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Incidence of Hypertension in Industrial Night Shift Workers

Madhura desai[1*], Dr. Poonam Patil[2]
[1*]Final year student, Krishna college of physiotherapy, KVV,415539, Agashivnagar, Malkapur, Maharashtra, India Email Id: desaimadhura2003@gmail.com ,
[2]Associated Professor Department of Cardiopulmonary, Krishna College of Physiotherapy, Krishna Vishwa Vidyapeeth, Karad (corresponding Author) Email Id: drppatil8388@gmail.com

ABSTRACT

BACKGROUND *- Hypertension is a major public health concern globally, contributing significantly to the burden of cardiovascular disease, stroke, and premature mortality. Numerous occupational and lifestyle factors have been implicated in the development of high blood pressure, with night shift work emerging as a notable risk factor. Industrial workers, in particular, are often exposed to irregular schedules, extended working hours, and high-stress environments, all of which can disrupt circadian rhythms and negatively impact cardiovascular health. The misalignment between the body's internal clock and external work demands in night shift workers leads to altered sleep patterns, hormonal imbalances, increased sympathetic activity, and metabolic disturbances, which together may elevate the risk of developing hypertension. Despite growing recognition of these risks, there remains limited region-specific data on the prevalence and incidence of hypertension among night shift workers in industrial settings. Understanding this relationship is crucial for designing effective workplace interventions and policies aimed at reducing the burden of chronic diseases among this vulnerable population.*

OBJECTIVE-

1.*To determine incidence of hypertension in industrial night shift workers.*

2. To identify the risk factors associated with the development of hypertension in industrial night shift workers.

1. ***MATERIAL AND METHODOLGY-*** *institutional protocol and ethical committee approval, vide their letter no. KVV/ IEC/01/2025 dated January 23, 2025****.****This cross-sectional study was conducted in Karad using a survey method over a duration of six months. The sample size was calculated using the formula $n = z^2 \times p \times q / L^2$, resulting in 150 participants, where z represents the confidence level, p the prevalence, q = 100 – p, and L the allowable error. Data collection involved a validated questionnaire (Google Form), a consent form, and the medical reports. Participants included males engaged in occupations involving night shifts. Individuals above 60 years, Individuals with history of cardiovascular disease, chronic kidney disease or other chronic medical condition were excluded from the study.*

RESULT-*Out of the 150 industrial night shift workers assessed, 50 individuals (34%) were found to have hypertension, while 97 (66%) were normotensive. The majority of hypertension-positive cases were observed in individuals aged 35–55 years, with a higher prevalence among those working night shifts for more than five years and those with a higher body mass index (BMI). Many reported associated symptoms such as fatigue, sleep disturbances, and headache, particularly after consecutive night shifts. A significant number were previously unaware of their hypertensive status and often attributed symptoms to work-related stress or lack of sleep. Participants who reported maintaining regular physical activity and adherence to healthy dietary habits demonstrated a lower incidence, suggesting a protective effect.*

CONCLUSION- *This research found that 34% of industrial night shift workers were hypertensive. The incidence was notably higher among workers aged 35–55 years, those with more than five years of night shift employment, and individuals with a higher BMI. A considerable proportion were previously unaware of their hypertensive status, emphasizing the importance of routine health screenings in this population. Adoption of regular physical activity, healthy dietary practices, and workplace health programs may play a protective role in reducing the risk of hypertension among industrial night shift workers.*

KEYWORDS- *hypertension, night shift work, industrial worker, circadian rhythm disruption, cardiovascular risk, sleep disturbance, blood pressure.*

INTRODUCTION:

Hypertension is characterized by increased blood pressure, typically recognized when readings hit 140/90 mmHg or higher. Chronically uncontrolled hypertension can lead to cardiovascular issues. Cardiovascular disease is one of the leading causes of death worldwide. HTN is primarily responsible for 57% of all stroke fatalities and 24% of all coronary heart disease (CHD) deaths in India. Age, familial origin, and race are all uncontrollable risk factors for the development of hypertension. Diet, smoking, alcohol use, sedentary lifestyle, sleep disorders, being overweight or obese, stress, and diabetes are risk

factors for hypertension that can be managed. Additionally, a recent study found that working nights raised blood pressure.

Shift work is the scheduling of work hours so that tasks can be completed more quickly or continuously by passing the workload from one employee to another. Certain industries have adopted this working schedule to increase productivity and/or because shift work is necessary for their operating requirements. There are two types of shift work systems: rotating shift systems and fixed shift systems. A fixed shift system requires employees to work the same hours every day, whereas a rotating shift system permits employees to work various hours every predetermined amount of time. Shift labor is typically performed in the manufacturing, mining, wholesale and retail commerce, lodging and food services, transportation, postal and warehousing, communications, and construction industries. Employees that work in rotating shifts might be required to work at night. Workers who work night shifts experience altered sleep patterns and disruptions to their circadian rhythms, which can have an adverse effect on their health.

The term "circadian rhythm" refers to the pattern your body follows depending on a 24-hour day; it is the internal clock of your body. Your body uses this rhythm to determine when to go to sleep and wake up. It's as though a small conductor inside your body is coordinating a 24-hour biological symphony. Circadian rhythms are generated by a pacemaker in the hypothalamic suprachiasmatic nuclei (SCN). The human body's hormones and metabolism are regulated by circadian rhythms, including cortisol release, core body temperature regulation, and thyroid and melatonin stimulation hormones.

