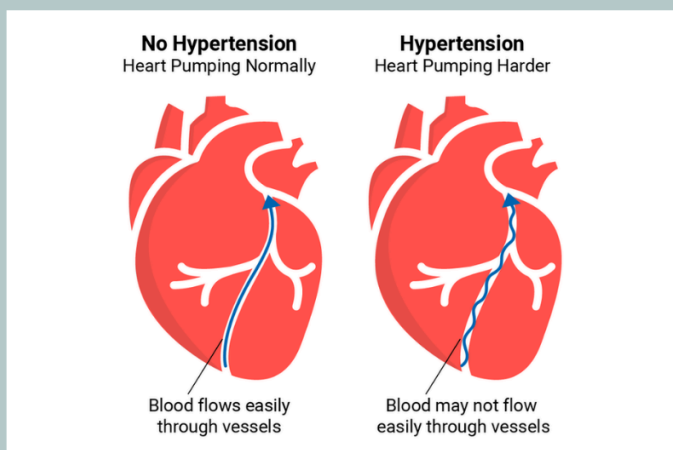
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As cardiovascular disease (CVD) is the leading cause of death in the United States, we must understand the toll it takes specifically on night shift workers. The risk for CVD is heightened by sedentariness, excess weight gain, hypertension, and poor diet, all of which can be factors of night shift work.

A recent meta-analysis found that shift work increased the risk of coronary heart disease (CHD) morbidity by 26% and increased the risk of CHD and CVD mortality by about 20%. Additionally, the risk of developing any CVD seemed to occur after the first five years of shift work, with a 7.1% increase for every five additional years (Torquati, 2018).



One key risk factor for CVD is hypertension (high blood pressure). Normally, blood pressure dips at night with the circadian rhythm to protect the heart and help it recover. Since night shift workers are awake during the night and often lose this dip in nocturnal blood pressure, they are at higher risk for hypertension because the heart doesn't get its nightly period of reduced workload.



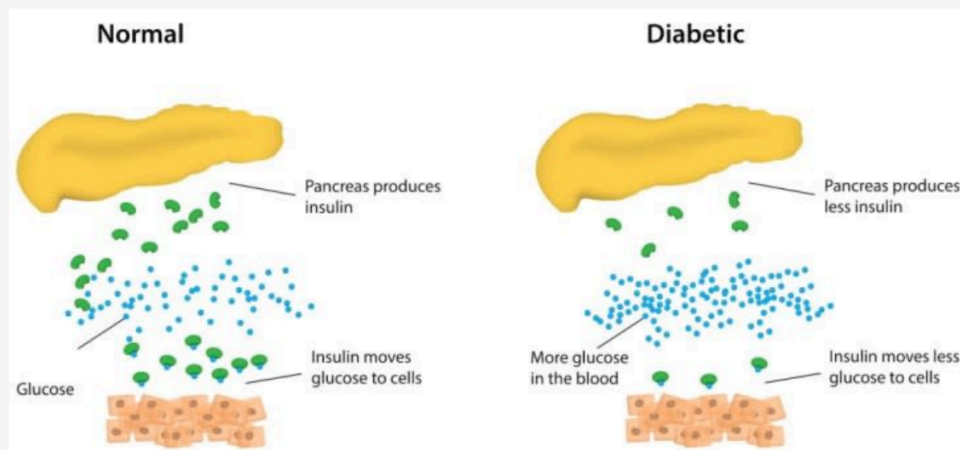
Aside from these factors, occupational stress and chronic fatigue associated with night shift can increase inflammation and oxidative stress, damaging blood vessel linings and potentially causing atherosclerosis (buildup of fatty plaque in arteries). Cortisol levels typically increase with stress, leading to insulin resistance and fat buildup, both of which are risk factors for CVD.

To combat this, workers should:

- Follow a heart-healthy diet: lean protein, healthy fats
- Manage stress with relaxation techniques/exercise to lower chronic high cortisol levels
- Monitor blood pressure and heart health to detect early signs of CVD
- Follow a consistent sleep schedule when possible to allow restoration of heart health

TYPE 2 DIABETES

Similar to CVD, the prevalence of type 2 diabetes mellitus (T2DM) is proliferating in the world. This disease occurs when the pancreas does not produce enough insulin, causing improper or impaired glucose uptake and high blood glucose.



