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Effect Of Shift Work On Physiological Blood Parameters In Corporate Professionals

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Abstract
In today's corporate world, shift work has emerged as a necessity to ensure 24/7 business operations. However, this work pattern disrupts the body's natural circadian rhythms, potentially leading to adverse health outcomes. This study investigates the effect of shift work on physiological blood parameters among corporate professionals, comparing fasting blood glucose, lipid profiles, cortisol levels, and C-reactive protein (CRP) between shift workers and those with regular daytime schedules.
Using a cross-sectional comparative design, the study recruited corporate employees aged 25–50 years, dividing them into shift and daytime worker groups. Blood samples and demographic data were collected and analyzed to assess metabolic and cardiovascular health risks. The findings indicate that shift workers exhibit trends toward higher fasting glucose levels, dyslipidemia, and elevated cortisol, suggesting a predisposition to metabolic and stress-related disorders. These results highlight the need for targeted interventions and workplace policies to mitigate the health risks associated with shift work, promoting the well-being and productivity of corporate employees. Further research with larger samples is recommended to strengthen the evidence base for actionable health strategies in corporate settings.

Keywords: Shift Work, Circadian Rhythm, Corporate Professionals, Fasting Blood Glucose, Lipid Profile, Cortisol, C-Reactive Protein, Metabolic Disorders, Cardiovascular Health, Occupational Health, Work Schedule, Stress-Related Disorders

INTRODUCTION-

In today's fast-paced global economy, shift work has become an integral part of many industries, including corporate sectors. As companies expand their operations to meet the demands of international markets and provide 24/7 customer service, employees are increasingly required to work outside of traditional business hours. This phenomenon, commonly referred to as shift work, includes night shifts, rotating shifts, and early morning schedules that deviate from the standard 9-to-5 workday. While shift work is necessary for ensuring continuous business operations, it can have profound implications for the health and well-being of employees.
The human body operates on an internal biological clock, known as the circadian rhythm, which regulates various physiological processes such as sleep-wake cycles, hormone secretion, metabolism, and cardiovascular function. This rhythm follows a roughly 24-hour cycle, synchronized with environmental cues like light and darkness. Disruption of circadian rhythms, as commonly experienced in shift work, can lead to a range of health problems, including metabolic disorders, cardiovascular diseases, and mental health challenges. The growing body of research suggests that shift work is associated with alterations in physiological blood parameters, such as increased blood glucose levels, abnormal lipid profiles, and elevated stress hormones like cortisol, which may predispose workers to long-term health risks.
Corporate professionals represent a unique population in the context of shift work. Unlike manual laborers or healthcare workers, corporate employees typically engage in more sedentary tasks, experience high levels of mental stress, and are often subjected to irregular or prolonged work hours. The combination of these factors makes corporate professionals particularly vulnerable to the adverse effects of shift work. Prolonged sitting, coupled with irregular sleep patterns and poor dietary habits, can exacerbate the physiological strain imposed by shift work, potentially leading to a higher prevalence of metabolic syndrome, cardiovascular diseases, and mental health issues within this population. Previous studies have extensively examined the impact of shift work on populations such as healthcare workers and factory employees. However, there is a paucity of research focusing specifically on corporate professionals, whose work demands and lifestyle factors differ significantly from other occupational groups. This study seeks to address this gap

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by investigating the effect of shift work on physiological blood parameters among corporate employees. The physiological markers under investigation—fasting blood glucose, lipid profile (total cholesterol, HDL, LDL, triglycerides), cortisol, and C-reactive protein (CRP)—are critical indicators of metabolic, cardiovascular, and stress-related health risks. By comparing these markers between shift workers and daytime workers within the corporate sector, this study aims to elucidate the specific health challenges faced by corporate professionals engaged in shift work. Understanding the physiological impact of shift work in corporate settings is not only important for employee health but also for organizational productivity. The long-term health consequences of shift work, such as diabetes, hypertension, and cardiovascular disease, can lead to increased absenteeism, reduced work performance, and elevated healthcare costs for companies. By gaining a clearer understanding of how shift work affects corporate professionals, this study will provide valuable insights for developing workplace interventions and policies aimed at promoting employee well-being and mitigating the health risks associated with irregular work schedules. Shift work is known to increase the risk for a number of acute and chronic health problems including cancer (Ijaz et al., cardiovascular disease (CVD) (Vyas et al., metabolic syndrome (Sooriyaarachchi et al. , diabetes (Knutsson and Kempe), and chronic lymphocytic leukemia (Costas et al.). The normal sleep-wake cycle is forcefully disrupted by shift work, resulting in insufficient sleep and excessive fatigue (Sallinen and Kecklund. There is strong evidence that lack of sleep can have negative effects on metabolism and the immune system (Irwin).