Circadian rhythm disruption will have a pathogenic impact on the body. The pineal gland produces the hormone melatonin, which is regulated by the SCN and linked to the circadian rhythm. Under normal circumstances, melatonin will increase during the dark phase of the night, peak in the early morning, and then fall back to its starting level in the morning. Circadian rhythms are most influenced by light and dark, but they are also influenced by temperature, food consumption, stress, physical activity, and social surroundings.

Under the rotating shift work, workers may have to take turns working at night. This night shift work changes the workers' sleep patterns and disrupts the human biological clock system, known as circadian rhythms, which can interfere with the workers' health.

Several interrelated mechanisms have been proposed to explain the association between night shift work and the increased risk of hypertension. One of the primary factors is the disruption of circadian rhythms. Night shift work interferes with the body's internal clock, which regulates various physiological processes, including blood pressure. This disruption can alter the normal diurnal variation of blood pressure, often eliminating the typical nighttime dip, thereby contributing to sustained hypertension. In addition, night shift workers frequently suffer from sleep disturbances, including reduced sleep duration, poor sleep quality, and insomnia. Chronic sleep deprivation impairs cardiovascular function and has been independently linked to elevated blood pressure levels.

Despite the growing body of evidence on the health risks associated with night shift work, there is a need for more research on the specific relationship between night shift work and hypertension in industrial settings. This study aims to investigate the incidence of hypertension in industrial night shift workers and explore the potential factors contributing to this association. The findings of this study will have implications for the development of targeted interventions aimed at reducing the risk of hypertension among industrial night shift workers.

1.AIM: To find incidence of hypertension in industrial night shift workers

2.OBJECTIVES:

1. To determine incidence of hypertension in industrial night shift workers.
2. To identify the risk factors associated with the development of hypertension in industrial night shift workers.

3. MATERIAL AND METHODOLOGY: This cross-sectional study was conducted in Karad over a six-month period using a survey-based approach. The sample size was calculated with the formula $n = z^2 \times p \times q / L^2$, resulting in 150 participants, where z denotes the confidence level, p the estimated prevalence, $q = 100 - p$, and L the allowable error. Participants were purposively selected from industries requiring night shifts. Data collection involved a validated questionnaire (Google Form) for demographic, occupational, and symptom details, an informed consent form, and the medical reports done by physician. Inclusion criteria were adult males engaged in night shift work in industries. Exclusion criteria

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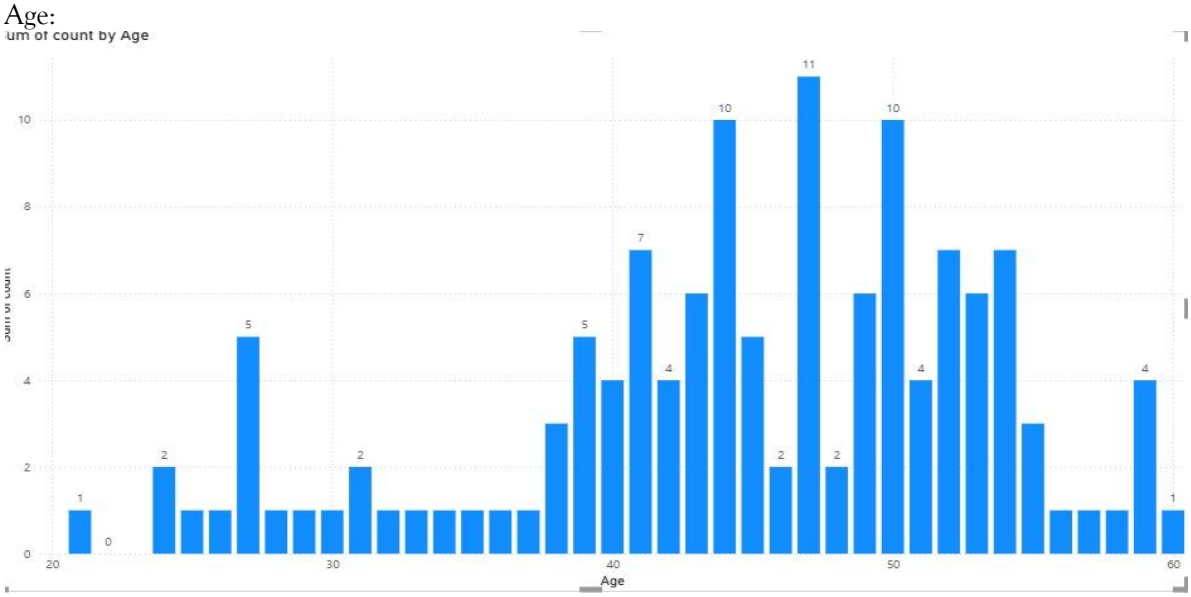
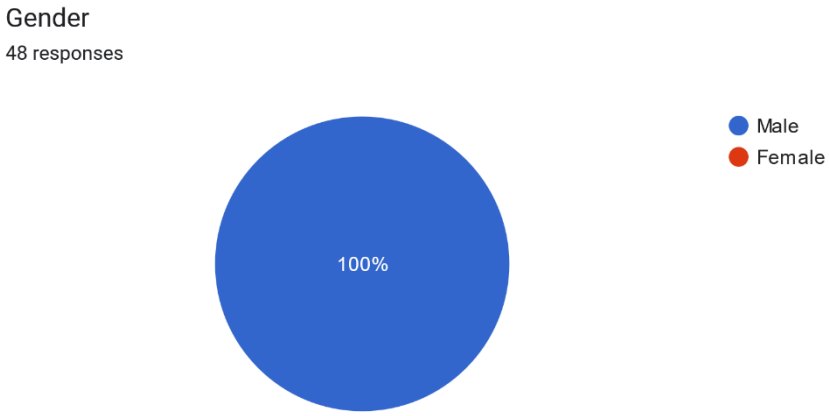
included Individuals above 60 years, Individuals with history of cardiovascular disease, chronic kidney disease or other chronic medical condition. Ethical clearance was obtained, and all participants were informed of the study's purpose, procedures, and potential risks before enrollment.