Research has indicated that shift workers often have higher levels of a biomarker for T2DM called Retinol Binding Protein 4 (RBP4). Excess RBP4 can diminish glucose uptake by beta cells in the pancreas, ultimately impairing glucose tolerance, decreasing insulin sensitivity, and increasing the risk for T2DM (Wang, 2023).

The lifestyle of shift work is accompanied by many factors that influence T2DM. Workers must be aware and take necessary precautions to mitigate the risk due to disturbances in the normal biological rhythm, sleep, diet, exercise habits, and normal glucose/lipid metabolism.



To combat this, workers should:

- Regulate your blood sugar properly: don't eat carbohydrate-heavy meals that spike blood pressure and reduce satiety
- Don't skip out on eating altogether: consider time-restricted eating
 - If your blood sugar remains too high, limit food intake to an 8-12 hour window
- Exercise regularly to manage weight gain

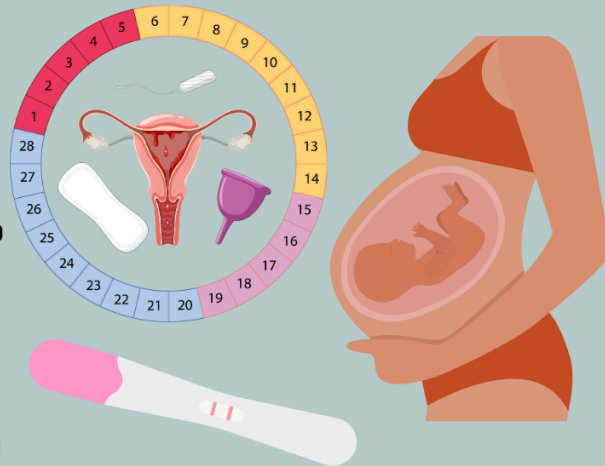
HORMONAL IMBALANCES

As previously mentioned, a disrupted circadian rhythm lends its way to a multitude of hormonal imbalances related to metabolism, stress, and reproduction. This is specifically imperative for female health, as fertility, pregnancy, and menstruation can be affected with shift work.

IMPACT ON FEMALE HORMONES

Compared to day workers, night workers (both male and female) often have increased levels of androgens and progestagens. For women, this translates to varied estrogen and progesterone levels.

Additionally, luteinizing hormone (LH) and follicle-stimulating hormone (FSH) levels can be affected, causing irregular ovulation or menstrual cycles.



IMPACT ON MENSTRUATION

- **Progesterone:** prepares and thickens the endometrium of the uterus to prepare for implantation
 - Low levels can prevent the uterine lining from developing adequately for embryo implantation
- **Estrogen:** regulates menstrual cycle
 - Low levels can have the same effect as low progesterone; high levels can increase the risk for polycystic ovary syndrome (PCOS), endometriosis, or uterine cancer
- **Inconsistent ovulation:**
 - Can decrease conception chances

IMPACT ON FERTILITY/PREGNANCY

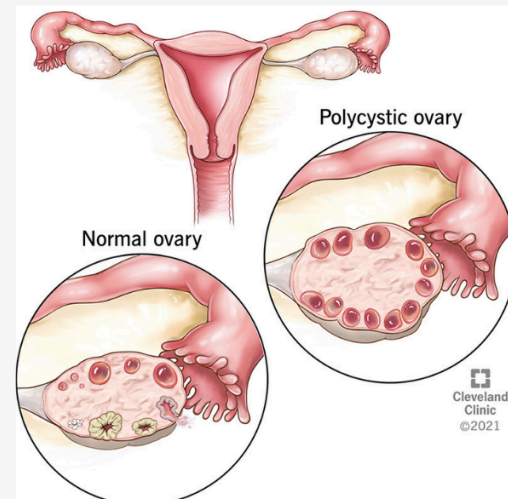
- Women working night shift are more likely to have fertility issues than day shift workers
- Women who are pregnant and work night shift are at a higher risk for adverse outcomes such as preterm birth, low birth weight, and miscarriage
 - This is often due to poor diet, chronic exhaustion, and circadian misalignment affecting metabolic processes

HORMONAL DISORDERS ¹⁶

The variability in female reproductive hormones such as estrogen and progesterone due to the lifestyle of night shift work could be linked to various hormonal disorders and cancers.