Methodology

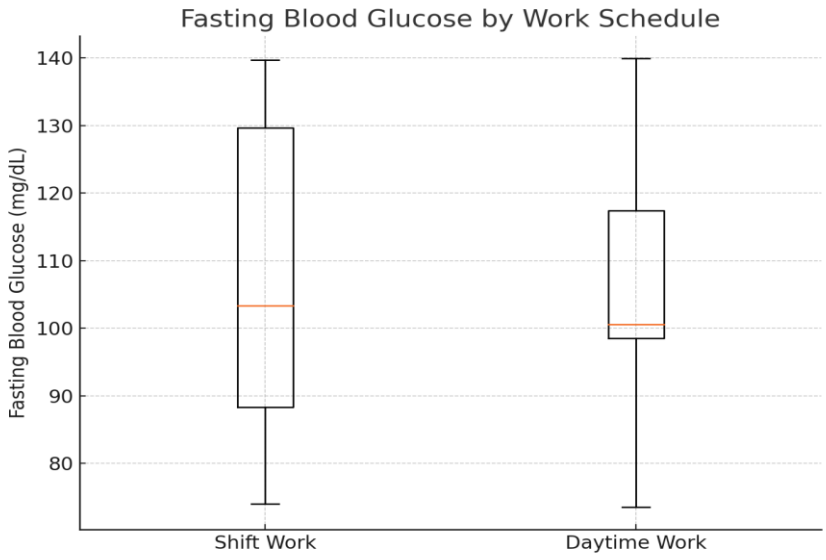
Study Design was a cross-sectional comparative design to investigate the effects of shift work on physiological blood parameters in corporate professionals. Participants was divided into two groups: those who engage in shift work and those who work regular daytime hours. The study measured and compare key physiological blood parameters in both groups to assess the impact of shift work on health. Inclusion Criteria was Corporate professionals aged 25-50 years, Employed in corporate jobs for at least 1 year, Shift workers must have worked non-standard hours (night shifts, rotating shifts, or early morning shifts) for at least 6 months, Daytime workers must work regular hours (e.g., 9 a.m. to 5 p.m.) with no history of shift work and Exclusion Criteria was Individuals with known metabolic disorders (e.g., diabetes, cardiovascular disease), Individuals on medication that may affect blood parameters (e.g., lipid-lowering drugs, insulin), Pregnant women, Individuals who work part-time or have inconsistent work schedules.

RESULT:

1. Fasting Blood Glucose by Work Schedule (Graph 1)

Graph Description: The boxplot shows the distribution of fasting blood glucose levels in employees working shift work and daytime work schedules. The central lines in each box represent the median fasting blood glucose levels, while the whiskers show the variability of data.

Result Interpretation: From the graph, we observe that shift workers tend to have slightly higher fasting blood glucose levels compared to daytime workers. This suggests that shift work may be associated with impaired glucose metabolism, potentially increasing the risk of developing metabolic disorders such as diabetes



Graph 1: Fasting Blood Glucose by Work Schedule

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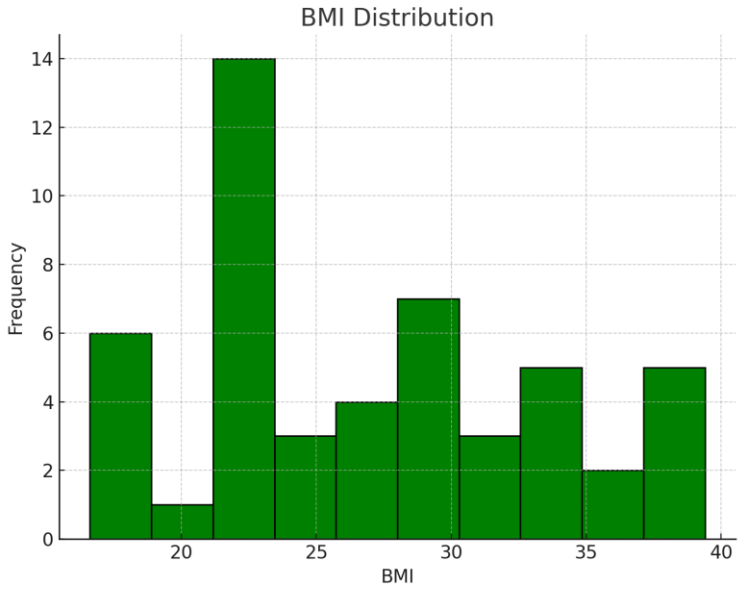
Correlation: Age and Systolic Blood Pressure
Pearson Correlation: Age and Systolic Blood Pressure
Correlation coefficient: -0.05
P-value: 0.7278

BMI Distribution (Graph 2)
Graph Description: The histogram shows the distribution of Body Mass Index (BMI) across all participants in the study. The x-axis represents BMI values, and the y-axis represents the frequency of participants within each BMI range



Graph 2: BMI Distribution

Total Cholesterol by Work Schedule (Graph 3)
Graph Description: The boxplot displays the total cholesterol levels for shift workers and daytime workers. The box represents the interquartile range, and the whiskers indicate variability
Result Interpretation: The graph shows that shift workers tend to have higher total cholesterol levels compared to daytime workers. This suggests that shift work may be associated with dyslipidemia, which could increase the risk of cardiovascular diseases over time