4. RESULT:

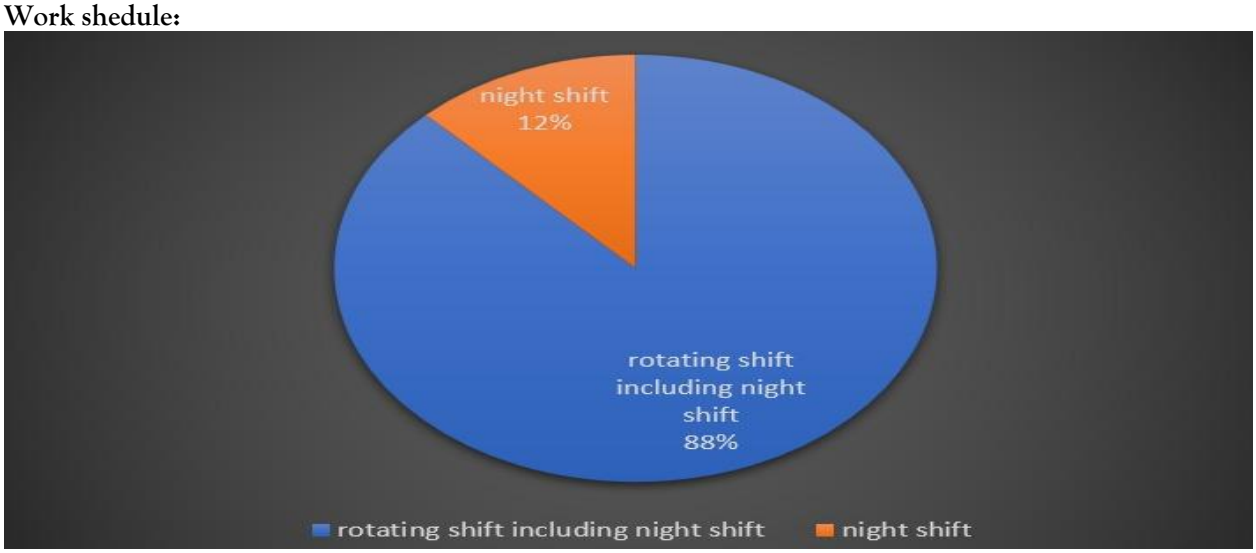
Age:



Gender :



Work shedule:



If have rotating then what is pattern? How often do you rotates shifts:

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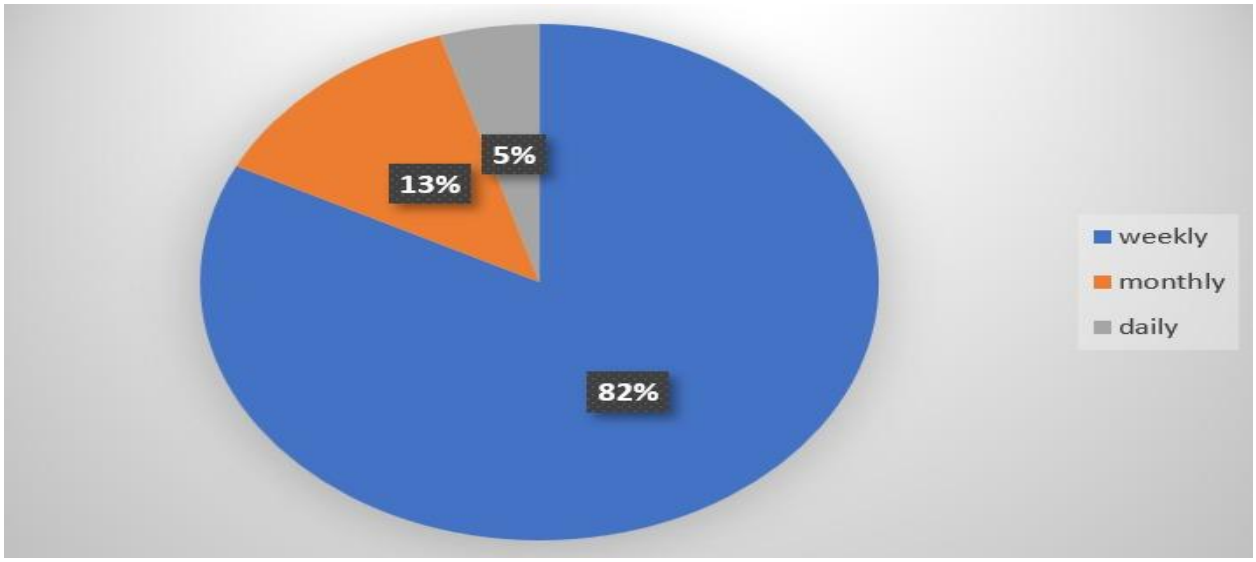
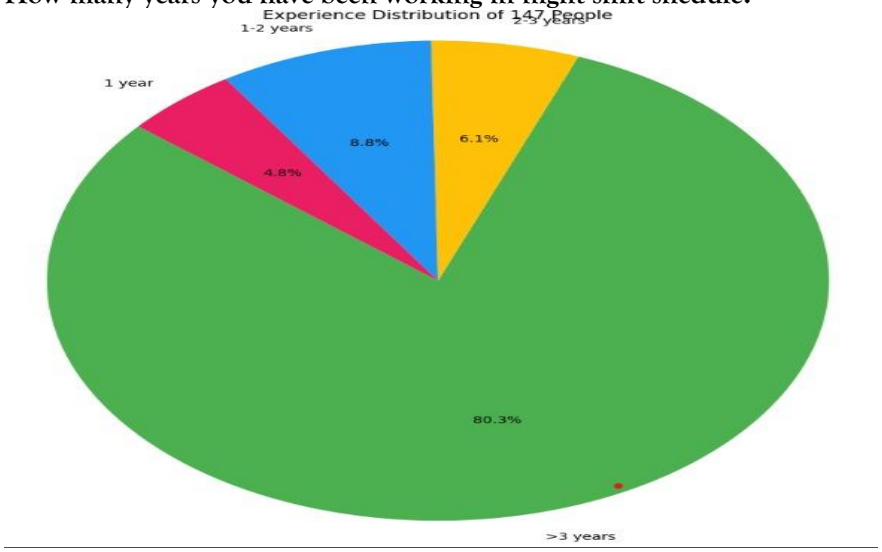
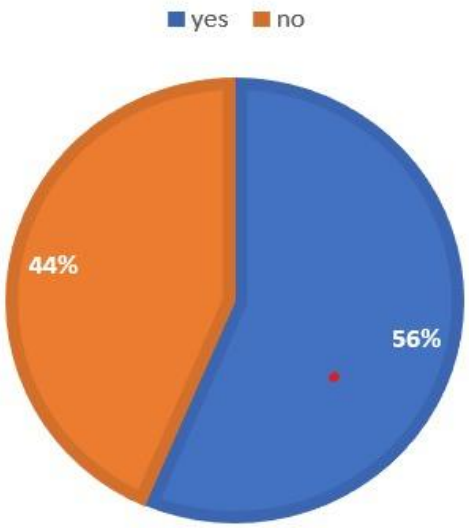


