Original Research

# Psychological Impact of Night Shifts: Prevalence of Depression, Anxiety, and Stress among Healthcare Workers in a Tertiary Care Hospital, Chennai, Tamil Nadu

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## Abstract

**Background:** Night shift work in healthcare is associated with significant psychological and physiological strain, disrupting sleep-wake cycles and increasing the risk of mental health issues, including stress, anxiety, and depression. This study investigates the prevalence and contributing factors of mental health disorders among night shift healthcare workers in a private hospital in Chennai, India.

**Methods:** A cross-sectional, hospital-based observational study was conducted from August to November 2024, targeting night shift workers, including doctors, nurses, lab technicians, and administrative staff. A sample size of 90 participants was selected using simple random sampling. Data was collected through structured interviews, using demographic and occupational data questionnaires and the DASS-21 scale for mental health assessment. Descriptive and analytical statistics were used for data analysis, with a significance level set at $p < 0.05$.

**Results:** Of the 90 participants, the female: male ratio was 1:1.14 and the mean (SD) age was 32 (6.8) years. The prevalence of stress, anxiety, and depression among the study participants were 26.7%, 33.3% and 26.7% respectively and varied across job roles, with doctors and nurses showing higher levels. Stress was significantly associated with age and job role, while anxiety was more prevalent in those with less night shift experience (1–2 years). Depression showed a similar trend. Smoking was associated with lower anxiety and depression levels.

**Conclusion:** The study highlights the mental health challenges faced by night shift healthcare workers, particularly in high-stress roles. Addressing workplace stressors, enhancing support systems, and promoting mental health interventions are crucial for improving both worker well-being and patient care. Further research with a longitudinal design is recommended to explore causality.

**Keywords:** Night shifts, healthcare workers, stress, anxiety, depression.

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## Introduction

The healthcare sector operates continuously, with night shifts being essential for providing uninterrupted patient care, especially during emergencies. However, the psychological and physical impact of night shift work is becoming an increasing concern, particularly in high-pressure environments such as hospitals. Night shifts interfere with the body's circadian rhythm, disrupting sleep-wake cycles, hormone regulation, and overall health. This disruption can lead to mental health issues like depression, anxiety, and stress. These conditions not only affect the quality of life of healthcare workers but also impair job performance, satisfaction, and patient care.[1,2] Night shift intolerance may result from individual differences in how people adapt to internal desynchronization. This can show up as disruptions in sleep patterns, changes in body temperature, and reduced grip strength in both hands. Many night-shift health care workers experience sleep-wake disruptions, fatigue, dependence on sedative drugs, and mood disorders. The misalignment of circadian rhythms in these workers is often driven by light-induced shifts in the circadian activity clock.[3]

The unique demands of healthcare, including emotional strain, long hours, and high-pressure situations, exacerbate the mental health risks associated with night shifts. Poor organizational support and inadequate recovery time between shifts further intensify these challenges. [4]While studies have explored the mental health impact of shift work across various industries, limited research has focused on private hospital settings in regions like Chennai, India, where such issues remain under-examined.

Night shifts disrupt healthcare workers' mental health, yet their impact in Chennai's private hospitals is underexplored. This study aims to assess the prevalence of depression, anxiety, and stress among night shift healthcare workers in a hospital setting in Chennai, Tamil Nadu. By identifying workplace stressors, organizational challenges, and job demands, the research aims to provide evidence-based insights regarding the psychological burden of night shift work. This research will not only bridge critical gaps in literature but also inform strategies for hospital administrators and policymakers to create a more supportive work environment for healthcare professionals.

## Material and Methods

This hospital-based observational study employed a cross-sectional design to investigate the prevalence of depression, anxiety, and stress among night shift healthcare workers in a hospital setting in Chennai, Tamil Nadu. The hospital is a 250-bed multispecialty facility equipped with 12 dedicated ICU beds, providing comprehensive and advanced medical care across various specialties.

The study was conducted over four months, from August 2024 to November 2024, targeting night shift workers, including doctors, nurses, lab technicians, administrative staff, and other support staff. The sample size for the study was calculated using the formula for cross-sectional studies with an infinite population: $\mathbf{n = (Z^2 * P * (1 - P)) / d^2}$. Assuming a 95% confidence level (Z = 1.96), an estimated prevalence (P) of 65%[5], and a margin of error (d) of 10%, the required sample size was approximately 88 participants. Simple random sampling was employed to select participants from a list of night shift workers provided by the hospital supervisor.