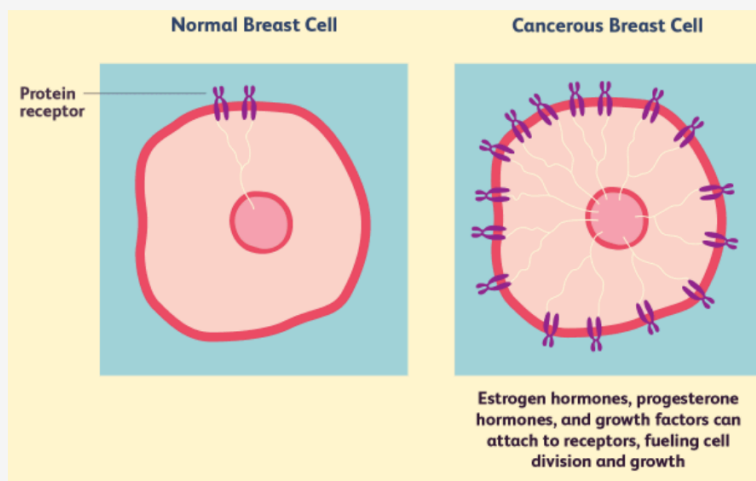
Polycystic Ovary Syndrome (PCOS):

- Ovaries produce excess androgens, causing irregular or no ovulation
- Small follicle cysts (fluid-filled sacs with immature eggs) may be visible on ovaries
- Chronic high cortisol levels and misaligned circadian rhythm can exacerbate these symptoms
- Increased insulin resistance can also contribute to PCOS symptoms



Ways to combat this:

- Hormonal birth control to regulate hormone levels and menstrual cycle
- Insulin-sensitizing medications to help the body process insulin
- Lifestyle changes or supplements to benefit diet, exercise, and sleep consistency



Breast Cancer:

- Cells in the breast mutate, proliferate, and form malignant tumors
- Excess estrogen is linked to a higher risk of breast cancer
- Some types of breast cancers are hormone-dependent
 - They have receptors that bind to estrogen and allow cells to multiply

Ways to combat this:

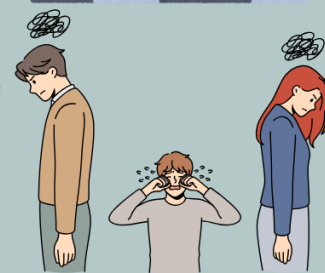
- Be aware and take precautions through routine check-ups
- Hormone therapy to stop estrogen fueling cancer cells to proliferate
- Lifestyle changes regarding diet, exercise, and sleep consistency

SOCIAL ISOLATION ¹⁷

Outside of work, night shift employees are often socially isolated, as they are on an opposite schedule from their friends and family.

A recent research study identified these problems among their participants (Vitale, 2015):

1. **The 'day off' after work is not a true 'day off'**
 - Participants found they needed to spend their day off recovering
 - They described it as a "wasted day" due to a lack of energy even after sleeping
2. **Participants often sacrifice sleep for social interactions**
 - Parents often sacrificed sleep to take care of children or to be there for familial functions
 - Others said they skipped sleeping to join daytime plans with friends that they would otherwise miss out on
3. **There are higher safety risks on the drive home from work**
 - The risk of falling asleep while driving is high; participants reported having to listen to loud radio or stay on a phone call
 - Workers with shift work sleep disorder are 300% more likely to be involved in a crash or near-crash
4. **Participants report higher levels of social isolation/fatigue**
 - Workers inevitably miss out on traditional schedules with friends or family
 - When they did make it to social functions, they reported reduced energy and motivation to socialize
5. **Participants experience strain on relationships**
 - Familial/friend/marital relationships suffer because of the opposite schedules
6. **Poor health from night shift affects self-esteem**
 - Weight gain, lack of exercise, and health concerns can take a toll on personal confidence and self-worth



To combat this, workers should:

- Schedule self-care on your days off: massage, workout, social plans with friends
- Understand that sometimes sleep is more of a priority than a social gathering
- Don't bring work stress home: take time to decompress with exercise/talking with coworkers
- Arrange social plans that work for you, even if they are brief
- Don't be hesitant to communicate what you need to loved ones for support

BENEFITS OF NIGHT SHIFT ¹⁸

After examining some negative factors associated with night shift work, it is equally important to recognize its benefits and value. Mental health plays into almost every one of these topics, so reframing one's views toward shift work can help lessen the negatives.