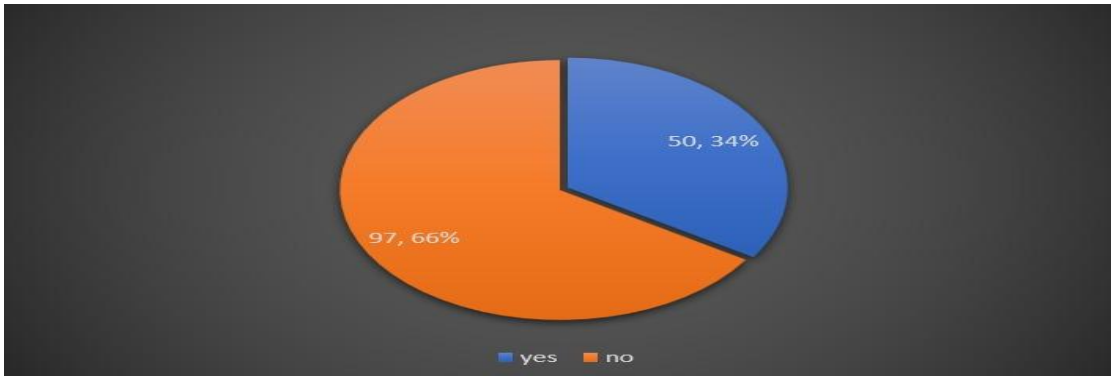
How many years you have been working in night shift shedule:



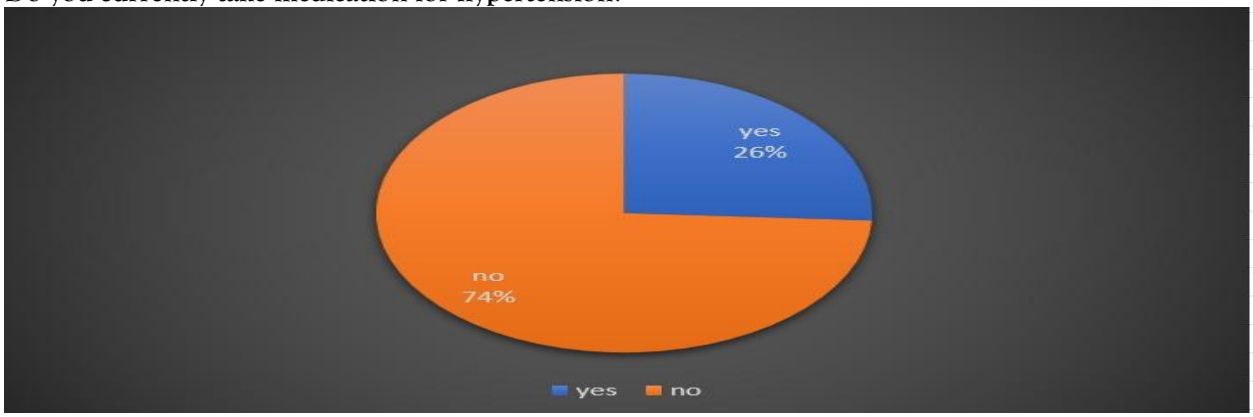
Do you experience difficulty sleeping during the day after a night shift?



