**The prospect of hypertension and diabetes among Saudi healthcare nightshift workers**

**Abstract:**

**Background:** Night shift employment is linked to various health consequences, especially among healthcare professionals. This study aims to evaluate the prevalent chronic illnesses among medical personnel working extended night shifts in Saudi Arabia. **Methodology**: This study was a prospective descriptive investigation that was carried out in Al-Kharj, Saudi Arabia, between the months of April and May of 2025. The information for this study was acquired through the use of an online questionnaire. **Results:** Only 16% of participants had hypertension, with females at 44% and males at 56%. About 16% of the participants had diabetes, with males and girls evenly represented. Doctors made up the majority of study subjects (68%), with 90% attending night shift; nurses made up 20%, with 80% attending night shift; and other professions accounted for 12%, with 83% working night shifts. **Conclusion**: Hypertension and type 2 diabetes mellitus (T2DM) are prevalent among healthcare professionals working night shifts. The risk level escalates with an extended duration period.

**Keywords:** Night shift, hypertension, Diabetes, Medical staff, Saudi Arabia

**Introduction**

Night shift work refers to employment, including transmeridian travel, that takes place during the typical sleeping hours of the general public. Such work changes the exposure to the natural light and dark schedule, disrupting circadian rhythms.
The term “night” or “nighttime” typically refers to the duration from sunset to sunrise within a 24-hour cycle. The human biological night is influenced by individual circadian rhythms, typically spanning from 23:00 to 07:00, which is the period most adults allocate for sleep. However, this timeframe can vary due to cultural and other differences [1].

A meta-analysis investigates the relationship between shift work and the risk of developing metabolic syndrome, specifically among employees in the healthcare sector. In 10 of the 12 studies reviewed, shift workers exhibited a higher prevalence of metabolic syndrome compared to their non-shift-working counterparts. The meta-analysis results indicated that shift workers have a twofold increased risk of developing metabolic syndrome compared to day workers.
The metabolic syndrome encompasses a combination of multiple recognized cardiovascular risk factors, such as insulin resistance, obesity, dyslipidemia, and hypertension.
The pooled odds ratio of metabolic syndrome in shift workers, derived from 12 studies, was 2.17 (95% confidence interval = 1.31-3.60, P = 0.003; I² = 82%, P < 0.001). Shift workers demonstrated over a twofold increase in the likelihood of developing metabolic syndrome compared to day workers [2].

The relationship between night shift work and the incidence of type 2 diabetes mellitus (T2DM) remains inadequately understood. That meta-analysis evaluates the relationship between night shift work and the risk of developing T2DM, examining this association across different subgroups.[10]
Night shift workers demonstrated a 30% higher incidence of T2DM relative to daytime workers (HR = 1.30, 95% CI: [1.18, 1.43], P < 0.001). In females, night shift workers exhibited a higher incidence of T2DM (HR = 1.28, 95% CI: [1.16, 1.41]); conversely, in males, the association lacked statistical significance (95% CI: [0.89, 2.63]) [3].

Cardiovascular disease (CVD) ranks among the primary causes of mortality globally, with shift workers exhibiting a heightened risk of developing it.
Night shift workers exhibited pooled relative risks of 1.02 (95% CI: 0.99, 1.06), 1.18 (95% CI: 0.94, 1.47), and 1.05 (95% CI: 0.83, 1.34) for all-cause, cardiovascular, and cancer mortality, respectively, compared to daytime workers [4].

Permanent night work and frequent afternoon and night shifts were linked to a heightened risk of T2DM in the subsequent year, but not to hypertension. The risk of T2DM was influenced by consecutive night shifts and the total duration of permanent night work [5]. This study aimed to assess the prevalence of hypertension and diabetes among Saudi healthcare nightshift workers.

**Materials and methods**

This study was a prospective descriptive investigation carried out in Al-Kharj, Saudi Arabia, from April 2025 to May 2025. The data for this study was collected through an online questionnaire that included questions related to hypertension and T2DM.

**Data analysis**

The data for this study was first organized in a data sheet and subsequently input into a statistical software package for social sciences (SPSS). Frequencies, percentages, means, and cross-tabulations were calculated. The chi-square test was conducted with a 95% confidence interval. A P-value below 0.05 is regarded as statistically significant.

**Results**

The study included 100 medical staff between the ages of 20 and 61, with a mean age of 37.4 and a standard deviation of 7.7 years. Most participants in this study were female (72%), with males accounting for 28%. In terms of sex and night shift, 87% were included, with the majority of participants being females (71.2% (62/87)) and males (28.8% (25/87)), while 13% did not work the night shift, with ten females and three males. Only 16% of participants had hypertension, with 7/16 (44%) females and 9/16 (56%) males. About 16% of the participants had diabetes, with males and girls evenly represented. Table 1 and Figure 1 illustrate this.

