

Occupational Stress and Health Status among Coal Mine Workers

JYOTI¹ AND SEEMA DEY^{*2}

¹Research Scholar and ²Associate Professor

Department of Home Science, Ranchi University, Ranchi (Jharkhand) India

ABSTRACT

This study looks at the connection between coal mine workers' health and occupational stress in Dhanbad, Jharkhand. Workers in coal mining are subjected to physically and mentally taxing working conditions. Using surveys and interviews, 200 employees provided primary data for the descriptive study design. The analysis, which was done with SPSS and Excel, showed that the main causes of stress were long work hours, hazardous workplaces, poor pay, and job uncertainty. According to a health assessment, workers had a significant prevalence of musculoskeletal conditions, respiratory illnesses, and general weakness.

Keywords: Occupational hazards, Health status, Work stress

INTRODUCTION

The majority of India's coal reserves are located in the country's east and south-central regions. 98.58% of India's known coal reserves were found in Jharkhand, Odisha, Chhattisgarh, West Bengal, Madhya Pradesh, Telangana, and Maharashtra (Neelakanti and Sriramula, 2019).

Coal is a sedimentary rock made mostly of carbonaceous material that was created over millions of years from plant remains that were heated and compressed by the earth. For ages, coal has been utilized as a fuel because it is flammable (Hendryx *et al.*, 2020)

The environment, biodiversity, and health of the communities nearby are directly harmed by the dust and radiation that coal produces throughout the excavation, loading, and unloading activities (Chaulya *et al.*, 2011).

Carlson (2019) says that, "Stress is nothing more than a socially acceptable form of mental illness". It is the mental and physical condition that arises when a person's resources are insufficient to meet the demands of the job. Stress associated with one's work is known as occupational stress (Karthikeyan and Lalwani, 2019).

The World Health Organization considers occupational stress a worldwide epidemic. With the

advancement of society, modern life has become increasingly fast-paced, and work patterns have changed significantly. People now face pressure related to family responsibilities, work demands, education, health, and other aspects of life, which has contributed to rising levels of occupational stress among employees. Recognized as a major psychosocial risk factor, occupational stress has become an important subject in international research on occupational health, psychology, and occupational disease prevention laws. A variety of factors contribute to occupational stress, and these can generally be divided into occupational and individual factors. Occupational factors include - Working conditions such as shift work or irregular schedules, sedentary, repetitive, or monotonous tasks, individual or group-based work, and tasks that may or may not be under a worker's control. Work environment factors, including physical conditions like heat, noise, and poor lighting, as well as chemical factors such as unpleasant Odors. Interpersonal relationships at work, particularly interactions with colleagues and supervisors. Organizational roles, including role ambiguity, role conflict, excessive workload, and issues related to role identity. Career development factors, such as job satisfaction, opportunities for rewards and promotions, job security, and confidence about future

employment prospects. Individual factors include personal characteristics such as gender, age, and Type A personality traits, along with self-perception, self-confidence, and the individual’s ability to manage stress effectively (Li *et al.*, 2019).

Review of Literature:

According to Das (2018), several factors contribute to work-related stress in the coal mining industry, including long working hours, inadequate wages, limited opportunities for career advancement, excessive workload, and challenging working conditions. These factors significantly affect employees’ efficiency and productivity. Occupational stress also leads to higher employee turnover, job dissatisfaction, and reduced organizational commitment, which ultimately hinder the growth and success of industries. In today’s rapidly changing world, workers are exposed to various stressors that influence different aspects of their lives.

Pizarro and Fuenzalida (2021) carried out a literature review involving mining industries from countries such as Australia, South Africa, China, and several Latin American nations. The study examined the impact of demographic factors on miners’ mental health across different mining settings. Findings showed that younger miners were more concerned about job insecurity, whereas older miners experienced long-term stress caused by prolonged exposure to hazardous working conditions and declining health. Female miners, despite being fewer in number, encountered additional stress due to gender discrimination, limited promotion opportunities, and conflicts between work and family responsibilities. Similar to previous studies, married miners generally demonstrated better mental health outcomes.

According to Becarevic *et al.* (2014), pit miners working in the Black Coal Mine Bano vici showed a high prevalence of arterial hypertension, metabolic syndrome, and depression, all of which increased their overall cardiovascular risk. The study further reported that six months of combined psychotropic and somatotropic therapy helped reduce depression levels, waist circumference, blood pressure, and blood concentrations of total cholesterol, HDL, LDL, and glucose among miners suffering from hypertension, metabolic syndrome, and depression. However, no significant improvement was observed in body mass index (BMI), while triglyceride levels in the blood increased during the treatment period.