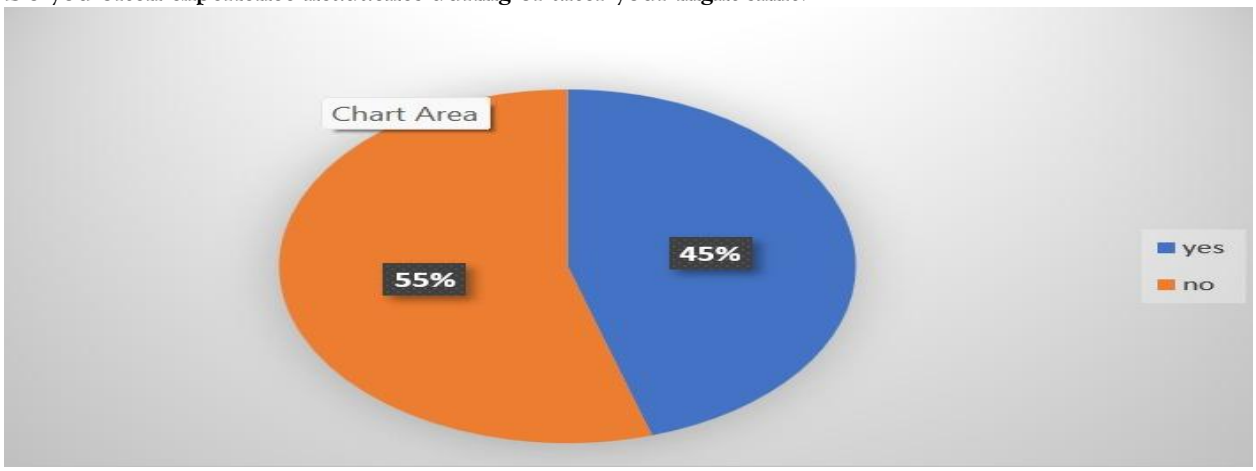
Have you ever been diagnosed with hypertension?



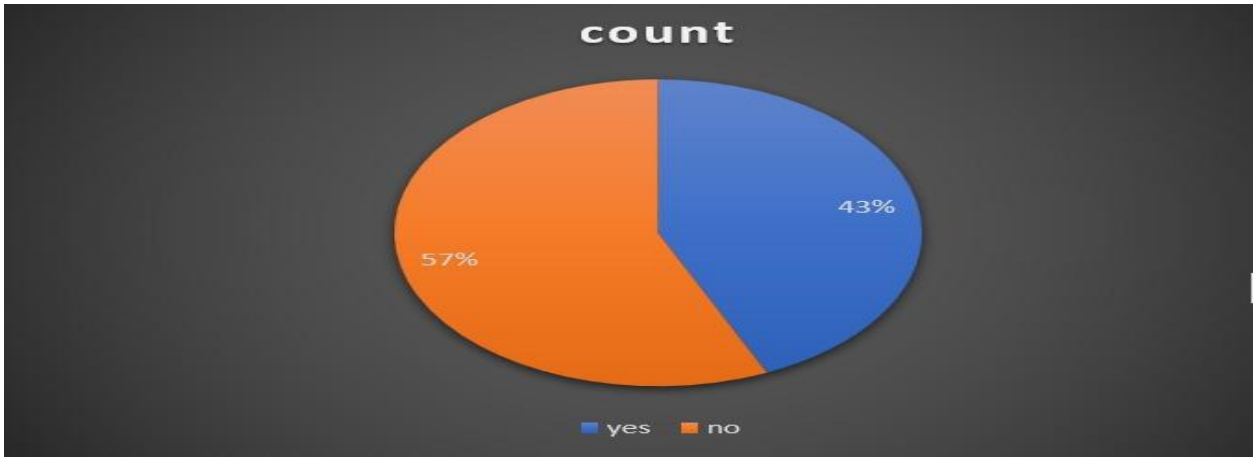
Do you currently take medication for hypertension?



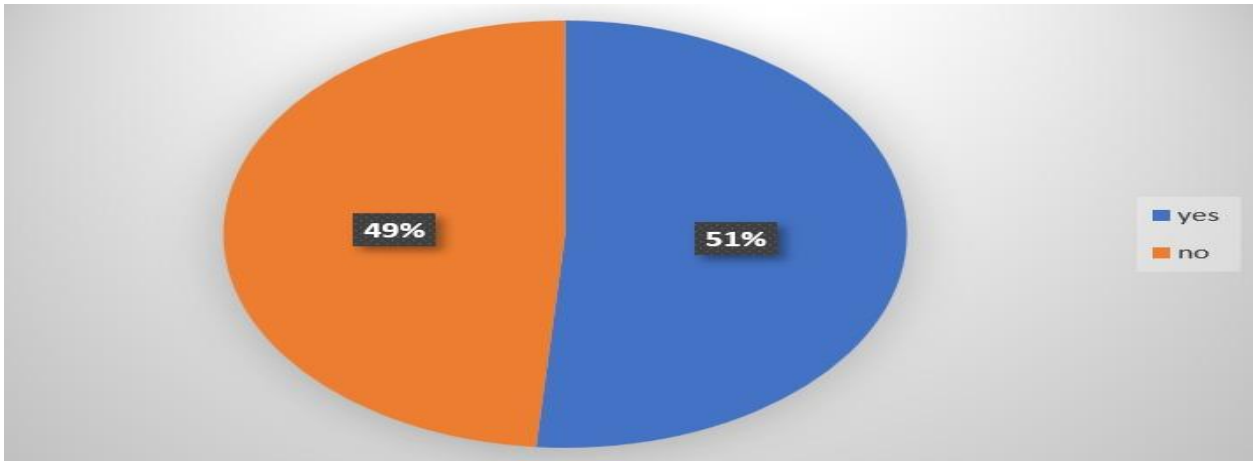
Do you often experience headaches during or after your night shift?