**Table 1: Distribution of the study subject by sex, night shift, and chronic illness.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable** | **Males** | **Females** | **Total**  |
| **Night shift** |  |
| Yes | 25 | 62 | 87 |
| No | 3 | 10 | 13 |
| Total | 28 | 72 | 100 |
| **Hypertension** |  |
| No | 19 | 65 | 84 |
| Yes | 9 | 7 | 16 |
| Total | 28 | 72 | 100 |
| **Diabetes**  |  |
| No | 20 | 64 | 84 |
| Yes | 8 | 8 | 16 |
| Total | 28 | 72 | 100 |

**Figure 1: Graph showing the Description of the study subject by sex, night shift, and chronic illness.**

Table 2 and Figure 2 summarize the distribution of research subjects by night shift, age group, and chronic illness. Most participants were 36-40 years old (31%), followed by 31-35 years old (25%), and >41 years old (25%). Those under 30 accounted for 19%.
The majority of study subjects were doctors (68%), with 90% (61/68) working the night shift. Nurses contributed 20%, with 16/20 (80%) working the night shift. Other professions accounted for 12% (10/12). 83 percent of them work the night shift.
Hypertension was observed in 16% of the population, with 14/16 (87.5%) working the night shift. In addition, 16% had diabetes; all of them worked the night shift. as seen in Table 2, Figure 2.

**Table 2 shows the distribution of study subjects categorized by night shift, age group, and chronic illness.**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Night shift** | **Total** |
|  | **Yes** | **NO** |  |
| **Age Group** |  |
| ≤30yrs | 17 | 2 | 19 |
| 31 – 35 | 19 | 6 | 25 |
| 36-40 | 28 | 3 | 31 |
| >41 | 23 | 2 | 25 |
| **Total** | 87 | 13 | 100 |
| **Profession of study subject** |  |  |  |
| Doctor | 61 | 7 | 68 |
| Nurse | 16 | 4 | 20 |
| Other | 10 | 2 | 12 |
| **Total** | **87** | **13** | **100** |
| **Hypertension** |  |
| Yes | 14 | 2 | 16 |
| No | 73 | 11 | 84 |
| **Total** | **87** | **13** | **100** |
| **Diabetes** |  |
| Yes | 16 | 0 | 16 |
| No | 71 | 13 | 84 |
|  **Total** | 87 | 13 | 100 |

|  |
| --- |
| **Table 2:Description of the study subject by night shift, age group and chronic illness****Figure 2: Graph showing the Description of the study subject by night shift, age group, and chronic illness** |
|  |

Table 3 and Figure 3 demonstrate the distribution of research subjects based on night shifts and years of experience. The bulk of participants in this survey have years of experience ranging from 6 to 10 years (33%), with 83% working night shifts, followed by 11 to 16 years (26%). Approximately 95% of them work the night shift. 21% are 16 years or older, and 20% are 5 years or younger. The majority work shifts at night.
Table 3, Figure 3. The distribution of study subjects, which is based on night shifts and years of experience, is provided. Of all participants, 87% worked night shifts, while only 13% did not. Those with 6-10 years of experience are the most likely to work night shifts, accounting for 85% of this group. From 11 to 16 years, more than 16 and less than 5 years account for 25%, 22%, and 20%, respectively. Most of them worked the night shift.

**Table 3: Distribution of the study subject by night shift and year of experience**

|  |  |  |
| --- | --- | --- |
| **Variable** | **Night shift** | **Total** |
|  | **Yes** | **No** |  |
| **Year of experience**  |  |
| 5years and less | 16 | 4 | 20 |
| From 6 to 10yrs | 28 | 5 | 33 |
| From11 to 16 | 24 | 1 | 25 |
| 16yrs and more | 19 | 3 | 22 |
| Total | 87 | 13 | 100 |

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**Figure 3: Graph showing the Description of the study subject 's night shift and year of experience**

**Discussion**

Night shift work presents various health and social implications for individuals who have engaged in it over an extended period. However, healthcare staff are more susceptible to various health disorders linked to night shift work. This study aims to investigate the chronic illnesses associated with night shift work among medical staff in Saudi Arabia.

Working night shifts entails various health and social repercussions for individuals who have engaged in this practice over an extended period. Nevertheless, healthcare personnel are more susceptible to various health issues linked to nocturnal shift work. In this study, we sought to investigate the chronic illnesses linked to night shift work among medical personnel in Saudi Arabia. The human body possesses an inherent circadian rhythm, functioning as an internal clock that regulates both sleep patterns and digestive processes. Additionally, it facilitates the secretion of insulin, a hormone integral to the regulation of blood sugar levels [6]. Rotational night shift duties in healthcare workers may adversely affect postprandial triglyceride responses and insulin sensitivity [7], consistent with our findings.

Engaging in night shift work has been correlated with an increased likelihood of developing cardiovascular and cerebrovascular diseases. It appears that one of the fundamental mechanisms at play is the promotion of hypertension through shift work [8]. Working night shifts is associated with a higher chance of getting hypertension, especially for those who have a family history of the condition, indicating that both night shifts and genetics together increase the risk of developing hypertension.

**Conclusion**

Prolonged night shifts among medical professionals in Saudi Arabia significantly increase the prevalence of hypertension and type 2 diabetes mellitus. Preventive measures are considered crucial in this sector of workers.

**Ethics approval and consent to participate**

The study's ethics were confirmed by obtaining a written consent prior to starting the questionnaire. The study adhered to the Helsinki Declaration. The human research ethics committee at MRCC has approved this research proposal (Approval number: HREC 0012/MRCC.4/25).

**Disclaimer (Artificial intelligence)**

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Details of the AI usage are given below:

1.

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3.

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