Data collection was conducted using a structured interview-based questionnaire designed specifically for the study. The questionnaire included sections on demographic information, occupational data, and mental health assessment using the validated DASS-21 scale.[6] Face-to-face interview technique was adopted as data collection technique. The inclusion criteria for participants were night shift workers of both genders who have been employed in the hospital for over eight months and work full-time or alternate night shifts. Exclusion criteria include workers on leave or relieving duties, those with a history of severe psychiatric disorders that could confound results, and those unwilling to participate.

Data collected was entered in Ms-Excel and was analysed using SPSS Vs 21. Descriptive statistics was expressed in percentages or proportions and analytical statistics like chi-square test was used to test the association between stress score, anxiety score, depression score with variables of interest. A p-value of <0.05% was taken as statistically significant.

Ethical approval for the study was obtained from the Institutional Ethics Committee of the All India Institute of Hygiene and Public Health (AIIH&PH), Kolkata, prior to its commencement add IEC no. IEC/2024(3)/127, dated 01st October 2024. Additionally, written informed consent was secured from both the hospital authority and the study participants before initiating the research.

## Results

The mean (SD) age of the study participants was 32 (6.8) years with minimum age of 24 years and maximum age of 48 years**.** The study included participants primarily aged 26–30 years (40%), with 53.33% being female and 46.67% male. Nurses and other staff each made up 23.33%, doctors and administrative staff 20% each, and lab technicians 13.33%. Smoking and alcohol use were reported by 20% and 13.3%, respectively. Most participants (73.33%) worked over 11 hours daily, with 60% doing two-night shifts per month and 83.33% having more than two years of night shift experience. Sleep difficulties after night shifts were reported always by 36.67%, sometimes by 26.67%, often by 16.67%, and rarely by 20%. (Table 1)

**Table 1. Distribution of the study participants according to their socio demographic profile, behavioural and occupational characteristics (N= 90)**

| Variables | Categories | Frequency (N) | Percentage (%) |
|---|---|---|---|
| Age groups | 18-25 years | 6 | 6.67 |
| | 26 - 30 years | 36 | 40 |
| | 31 - 35 years | 18 | 20 |
| | 36 - 45 years | 21 | 23.33 |
| | 46 - 50 years | 9 | 10 |
| Gender | Female | 48 | 53.33% |
| | Male | 42 | 46.67% |
| Job title | Nurse | 21 | 23.33% |
| | Doctor | 18 | 20% |
| | Administrative staff | 18 | 20% |
| | Lab technician | 12 | 13.33% |
| | Others | 21 | 23.33% |
| Smoking | Yes | 18 | 20% |
| | No | 72 | 80% |
| Alcohol Intake | Yes | 12 | 13.3% |
| | No | 78 | 86.7% |
| Work hours | 11 or more | 66 | 73.33% |
| | 10 or less | 24 | 26.67% |
| Night shifts per month | Alternate | 21 | 23.3% |
| | Once | 15 | 16.7% |
| | Twice | 54 | 60.0% |
| Years of night shifts | 1 - 2 years | 15 | 16.67% |
| | >2 years | 75 | 83.33% |
| Perceived difficulty in sleeping after night shift | Always | 33 | 36.67% |
| | Sometimes | 24 | 26.67% |
| | Rarely | 18 | 20% |
| | Often | 15 | 16.67% |