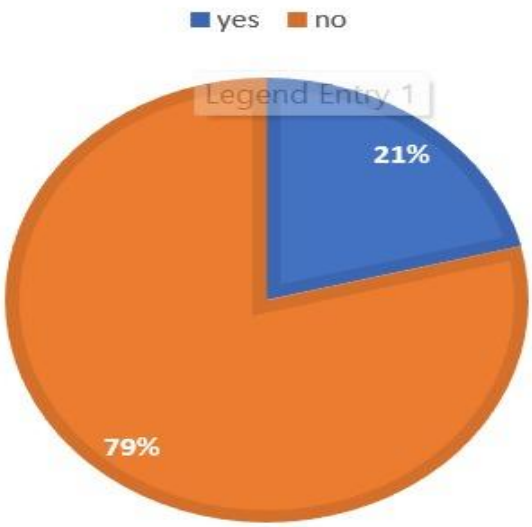
Do you feel dizzy or lightheaded when standing up during your night shift?



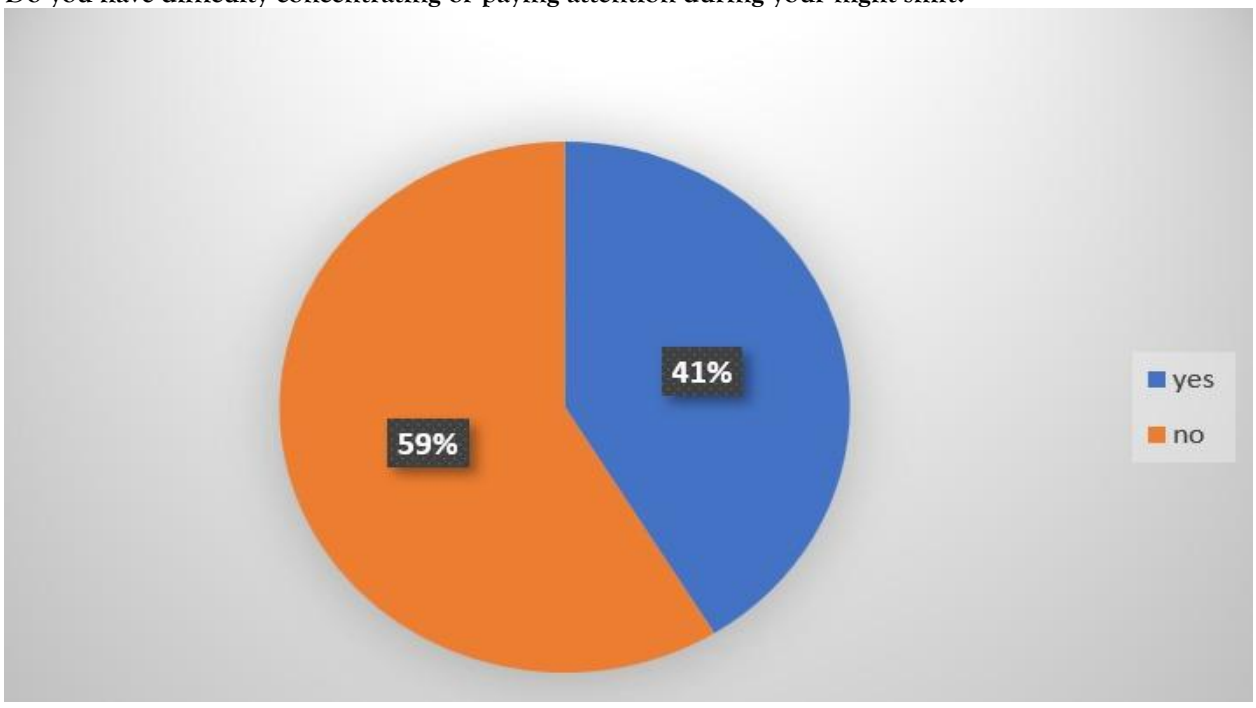
Do you experience fatigue or weakness during or after your night shift?



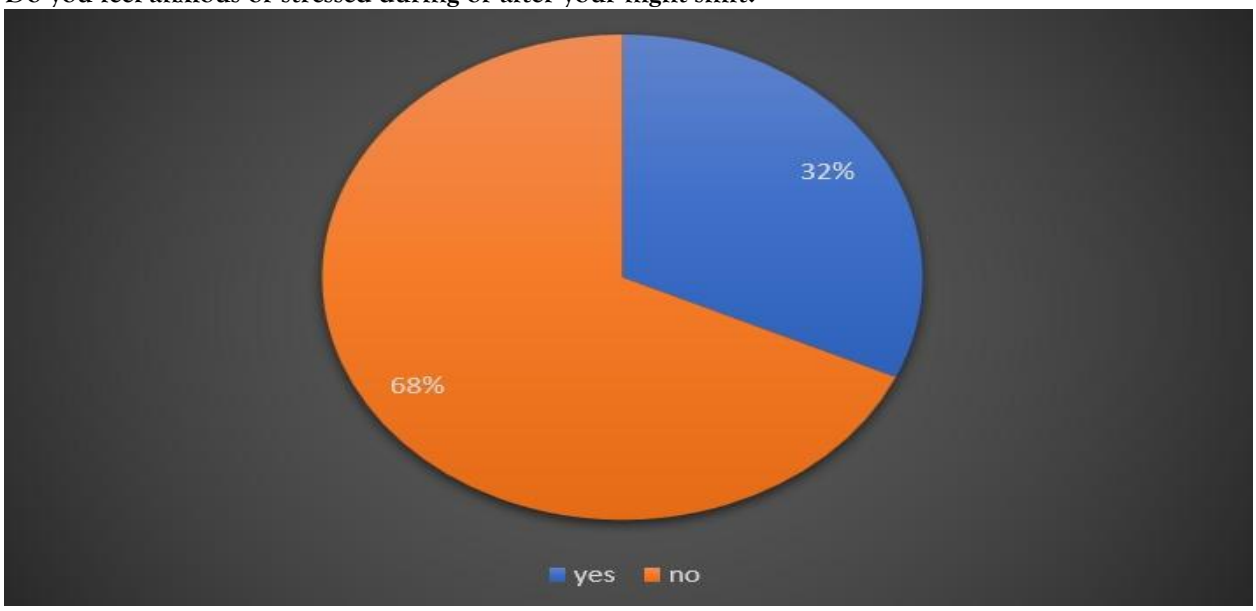
Do you experience fatigue or weakness during or after your night shift?



