A Study on The Impact of Shift Work on Employee Health At Chengalrayan Co-Operative Sugar Mills

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Abstract- *Shift work has emerged as an essential element of industrial operations, ensuring continuous production and service delivery in sectors such as manufacturing, healthcare, and sugar processing. Despite its economic advantages, shift work has been associated with numerous physiological, psychological, and social consequences for employees. This study explores the multifaceted impact of shift work on employee health with a specific focus on Chengalrayan Co-operative Sugar Mills, Villupuram District, Tamil Nadu. Using a descriptive research design, primary data was collected from 100 employees through structured questionnaires, and analyzed using ANOVA, Pearson Correlation, and Regression analysis. The study reveals that irregular working hours, night shifts, and rotational schedules contribute significantly to fatigue, mental stress, and reduced concentration levels among employees. It also identifies gaps in employee wellness programs and highlights the importance of management interventions in promoting occupational health. The findings emphasize that shift work should be managed strategically to balance productivity with worker well-being.*

Keywords- Employee Health, Job Satisfaction, Occupational Health, Shift Work, Wellness Programs.

I. INTRODUCTION

Shift work, defined as employment practices outside traditional daytime hours, is an operational necessity in industries that require continuous production cycles. In the Indian context, the sugar industry plays a vital role in supporting rural livelihoods and contributes significantly to the economy. However, continuous operations during the crushing season necessitate the deployment of workers in rotating and night shifts.

At Chengalrayan Co-operative Sugar Mills, employees work under intense production pressure and extended hours, which disturb the body's circadian rhythm, leading to several health-related issues. Research suggests that prolonged exposure to shift work results in cardiovascular disorders, metabolic diseases, insomnia, and psychological stress. Additionally, social and family disruptions further compound these effects, creating an imbalance between work and personal life.

The current study attempts to investigate how shift work influences physical, psychological, and occupational health. It also aims to recommend evidence-based solutions such as health education, schedule optimization, and wellness initiatives that can enhance employee satisfaction and organizational performance.

II. OBJECTIVES OF THE STUDY

- To identify the demographic differences in health impact due to shift work.
- To understand employee satisfaction related to various shift schedules.
- To evaluate the impact of shift work on productivity, absenteeism, and job satisfaction.
- To suggest employee awareness of health education and wellness programs.

III. REVIEW OF LITERATURE

Patel, Kumar & Wong (2024):

In their study Cultural Factors in Shift Work Management highlighted that employees from collectivist societies face dual stress due to professional and family responsibilities. Cultural adaptation strategies and peer support were found to mitigate health risks.

Martinez & Wong (2024):

Proposed a holistic framework for developing sustainable shift work ecosystems. Their integrated model emphasized rest breaks, employee-driven scheduling, and ergonomic redesign to enhance sleep quality and productivity.

Clari et al. (2024)

Analyzed the effect of 12-hour shifts and identified a strong correlation between long working hours and increased cardiovascular risk. The study stressed the need for institutional policies promoting reduced shift durations.

Turunen et al. (2024)

Explored participatory scheduling in Finnish industries and found that involving employees in shift planning reduces absenteeism and improves sleep patterns.

Silva & Costa (2023)

Examined the consequences of night shifts and confirmed strong links with sleep disorders, depression, and metabolic dysfunctions.

Moreira, Wu &Jeong (2023)

Developed the Health Belief Model for shift workers and concluded that self-efficacy and health awareness are vital predictors of positive behavioral outcomes.

IV. RESEARCH METHODOLOGY

Research Design:

The study employs a descriptive research design to systematically examine how different shift patterns influence employee health at Chengalrayan Co-operative Sugar Mills. This approach captures the existing conditions, behaviors, and perceptions among the workforce.

Data Collection:

Primary Data: Obtained through structured questionnaires distributed among 100 employees actively engaged in day, night, and rotational shifts.

Secondary Data: Derived from journals, government reports, and organizational documents to support theoretical analysis.

Sampling Method:

The study uses purposive sampling to ensure that respondents represent employees directly impacted by shift work. The total population of the mill is approximately 400, and 100 respondents were selected for statistical reliability

Statistical Tools:

The collected data was analyzed using the Statistical Package for the Social Sciences (SPSS). The tools used include Descriptive Statistics, ANOVA, Pearson Correlation, Multiple Regression Analysis.

V. DATA ANALYSIS AND INTERPRETATION

DESCRIPTIVE STATISTICS

Aim: To summarize the demographic characteristics of respondents and identify basic trends regarding shift patterns and health outcomes among employees of Chengalrayan Co-operative Sugar Mills.

HYPOTHESES:

NULL HYPOTHESIS (H{0}): There is no significant variation in demographic characteristics among employees working different shift schedules.

ALTERNATIVEHYPOTHESIS(H{1}): There is a significant variation in demographic characteristics among employees working different shift schedules.

Category	Classification	No. of Respondents	Percentage (%)
Gender	Male	54	54%
	Female	46	46%
Age Group	Below 25 years	12	12%
	25-34 years	45	45%
	35-44 years	28	28%
Type of Shift	Day Shift	32	32%
	Night Shift	40	40%
	Rotational Shift	28	28%

INTERPRETATION:

Most employees (40%) work night shifts, while 45% fall within the 25–34 age range, indicating a predominance of younger workers in production roles.