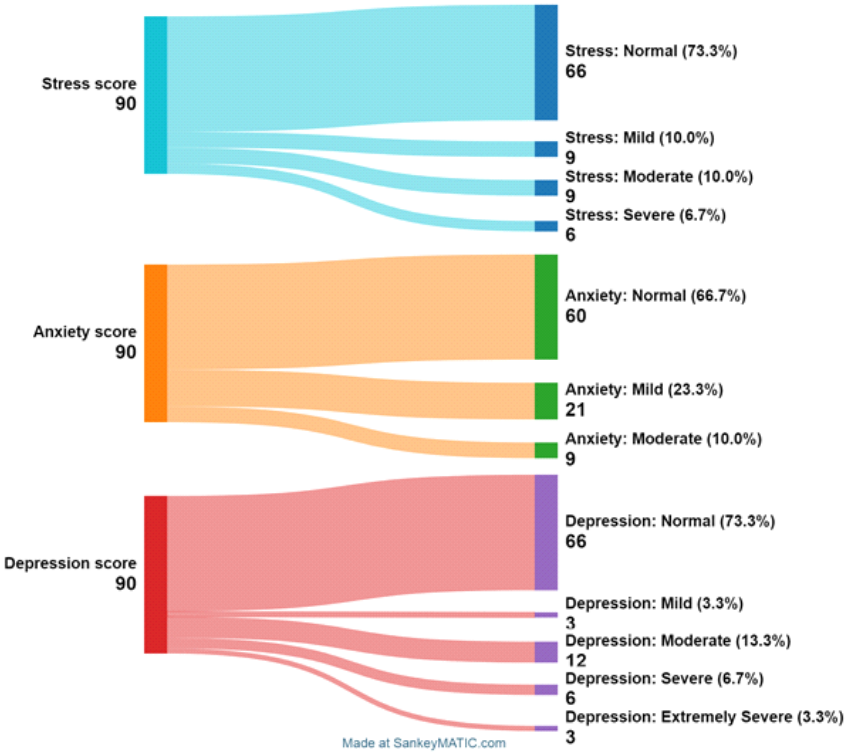


**Figure 1. Sankey diagram showing the distribution of study participants as per DASS 21 Scale (N=90).**

The majority of participants had normal stress scores (73.3%), while 10% each experienced mild and moderate stress, and 6.7% reported severe stress levels. Anxiety scores showed that 66.7% had normal levels, 23.3% experienced mild anxiety, and 10% had moderate anxiety. For depression, 73.3% had normal scores, while 3.3% reported mild, 13.3% moderate, 6.7% severe, and 3.3% extremely severe levels of depression. (Figure 1)

**Table 2. Association between presence of stress and socio demographic, occupational characteristics of the study participants (N=90)**

| Variables | Categories | Stress | | p-value |
|---|---|---|---|---|
| | | Absent | Present | |
| Age in years | Mean (SD) | 34.8 (6.8) | 27.2 (1.5) | <0.001 |
| Sex | Female | 33(68.8%) | 15 (31.3%) | 0.29 |
| | Male | 33 (78.6%) | 9 (21.4%) | |
| Job title | Administration | 15 (83.3%) | 3 (16.7%) | 0.003 |
| | Doctor | 9 (50.0%) | 9 (50.0%) | |
| | Lab technician | 9 (75.0%) | 3 (25.0%) | |
| | Nurse | 12 (57.1%) | 9 (42.9%) | |
| | Others | 21 (100.0%) | 0 (0) | |
| Work hours | 10 or less | 18 (75.0%) | 6 (25.0%) | 0.82 |
| | 11 or more | 48 (72.7%) | 18 (27.3%) | |
| Frequency of Night shift per month | Alternate | 12 (57.1%) | 9 (42.9%) | 0.03 |
| | Once | 9 (60.0%) | 6 (40.0%) | |
| | twice | 45 (83.3%) | 9 (16.7%) | |

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|---|---|---|---|---|
| Years of night shift | >2years | 57 (76.0%) | 18 (24.0%) | 0.20 |
| | 1-2 years | 9 (60.0%) | 6 (40.0%) | |
| Smoking | Yes | 15 (83.3%) | 3 (16.7%) | 0.16 |
| | No | 51 (70.8%) | 21 (29.2%) | |
| Alcohol | Yes | 12 (100%) | 0 (0%) | 0.16 |
| | No | 54 (69.2%) | 24 (30.8%) | |

Stress was significantly associated with younger age, with a mean of 27.2 years among those with stress compared to 34.8 years for those without ($p < 0.001$). While slightly more females (31.3%) than males (21.4%) reported stress, the difference was not significant ($p = 0.29$). Job roles showed a significant link to stress ($p = 0.003$), with doctors (50.0%) and nurses (42.9%) being more affected than administrative staff (16.7%) and lab technicians (25.0%). Stress was notably higher among those working alternate (42.9%) compared to twice per month (16.7%) ($p = 0.03$). Night shift experience and work hours did not show significant associations with stress. No significant association between habits and stress. (Table 2)