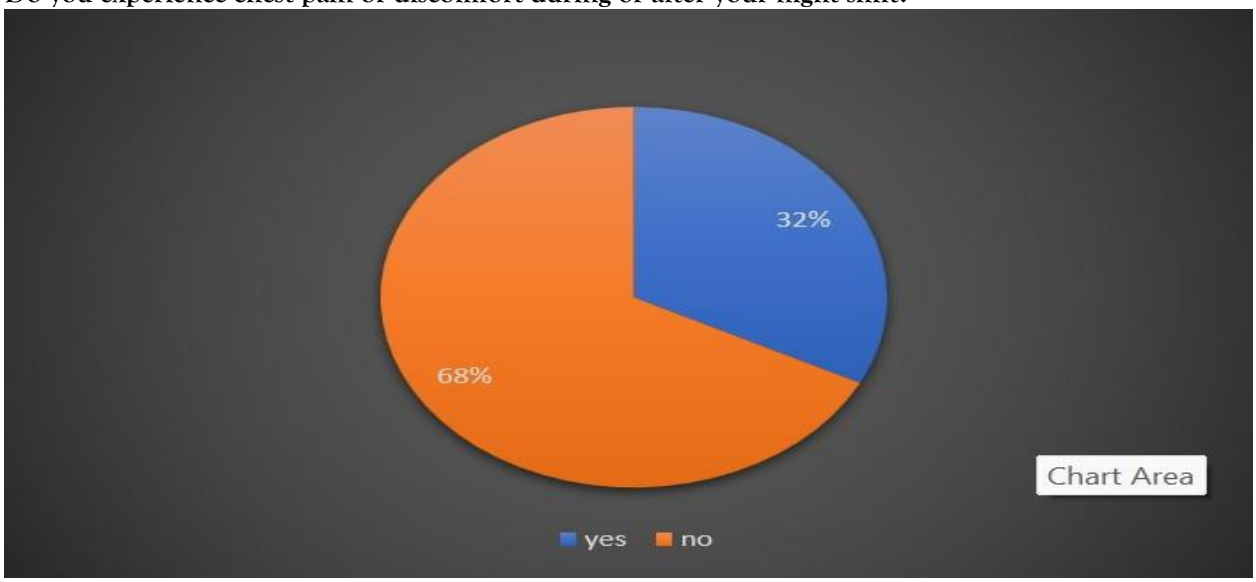
Do you have difficulty concentrating or paying attention during your night shift?



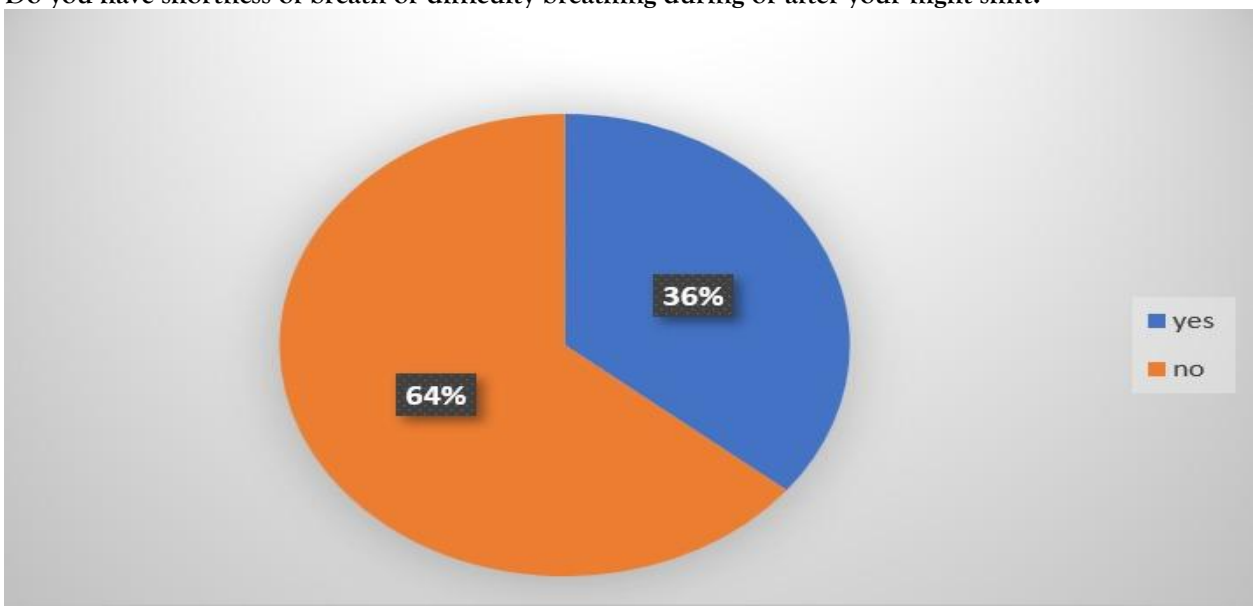
Do you feel anxious or stressed during or after your night shift?