For some, working night shift allows for increased flexibility with their families. Some parents prefer working at night to be present with family when they wake up after their shift. Also, some benefit from working an opposite schedule than their spouse to take care of children.



Additionally, night shift is often slower paced and there are fewer resources and staff available for help. Thus, healthcare workers working night shift have more opportunities for independent learning.

The pay differential is a big draw for many night shift workers. According to the United States Department of Commerce, night shift workers are compensated for their basic pay plus a pay differential amounting to 10% of their rate of basic pay.



Because of the slower pace, night shift healthcare workers can deliver care that is not rushed, as they have more time to care for patients without the hustle and bustle of day shift.

SAMPLE 24-HOUR ROUTINE

Example routine for those working a 12-hour shift from 7:00 PM to 7:00 AM

8:00 AM – 3:00 PM: Sleep

- Implement a quiet, dark, & cool environment to promote deep sleep (can use blackout curtains, earplugs, or a white noise machine)
- If you feel hungry, have a light snack before getting in bed
- Aim for 7-8 hours of sleep if possible



3:00 PM – 4:00 PM: Wake Up & Light Snack

- Eat a light, protein-rich snack
- Too heavy of meals upon waking can cause sluggishness



4:00 PM – 5:00 PM: Get a Quick Workout In

- Engage in light to moderate exercise like walking, yoga, running, or a short strength training session
- Exercise can boost energy, improve mood, & kickstart your metabolism before your shift



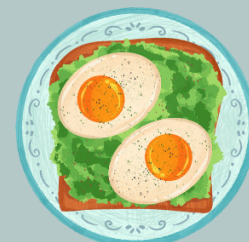
5:00 PM – 5:30 PM: Meal Prep and Relax

- Pack healthy & sustainable meals/snacks for your shift ahead of time to avoid relying on unhealthy options
- Ex: grilled chicken salad, yogurt, nuts, egg bites
- Take a few minutes to relax & decompress before leaving



5:30 PM – 6:30 PM: Eat Dinner/Breakfast

- Eat a balanced meal with protein, complex carbs, & healthy fats to help stabilize metabolism & prevent blood sugar spikes
- Ex (dinner): grilled chicken, quinoa, & vegetables
- Ex (breakfast): eggs, avocado toast, fruit



6:30 PM – 7:00 PM: Commute to Work

- Make sure you are fully awake and alert before heading out
- Consider listening to upbeat music or a podcast to stay focused



CONTINUED

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7:00 PM – 8:00 PM: Begin Your Shift

- Get your blood flowing with a quick stretch or walk (take the stairs instead of the elevator!)
- Try not to rely on caffeine but if you want it, drink it toward the beginning of your shift



9:00 PM – 9:15 PM: First Break/Snack

- Eat a light, energy-sustaining snack & drink water
- Ex: a handful of nuts, a protein bar, or veggies with hummus
- Avoid sugary snacks that can spike blood sugar



11:00 PM – 11:15 PM: Quick Stretch/Walk

- Use this break to stretch, take a short walk, or eat a snack if you have not had time
- If you are charting, stand instead of sitting to get your muscles activated



12:30 AM – 1:00 AM: Mid-Shift Meal

- Try not to skip out on a meal, even if you are feeling nauseous (ginger tea or electrolytes can help)
- Remember, a balanced meal should include lean protein, whole grains, & vegetables



2:30 AM – 2:45 AM: Mental Break

- If you have downtime, take a quick mental break (especially if you are feeling stressed or down)
- Talk to a coworker



4:00 AM – 4:15 AM: Final Snack/Break

- If you feel hungry, eat a healthy snack & drink water
- Don't let yourself get hypoglycemic before you decide to eat

7:00 AM – 7:30 AM: End of Shift & Commute Home

- Listen to music, a podcast, or make a phone call if you feel like you might fall asleep to avoid accidents
- Avoid caffeine, even if you are having trouble staying awake



7:30 AM – 8:00 AM: Light Snack & Unwind

- If your sleep might be disrupted by hunger, have a snack & hydrate with water before going to bed
- Shower & complete your self-care routine to relax (read a book, listen to calming music, or meditate)



Q&A WITH AN REGISTERED NURSE



Emma Zuniga, a pediatric oncology nurse at Children's Hospital Colorado, shares her own experiences, advice, and knowledge regarding night shift

Q: What did your typical schedule look like when you worked night shift?