**Table 3. Association between presence of Anxiety and socio demographic, occupational characteristics of the study participants (N=90)**

| Variables | Categories | Anxiety | | p-value |
|---|---|---|---|---|
| | | Absent | Present | |
| Age in years | Mean (SD) | 33.7 (7.5) | 31.0 (4.7) | 0.07 |
| Sex | Female | 33(68.8%) | 15 (31.3%) | 0.65 |
| | Male | 27 (64.3%) | 15 (35.7%) | |
| Job title | Administration | 12 (66.7%) | 6 (33.3%) | <0.001 |
| | Doctor | 3 (16.7%) | 15 (83.3%) | |
| | Lab technician | 12 (100.0%) | 0 (0) | |
| | Nurse | 12 (57.1%) | 9 (42.9%) | |
| | Others | 21 (100.0%) | 0 (0) | |
| Work hours | 10 or less | 15 (62.5%) | 9 (37.5%) | 0.61 |
| | 11 or more | 45 (68.2%) | 21 (31.8%) | |
| Frequency of Night shift per month | Alternate | 12 (57.1%) | 9 (42.9%) | 0.38 |
| | Once | 9 (60.0%) | 6 (40.0%) | |
| | twice | 39 (72.2%) | 15 (27.8%) | |
| Years of night shift | >2years | 54 (72.0%) | 21 (28.0%) | 0.01 |
| | 1-2 years | 6 (40.0%) | 9 (60.0%) | |
| Smoking | Yes | 15 (83.3%) | 3 (16.7%) | 0.02 |
| | No | 45 (62.5%) | 27 (37.5%) | |
| Alcohol | Yes | 12 (100%) | 0 (0%) | 0.05 |
| | No | 48 (61.5%) | 30 (38.5%) | |

Anxiety was more common among younger individuals, with a mean age of 31.0 years for those with anxiety compared to 33.7 years for those without, though the difference was not statistically significant ($p = 0.07$). Females (31.3%) and males (35.7%) showed similar levels of anxiety ($p = 0.65$). Job roles were significantly associated with anxiety ($p < 0.001$), with doctors having the highest prevalence (83.3%), followed by nurses (42.9%) and administrative staff (33.3%), while lab technicians and others reported no anxiety. Work hours and night shift frequency showed no significant association with anxiety. However,

those with 1–2 years of night shift experience reported significantly more anxiety (60.0%) compared to those with over two years of experience (28.0%) (p = 0.01). Smoking was significantly associated with less anxiety (p= 0.02). (Table 3)

**Table 4. Association between presence of Depression and socio demographic, occupational characteristics of the study participants (N=90)**

| Variables | Categories | Depression | | p-value |
|---|---|---|---|---|
| | | Absent | Present | |
| Age in years | Mean (SD) | 34.8 (6.8) | 27.2 (1.5) | <0.001 |
| Sex | Female | 33(68.8%) | 15 (31.3%) | 0.29 |
| | Male | 33 (78.6%) | 9 (21.4%) | |
| Job title | Administration | 15 (83.3%) | 3 (16.7%) | 0.003 |
| | Doctor | 9 (50.0%) | 9 (50.0%) | |
| | Lab technician | 9 (75.0%) | 3 (25.0%) | |
| | Nurse | 12 (57.1%) | 9 (42.9%) | |
| | Others | 21 (100.0%) | 0 (0) | |
| Work hours | 10 or less | 18 (75.0%) | 6 (25.0%) | 0.82 |
| | 11 or more | 48 (72.7%) | 18 (27.3%) | |
| Frequency of Night shift per month | Alternate | 12 (57.1%) | 9 (42.9%) | 0.03 |
| | Once | 9 (60.0%) | 6 (40.0%) | |
| | twice | 45 (83.3%) | 9 (16.7%) | |
| Years of night shift | >2years | 57 (76.0%) | 18 (24.0%) | 0.20 |
| | 1-2 years | 9 (60.0%) | 6 (40.0%) | |
| Smoking | Yes | 15 (83.3%) | 3 (16.7%) | 0.001 |
| | No | 51 (70.8%) | 21 (29.2%) | |
| Alcohol | Yes | 12 (100%) | 0 (0%) | 0.28 |
| | No | 54 (69.2%) | 25 (30.8%) | |

Depression prevalence varied by demographics and job roles. Females (31.3%) and males (21.4%) showed no significant difference (p = 0.29). Doctors had the highest prevalence (50.0%), followed by nurses (42.9%), with job roles significantly associated (p = 0.003). Work hours showed no impact (p = 0.82). Night shift frequency significantly influenced depression, with alternate shifts showing higher rates (42.9%) than twice-monthly shifts (16.7%) (p = 0.03). While no statistically significance (p = 0.20), was seen though 1–2 years of night shifts reported higher rates (40.0%) than those with over two years (24.0%). Smoking was significantly associated with less depression (p= 0.001). (Table 4)