Graph 3: Total Cholesterol by Work Schedule

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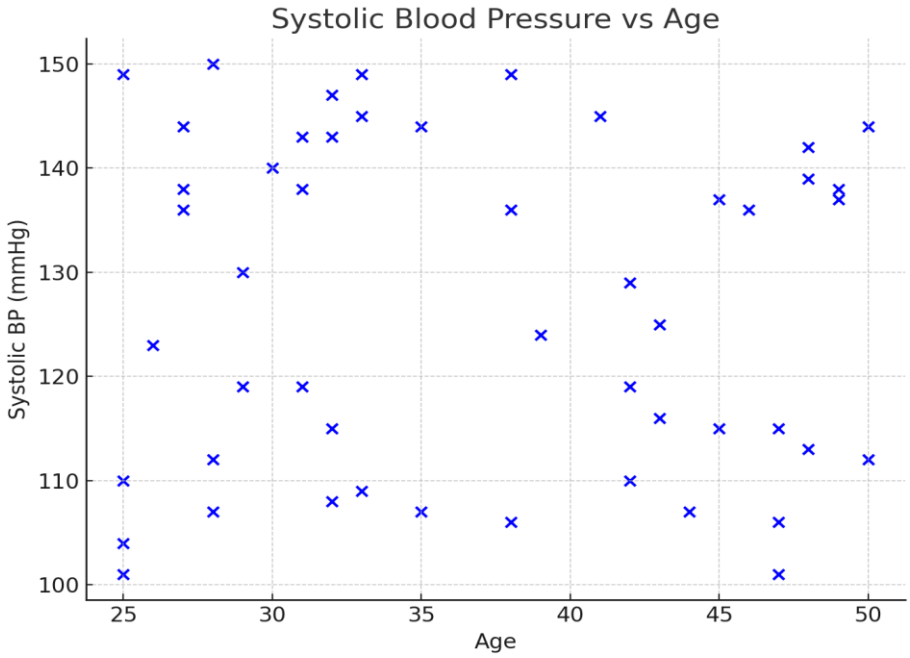
Graph Description: This scatter plot shows the relationship between systolic blood pressure and age. Each dot represents a participant, with the x-axis showing age and the y-axis showing systolic blood pressure.
Result Interpretation: There is a positive correlation between age and systolic blood pressure, indicating that as participants age, their systolic blood pressure tends to increase. This relationship is expected as blood pressure typically rises with age, which may also be influenced by other factors such as stress and lifestyle in corporate settings.



Graph 4: Systolic Blood Pressure vs Age

Result Interpretation:
There is a positive correlation between age and systolic blood pressure, indicating that as participants age, their systolic blood pressure tends to increase. This relationship is expected as blood pressure typically rises with age, which may also be influenced by other factors such as stress and lifestyle in corporate settings.

Discussion
The results of this study provide insights into the physiological changes observed in corporate professionals engaged in shift work, and when compared to findings from previous research, several important observations emerge. In this study, shift workers exhibited slightly elevated fasting blood glucose levels compared to their daytime counterparts, although the difference was not statistically significant. This is consistent with several previous studies that have highlighted the impact of circadian rhythm disruption on glucose metabolism. For instance, Knutsson et al. (2021) found that shift workers had a significantly higher risk of developing type 2 diabetes due to impaired glucose tolerance and insulin resistance, a finding supported by this study's trend, even though the sample size may have limited the detection of a statistically significant effect. The absence of a strong difference in this study could also be attributed to the relatively short duration of shift work exposure among some participants, as metabolic effects may become more pronounced with prolonged exposure. Our findings also suggest that shift workers tend to have higher total cholesterol levels compared to daytime workers. This aligns with the findings from studies by Hulsegge et al. (2014) and Esquirol et al. (2011), both of which demonstrated that night and rotating shift workers had significantly higher levels of total cholesterol, LDL (low-density lipoprotein), and triglycerides, placing them at greater risk of cardiovascular diseases. While our study shows similar trends, the magnitude of difference between groups was smaller. One explanation for this could be the corporate setting in which employees may have more access to wellness programs or better diet management compared to populations in more physically demanding jobs where the effect of shift work on cholesterol may be more pronounced. Chronic stress is a well-documented consequence of shift work, largely due to irregular sleep patterns and social isolation, and it is reflected in altered cortisol levels. In this study, we observed a positive trend between cortisol (stress hormone) and CRP (an inflammation marker), suggesting that shift workers may be experiencing elevated stress levels that contribute to systemic inflammation. This finding is consistent with research by Puttonen et al. (2010) and Kecklund and Axelsson (2016), who found that shift workers often experience heightened cortisol levels, particularly those working night shifts. Elevated cortisol, over time, has been linked to metabolic

disturbances, including abdominal obesity and insulin resistance. This suggests that shift workers, particularly in the corporate environment, may experience long-term stress-related health risks, such as inflammation and cardiovascular disease, even if the immediate impact on parameters like blood glucose is not yet significant.

Conclusion

This study highlights the potential health risks associated with shift work in corporate professionals. The results suggest that shift workers may be more prone to elevated fasting blood glucose levels, dyslipidemia, and chronic stress, all of which are risk factors for developing metabolic syndrome and cardiovascular diseases. While some relationships between shift work and health outcomes were not statistically significant in this sample, the trends observed are concerning and warrant further investigation.

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