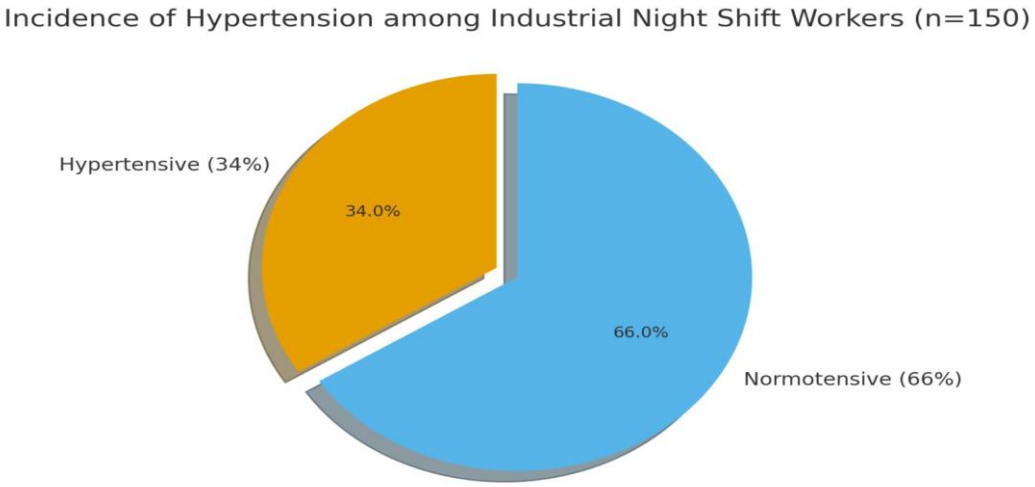
Do you experience chest pain or discomfort during or after your night shift?



Do you have shortness of breath or difficulty breathing during or after your night shift?



RESULT OF MEDICAL REPORTS



5. DISSCUSSION: The present study revealed a 34% incidence of hypertension among industrial night shift workers, which is considerably higher than the general population prevalence reported in several epidemiological studies. This suggests that night shift work is a significant occupational risk factor for the development of hypertension. The findings align with previous research indicating that disruption of the circadian rhythm, sleep deprivation, and altered cortisol and melatonin secretion contribute to elevated blood pressure among shift workers.

The majority of hypertensive cases were observed in workers aged 35–55 years, supporting the evidence that advancing age increases susceptibility to cardiovascular risk. Additionally, a longer duration of night shift employment (>5 years) was strongly associated with hypertension, highlighting the cumulative effect of prolonged exposure to irregular work schedules. Increased BMI among hypertensive participants further supports the role of obesity as an independent and additive risk factor.

Many workers were unaware of their hypertensive status, which underscores the silent nature of the condition and the lack of routine health surveillance in industrial settings. The common symptoms reported — fatigue, sleep disturbances, and headache — are often nonspecific and attributed to work-related stress or insufficient rest, which may delay diagnosis.
On a positive note, participants who engaged in regular physical activity and followed healthy dietary habits showed a lower incidence of hypertension, suggesting that lifestyle modifications could serve as protective measures even in high-risk occupational groups. This highlights the importance of implementing workplace health promotion programs, including periodic screening, stress management, ergonomic scheduling, and education on diet and exercise.
Overall, the study emphasizes that industrial night shift workers constitute a vulnerable group requiring targeted preventive and therapeutic strategies to reduce the burden of hypertension and its long-term cardiovascular complications.

6.CONCLUSION: This research found that 34% of industrial night shift workers were hypertensive. The incidence was notably higher among workers aged 35–55 years, those with more than five years of night shift employment, and individuals with a higher BMI. A considerable proportion were previously unaware of their hypertensive status, emphasizing the importance of routine health screenings in this population. Adoption of regular physical activity, healthy dietary practices, and workplace health programs may play a protective role in reducing the risk of hypertension among industrial night shift workers.

7.LIMITATION: Uncontrolled Variables: Genetic predispositions, diet, physical activity, and socioeconomic status are some of the variables that are often not adequately controlled and may complicate the relationship between working night shifts and hypertension.
Occupational Stress: It can be challenging to determine how each aspect of shift work contributes to the risk of hypertension because the impacts of job-related stresses are often not separated from one another.

8.REFERENCE:

1.Balzini L, Vannucchi Hanna Silvia Debori, Baiduri Widanarko The association between night shift work and hypertension among workers at a construction company in jakarta.

2. Sara Gamboa Madeira, carina fernandes, Teresa Paiva, carlos Santos Moreira and Daniel Caldeira The impact of different types of shift work on blood pressure and hypertension: a systemic review and meta-analysis.

3. Raghupathy Anchalaa,b, Nanda K. Kannurib, Hira Pantb, Hassan Khana, Oscar H. Francoc Emanuele Di Angelantonioa, and Dorairaj Prabhakarand Hypertension in India: a systematic review and meta-analysis of prevalence, awareness, and control of hypertension.