## Discussion

Depression, anxiety, and stress can significantly impair the performance and responsibilities of healthcare workers, particularly those working night shifts. These mental health challenges can lead to impaired decision-making, reduced attention and concentration, and increased susceptibility to errors, directly impacting patient care and safety. Persistent stress and depression may cause fatigue and burnout, reducing productivity and job satisfaction, while also contributing to absenteeism and staff turnover, which disrupts workflow and places additional burdens on colleagues. Furthermore, emotional withdrawal and irritability can strain team dynamics and hinder compassionate patient communication. Collectively, these issues not only compromise the well-being of healthcare workers but also pose a serious risk to the quality of care delivered to patients. Hence, prioritizing mental health is crucial for ensuring both staff well-being and high-quality patient care. [7-11]

The study revealed a significant variation in mental health outcomes among participants, with 16.7% experiencing stress at varying intensities—10%

reported mild stress, 6.7% moderate stress, and 6.7% severe stress. While the majority of night-shift workers demonstrated baseline resilience, a notable minority faced considerable psychological distress. Anxiety was prevalent among 33.3% of respondents, highlighting a widespread mental health challenge. Depression was also a critical concern, with moderate (13.3%), severe (6.7%), and extreme (3.3%) cases, painting a troubling picture of the mental well-being of night-shift hospital staff. Wang Q et al[5] found higher prevalence rates, with 67.1% of participants being overstressed, and 57.5%, 69.2%, and 78.4% experiencing symptoms of depression, anxiety, and stress, respectively. Li Y et al [11] observed depression and anxiety among 58.82% and 62.08% of shift nurses, while a cohort study by Xu M et al[12] reported lower rates, with 2.3% and 1.7% of healthcare workers developing depression and anxiety, respectively. Lee HY et al[13] noted a significant increase in depression among female nurses working night shifts in Korea, while Weaver MD et al[14] reported that 21.6% of healthcare workers screened positive for depression or anxiety, with those screening positive showing a 63% higher risk of adverse outcomes. Ugwu et al [15] further highlighted a pronounced correlation between night shifts and heightened levels of anxiety, stress, and depression. The wide disparities in findings across studies may arise from differences in study settings, assessment tools, sample characteristics, and definitions of mental health conditions. Additionally, cultural, occupational, and systemic factors, including workplace support, gender differences, and job demands, likely contribute to these variations, underscoring the complex interplay of factors affecting mental health in healthcare environments.

The relationship between job roles and mental health outcomes was also significant. Doctors, in particular, demonstrated the higher stress, with 50% reporting such conditions. Nurses also showed a substantial burden of stress, with 57.1% reporting normal stress, but 42.9% experiencing mild to moderate anxiety. Similar findings were reported in a study by Geniş B et al. [16] As the doctors often face intense decision-making demands, critical patient care responsibilities, and extended work hours, may be contributing to higher stress levels. Similarly, nurses, who serve as primary caregivers and frequently interact with patients, experience emotional strain and workload pressures, which may explain the heightened anxiety levels.

The findings suggest that healthcare workers with less experience, particularly those with fewer than two years of night shift work, or increase frequency of night shifts were more likely to experience anxiety. Additionally, younger age groups showed a significant increase in stress and depression levels. These results indicate that workers with less experience and younger individuals may take more time to adjust to the demands of night shift work. Supporting this, a study by Alreshidi SM et al[17] emphasized that prolonged working hours were independently linked to a higher risk of developing depressive symptoms among healthcare workers.

The study observed that smoking was significantly associated with lower reported levels of anxiety and depression, suggesting that substance use may serve as a maladaptive coping mechanism to manage workplace stressors. Similarly, a study by Ohida T et al[18] among healthcare workers in Japan reported comparable findings. However, this relief is likely short-lived, as reliance on smoking can exacerbate mental health challenges in the long term by contributing to physical health issues and perpetuating a cycle of dependency, ultimately worsening the overall situation.

Some limitations of the study include being cross-sectional design limits the ability to establish causality between occupational factors and mental health outcomes. The reliance on self-reported measures may introduce reporting bias, as participants may underreport or overestimate their mental health conditions. Furthermore, the study is context-specific, focusing on hospital staff in a single city, which may restrict the generalizability of its findings to other regions or professions. Future studies could benefit from a longitudinal approach and a more diverse sample to deepen the understanding of mental health dynamics among healthcare workers.

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