A: "The first day before night shift, I stayed up super late and slept in as long as possible, usually around 11:00 AM. Then I would go to the gym, eat breakfast, meal prep, and leave for work. Between shifts I'd come home and immediately shower and go straight to bed, wake up around 3:00 PM, and repeat my before-work routine."

Q: What strategies did you utilize to stay focused and alert at work?

A: "I unfortunately consumed a lot of caffeine, like coffee and energy drinks. I'd try not to pack a heavy meal or snacks that would make me crash. After I took my lunch around 2:00 AM, I'd walk laps or talk to my coworkers for the rest of lunch."

Q: What did you struggle with most (physically or mentally), and how did you cope?

A: "The biggest thing I struggled with was not feeling awake after my shifts, I felt like I was a zombie walking around. Getting blackout curtains and sleeping with a fan really helped. I'd stop drinking caffeine by around 2:00 AM, and I'd try to stack my three shifts in a row so I had the longest amount of days off as possible."

Q: How did you balance your personal life with the demands of a night shift schedule?

A: "Know when to say no. It's ok if you have to reschedule events if you're too tired. I think setting expectations with your roommates or whoever you live with about your sleep schedule is important. Communicate when you need to sleep so the house can be quiet."

Q: Since most new graduate nurses start on night shift, what is your biggest piece of advice for them to be successful?

A: "Play around with routines to find what works for you because not everyone is the same, and don't expect to feel great right away. Your body will get used to it and the schedule will get easier. There are a lot of great things about night shift, like the type of patient care and the pay raise. And if it doesn't work, know that it's temporary."

**“Surviving the Shift: A Practical Handbook for Night
Shift Healthcare Workers”**

CLAIRE CLOTHIER

Health and Exercise Science, Sports Medicine
Colorado State University Honors Program
Senior Honors Thesis

Adviser: Pamela Vaughan Knaus
Committee Member: Rick Perry

Annotated Bibliography

About HNHN. Healthy Nurse Healthy Nation. (n.d.).

<https://www.healthynursehealthynation.org/about/about-hnhn/>

On this webpage, there is useful information about the organization Healthy Nurse Healthy Nation, which is a part of the American Nurses Association Enterprise. It includes their mission, goals, implementation model, and annual report. One who is looking for general information about this institution would benefit from this website because it provides valuable information directly from the source. It summarizes six key areas of interest for nurse health: physical activity, rest, nutrition, quality of life, safety, and mental health.

Boivin, D. B., Boudreau, P., & Kosmadopoulos, A. (2022, February). Disturbance of the Circadian System in Shift Work and Its Health Impact. *Journal of biological rhythms*, 37(1), 3–28. <https://doi.org/10.1177/07487304211064218>

This journal provides fundamental information regarding the effects of shift work on sleep/wake cycles, and it discusses the potential impacts on those working in a clinical setting. Importantly, it delivers key facts about the endogenous circadian rhythm and how it changes with shift work. Another helpful feature of this source is its inclusion of how physical and mental health is impacted with shift work. It is used in this thesis to introduce the underlying problem with circadian misalignment and promote awareness amongst night shift healthcare professionals.

Bonnell, E. K., Huggins, C. E., Huggins, C. T., McCaffrey, T. A., Palermo, C., & Bonham, M. P. (2017, February 26). Influences on Dietary Choices During Day Versus Night

Shift in Shift Workers: A Mixed Methods Study. *Nutrients*, 9(3), 193.

<https://doi.org/10.3390/nu9030193>

This article presents a study exploring the various factors that play into the quality of diets in shift workers. It includes four overarching themes of participants that all contribute to shift employees consuming less healthy foods. Specifically, it pinpoints distinct problems seen in night shift work that are not present in day shift work. The information is supported by statistics and delivers relevant scientific data that is summarized in this thesis to introduce a major health concern of night shift work.

Bouillon-Minois, J. B., Thivel, D., Croizier, C., Ajebo, É., Cambier, S., Boudet, G., Adeyemi, O. J., Ugbole, U. C., Bagheri, R., Vallet, G. T., Schmidt, J., Trousselard, M., & Dutheil, F. (2022, February 16). The Negative Impact of Night Shifts on Diet in Emergency Healthcare Workers. *Nutrients*, 14(4), 829.