METHODOLOGY

The study was conducted in Dhanbad, located in the state of Jharkhand, which is widely known as the “Coal Capital of India”. A total of 200 coal mine workers were selected as the sample size for this research. The sample included workers from different age groups, educational backgrounds, and job roles to ensure diversity and representation. The selection of 200 respondents was considered adequate for statistical analysis and for drawing meaningful conclusions regarding the research objectives.

These tools and techniques enabled the researcher to interpret the data effectively and test the relationships between variables in line with the research objectives.

RESULTS AND DISCUSSION

Demographic Profile of Workers:

The demographic characteristics of coal mine workers provide insight into the background variables influencing stress and health status (Table 1).

Variable	Category	Frequency	Percentage (%)
Age Group	20–30 years	44	22%
	31–40 years	70	35%
	41–50 years	56	28%
	Above 50 years	30	15%
Education	Illiterate	36	18%
	Primary	64	32%
	Secondary	60	30%
	Higher	40	20%
Work Experience	< 5 years	40	20%
	5–10 years	76	38%
	> 10 years	84	42%

The majority of workers (35%) belonged to the age group of 31–40 years, indicating a relatively active workforce. A significant proportion had more than 10 years of experience (42%), which suggests prolonged exposure to occupational hazards. Educational levels were generally low, with most workers having only primary or secondary education, which may influence awareness regarding health and stress management.

Causes of Work Stress:

Work stress among coal mine workers arises due

to various occupational and environmental factors (Table 2).

Table 2 : Major Causes of Work Stress		
Causes of Stress	Frequency	Percentage (%)
Long working hours	60	30%
Unsafe working conditions	50	25%
Low wages	40	20%
Job insecurity	30	15%
Work pressure	20	10%

The findings indicate that long working hours (30%) and unsafe working conditions (25%) were the primary causes of stress among workers. Economic factors such as low wages and job insecurity also contributed significantly. These stressors reflect the challenging nature of mining work and its impact on workers' mental well-being.

Health Status Analysis:

The health condition of workers was assessed based on common diseases and overall well-being (Table 3).

Table 3 : Health Problems among Workers		
Health Issues	Frequency	Percentage (%)
Respiratory diseases	70	35%
Musculoskeletal disorders	40	20%
Heart-related problems	30	15%
General weakness	36	18%
Other diseases	24	12%

Respiratory diseases were found to be the most prevalent health issue (35%), mainly due to continuous exposure to coal dust. Musculoskeletal problems (20%) were also common due to physically demanding work. The presence of heart-related issues and general weakness indicates poor overall health conditions among workers, possibly linked to stress and inadequate nutrition.

Relationship Between Stress and Health:

To examine the relationship between work stress and health status, correlation analysis was conducted (Table 4).

Table 4 : Correlation between Work Stress and Health Status		
Variables	Correlation Coefficient (r)	Significance (p-value)
Stress vs Health	0.62	0.01

The correlation coefficient ($r = 0.62$) indicates a moderately strong positive relationship between work stress and poor health status. This implies that as stress levels increase, health conditions tend to deteriorate. The p-value (0.01) shows that the relationship is statistically significant.

These findings confirm that occupational stress plays a crucial role in influencing the health of coal mine workers. Therefore, addressing stress factors can significantly improve their overall health and productivity.

The analysis reveals that coal mine workers in Dhanbad face multiple challenges related to stress and health. Demographic factors such as age and experience influence exposure to stress, while working conditions and economic factors act as major stressors. Health issues, particularly respiratory diseases, are widespread due to occupational hazards. The strong relationship between stress and health highlights the need for integrated interventions focusing on both physical and mental well-being.

Conclusion

Summary of Findings:

The findings revealed that the majority of workers belonged to the economically active age group and had considerable work experience, indicating prolonged exposure to occupational hazards. It was observed that educational levels among workers were relatively low, which may limit their awareness regarding health practices and stress management.

The study identified several major causes of work stress, including long working hours, unsafe working conditions, low wages, and job insecurity. These factors contributed significantly to psychological strain and reduced job satisfaction among workers. In terms of health status, respiratory diseases emerged as the most common health problem, followed by musculoskeletal disorders and general weakness. This reflects the adverse impact of continuous exposure to coal dust and physically demanding work conditions.

Furthermore, the analysis established a significant positive relationship between work stress and poor health status. This indicates that increased stress levels are associated with deterioration in both physical and mental health. Overall, the findings highlight that coal mine workers face a dual burden of occupational stress and health risks, which adversely affects their quality of life and productivity.

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