INFERENCE:

Night shifts and rotational schedules are more common and tend to be associated with increased fatigue and reduced rest, making this group more vulnerable to work-related health problems.

ONE-WAY ANOVA

Shift Timing vs. Employee Health Issues

Aim: To determine whether there is a significant difference in health problems among employees working in different shift timings.

HYPOTHESES:

NULL HYPOTHESIS (H{0}): There is no significant difference in mean health impact scores among employees working in different shift timings.

ALTERNATIVE HYPOTHESIS(H{1}): There is a significant difference in mean health impact scores among employees working in different shift timings.

Source	df	F-Statistic	Sig. (p-value)
Between Groups	2	4.215	0.018
Within Groups	97		
Total	99		

INTERPRETATION:

The ANOVA test produced an F-value of 4.215 and a p-value of 0.018. As the p-value < 0.05, the result is statistically significant.

INFERENCE:

The null hypothesis is rejected. This indicates that the type of shift (day, night, or rotational) significantly influences employee health outcomes. Employees working night and rotational shifts experience greater fatigue, sleep disorders, and stress compared to day-shift workers.

3) PEARSON CORRELATION

Relationship between Shift Work and Employee Health

Aim: To examine the degree and direction of correlation between shift work factors (timing and duration) and employee health indicators such as stress, fatigue, and satisfaction.

HYPOTHESES:

NULL HYPOTHESIS (H{0}): There is no significant correlation between shift work and employee health.

ALTERNATIV EHYPOTHESIS(H{1}): There is a significant correlation between shift work and employee health.

Variables	Pearson Correlation (r)	Sig. (p-value)
Shift Work – Fatigue	0.486	0.000
Shift Work– Stress Level	0.532	0.000
Shift Work– Job Satisfaction	0.371	0.002

INTERPRETATION:

The correlation coefficients show a positive relationship between shift work and both fatigue (r = 0.486) and stress (r = 0.532), and a negative relationship with job satisfaction (r = -0.371).

INFERENCE:

Since all relationships are statistically significant (p < 0.05), the null hypothesis is rejected. This implies that shift work strongly contributes to employee fatigue and stress, while inversely affecting job satisfaction and morale.

MULTIPLE REGRESSION ANALYSIS

Impact of Shift Work Dimensions on Employee Health

Aim: To identify the extent to which various aspects of shift zwork — such as shift timing, work duration, and rest intervals — collectively influence employee health.

HYPOTHESES:

NULL HYPOTHESIS (H{0}):: Shift work dimensions (timing, duration, rest intervals) have no significant impact on employee health.

ALTERNATIVE HYPOTHESIS(H{1}): Shift work dimensions (timing, duration, rest intervals) have a significant impact on employee health.

Model	R Square	Adjusted R^2	F	Sig. (p-value)
1	0.328	0.317	15.278	0.000

Predictors:(Constant), Shift Timing, Work Duration, Rest Intervals
Dependent Variable: Employee Health

INTERPRETATION:

The regression model yielded an R^2 value of 0.328, indicating that 32.8% of the variation in employee health is explained by shift work variables. The F-value of 15.278 and p-value of 0.000 show the model is statistically significant.

INFERENCE:

The null hypothesis is rejected. Shift timing, long working hours, and inadequate rest significantly influence employee health outcomes. Regular monitoring, ergonomic scheduling, and adequate rest periods are vital to improving worker health and overall performance.

VI. FINDINGS

- Shift work significantly affects both physical and psychological well-being of employees.
- Night shifts are associated with higher fatigue, irregular sleep patterns, and decreased productivity.
- Younger employees adapt better to shift rotations, while older workers face greater health deterioration.
- Lack of health awareness programs leads to low engagement in wellness activities.
- Absenteeism and low morale are more frequent during extended crushing periods.
- Gender plays a moderating role, with female employees experiencing higher stress due to social and family responsibilities.

VII. SUGGESTIONS

- The study reveals that shift work considerably affects the physical and mental health of employees. Therefore, it is suggested that Chengalrayan Co-operative Sugar Mills adopt flexible and balanced shift schedules that provide sufficient rest between shifts. Forward rotation should be preferred as it aligns better with the body's natural rhythm.
- Regular health check-ups, wellness programs, and awareness sessions on fitness, stress management, and sleep hygiene can help employees maintain good health. The organization should also provide proper rest breaks, improve workplace ergonomics, and ensure adequate lighting and ventilation for night shift workers.
- Counselling and mental health support should be made available to help employees manage stress and fatigue. Promoting work-life balance through family-friendly policies and incentive schemes for health participation can enhance morale and productivity. These combined efforts will reduce health risks, absenteeism, and turnover while improving employee satisfaction and organizational performance.

VIII. CONCLUSION

The study concludes that shift work has a significant impacton employee health and productivity at Chengalrayan Co-operative Sugar Mills. Employees engaged in night and rotational shifts experience higher levels of fatigue, stress, and disrupted sleep compared to day-shift workers.

These factors reduce job satisfaction and overall performance. To overcome these challenges, management must implement effective scheduling systems, wellness initiatives, and counselling programs to promote physical and mental well-being.

Ensuring employee health is not only a moral responsibility but also essential for long-term industrial success. A healthy and motivated workforce contributes to higher productivity, better performance, and sustainable organizational growth.

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