<https://doi.org/10.3390/nu14040829>

This journal exhibits an observational study on the influence of night shift work on the diet of healthcare workers. It delivers key data about water consumption, carbohydrate, protein, and lipid intake and compares it to statistics of day shift workers. The comprehensive data included in this source is useful because it analyzes the 24-hour food intake of 184 emergency healthcare workers and ties it to potential implications for occupational health and job performance.

Davis, S., Mirick, D. K., Chen, C., & Stanczyk, F. Z. (2012, April). Night Shift Work and Hormone Levels in Women. *Cancer epidemiology, biomarkers & prevention: a publication of the American Association for Cancer Research, cosponsored by the*

American Society of Preventive Oncology, 21(4), 609–618.

<https://doi.org/10.1158/1055-9965.EPI-11-1128>

In this research article, the authors pose intriguing information regarding how night shift can impact female hormonal levels, thus increasing the risk for certain cancers and impacting reproductive levels. It includes the mechanism of melatonin and other reproductive hormones, which are impacted by circadian misalignment. Importantly, it is used in this thesis to highlight the need to perform more research and develop mitigation strategies for female night shift employees that are at an increased risk for breast cancer and other hormonal disorders.

Easton, D. F., Gupta, C. C., Vincent, G. E., & Ferguson, S. A. (2024, March 2). Move the Night Way: How can Physical Activity Facilitate Adaptation to Shift Work?.

Communications biology, 7(1), 259. <https://doi.org/10.1038/s42003-024-05962-8>

This peer-reviewed journal provides detailed information on the relationship between physical exercise and health issues brought upon by shift work. Its findings imperatively show that physical activity before, during, or after the shift can lessen some negative health symptoms. At the close of the article, there are numerous suggestions that workers can implement as well as a call to action for specific research that should be conducted. It is beneficial because it focuses on exercise, an adaptation that can increase many aspects of one's health.

James, S. M., Honn, K. A., Gaddameedhi, S., & Van Dongen, H. P. (2017, June). Shift Work: Disrupted Circadian Rhythms and Sleep—Implications for Health and Well-Being.

Current sleep medicine reports, 3(2), 104–112.

<https://doi.org/10.1007/s40675-017-0071-6>

This source exhibits the biological importance of circadian rhythm and emphasizes how misalignment can lead to various health issues. Specifically, it focuses on impacts to metabolic health, cancer risk, cardiovascular health, and mental health. It is beneficial to this thesis because it encapsulates several health implications and suggests potential countermeasures that can be taken to improve them.

Knutsson, A., & Bøggild, H. (2010, March). Gastrointestinal Disorders Among Shift Workers. *Scandinavian journal of work, environment & health*, 36(2), 85–95.
<https://doi.org/10.5271/sjweh.2897>

In this literature review, several studies are compared in which shift workers report gastrointestinal problems and diseases. Importantly, this source takes a deeper look into previously ignored symptoms in night shift employees. It serves as an example of a current study that pleads for health interventions for shift workers to improve their well-being. Furthermore, there is extensive information about which symptoms or diseases are most prevalent and why.

Mahindru, A., Patil, P., & Agrawal, V. (2023, January 7). Role of Physical Activity on Mental Health and Well-Being: A Review. *Cureus*, 15(1), e33475.
<https://doi.org/10.7759/cureus.33475>

This peer-reviewed article explores different mechanisms through which physical exercise can improve mental health such as neurochemical changes, stress reduction, and better quality sleep. Although it does not have a specific link to shift work, it delivers practical insights for healthcare professionals and individuals seeking to improve mental well-being through physical activity.

Martchenko, A., Martchenko, S. E., Biancolin, A. D., & Brubaker, P. L. (2020, December 1).

Circadian Rhythms and the Gastrointestinal Tract: Relationship to Metabolism and Gut Hormones. *Endocrinology*, *161*(12), bqaa167.

<https://doi.org/10.1210/endocr/bqaa167>

In this journal, there is extensive research on the circadian regulation of the gastrointestinal tract, specifically through hormone release. It also details relevant facts about the gastrointestinal barrier, intestinal immunity, digestion, and absorption. One thing that is helpful about this source is the information regarding how susceptible shift workers are to gastrointestinal complications due to their often lack of sleep and misaligned circadian rhythm. It serves as a testimony for the importance of bringing awareness to how these side effects can be improved.

Qian, J., Morris, C. J., Caputo, R., Garaulet, M., & Scheer, F. A. J. L. (2019, August). Ghrelin

Is Impacted by the Endogenous Circadian System and by Circadian Misalignment in Humans. *International journal of obesity (2005)*, *43*(8), 1644–1649.

<https://doi.org/10.1038/s41366-018-0208-9>

This peer-reviewed article elucidates the metabolic disruptions to the hormone ghrelin caused by disrupted circadian rhythms. It exemplifies the mechanisms of ghrelin and how vital it is in maintaining proper digestion and overall health. By linking the issues with night shift work, it explains how this imbalance can lead to increased ghrelin levels, overeating, and potential obesity. As mentioned in this thesis, there are interventions outlined in this source that can be applied but should be researched further.

Salamon, M. (2023, February 28). Shift Work Can Harm Sleep and Health: What Helps?.

Harvard Health.

<https://www.health.harvard.edu/blog/shift-work-can-harm-sleep-and-health-what-helps-202302282896>

This article is a scientific guide for those working night shift and explores ways to combat lack of quality sleep. It is beneficial for those looking for professional tips on how to get more or better sleep despite being on an opposite schedule. It incorporates reviews of scientific studies as well as expert commentary to add depth and relevance to the topic.

Silva, I., & Costa, D. (2023, May 12). Consequences of Shift Work and Night Work: A

Literature Review. *Healthcare (Basel, Switzerland)*, 11(10), 1410.

<https://doi.org/10.3390/healthcare11101410>

This journal is a review of literature regarding how night shift work impacts employee health, family life, and organizational context. Comprehensively, it examines various scientific studies that are all concerned with the overall well-being of night shift workers. One key aspect included in this source is the inclusion of the impact on family dynamics and social interactions. This is beneficial for this thesis because it proves there are more hindrances stemming from working night shift than just those to do with physical health.

Torquati, L., Mielke, G. I., Brown, W. J., & Kolbe-Alexander, T. (2018, May 1). Shift Work

and the Risk of Cardiovascular Disease. A Systematic Review and Meta-Analysis

Including Dose-Response Relationship. *Scandinavian journal of work, environment & health*, 44(3), 229–238. <https://doi.org/10.5271/sjweh.3700>

In this source, the authors display fundamental information regarding the increased risk of cardiovascular disease due to shift work schedules. It exemplifies the severity of these symptoms and shows that they cannot be overlooked. Uniquely, it provides a deeper look at whether the duration of shift work exposure and the risk of disease are connected. This is useful in this thesis because it highlights the next steps in creating workplace interventions and making this knowledge more widespread among workers.

Vitale, S. A., Varrone-Ganesh, J., & Vu, M. (2015, July 27). Nurses Working the Night Shift: Impact on Home, Family and Social Life. *Journal of Nursing Education and Practice*. <https://doi.org/10.5430/jnep.v5n10p70>

This article exposes how shift work truly affects social and familial aspects of healthcare employees, specifically nurses. Not only does it present health issues with sleep, diet, menstrual cycles, stress, anxiety, weight gain, workplace errors and driving accidents, but it equally discusses problems regarding self care and familial/social responsibilities. This source importantly uncovers that workers are not merely impacted during work, but they are also affected even in their free time. It is crucial to include in this thesis because it considers perspectives of workers.

Wang, L., Ma, Q., Fang, B., Su, Y., Lu, W., Liu, M., Li, X., Liu, J., & He, L. (2023, June 14). Shift Work Is Associated With an Increased Risk of Type 2 Diabetes and Elevated RBP4 Level: Cross Sectional Analysis From the OHSPIW Cohort Study. *BMC public health*, 23(1), 1139. <https://doi.org/10.1186/s12889-023-16091-y>

This peer-reviewed journal provides detailed information on how shift work specifically impacts the risk for type 2 diabetes. It describes insulin resistance as it

relates to Retinol binding protein 4 (RBP4) and how this could be a potential biomarker for assessing diabetes. Additionally, it includes statistics for shift work versus normal-scheduled work. It serves as an important dichotomy between both groups and highlights the necessity to recognize how to lessen these risks in order to better support shift workers.

Zuniga, Emma, BSN. (2024, November 14). Personal Interview.

This interview presents perspectives, advice, and firsthand experiences from a nurse who worked both night and day shift. It is advantageous to include in this thesis because it corroborates scientific research with direct quotations from someone who has lived through the highs and lows of night shift. Not only this, but it is engaging and provides a different format of information to bolster this thesis.