

Beyond the surface: a perspective on the psychosocial dimensions in mining operations in Indonesia

Vena Jaladara^{1*}, Mubasysyir Hasanbasri²

¹ Department of Health Behavior, Environment, and Social Medicine, Universitas Gadjah Mada, Yogyakarta, Indonesia

² Department of Biostatistics, Epidemiology, and Population Health, Universitas Gadjah Mada, Yogyakarta, Indonesia

Abstract. The mining industry still faces high accident rates among heavy vehicle operators, despite advancements in safety technologies and regulations. Fatigue is one of the most common issues faced by heavy vehicle operators. Fatigue has become a critical concern that significantly impacts occupational safety and productivity. Physical and psychosocial factors are frequently linked to the cause of fatigue. However, despite the implementation of various preventive measures, there has been little further investigation into psychosocial factors, including work-related burnout caused by long working hours and the need to adhere to rest regulations, which have not been prioritized. Implementing preventive measures is essential to improving the safety and well-being of heavy vehicle operators in the mining industry. This perspective explores how there are still many psychosocial issues that have not been addressed.

1 Introduction

Indonesia possesses a multitude of natural resources, rendering its mining sector a crucial contributor to the social and economic advancement of the country. In order to ensure high productivity and efficiency, the mining industry runs around the clock. Heavy vehicles operators play a crucial role in mining activities. Working night shifts as part of the 24-hour schedule can disrupt their natural body clock, potentially causing fatigue - a condition marked by extreme tiredness and reduced energy levels that can impact decision-making and performance [1].

Fatigue among heavy vehicle operators in the mining sector is a widespread concern with extensive implications for occupational safety and operational productivity [2]. Fatigue is described as acute exhaustion resulting from either mental or physical exertion or illness, and it has the potential to significantly hinder an individual's ability to perform tasks securely and efficiently. In the context of mining industries, where operators have to operate heavy machines under challenging circumstances, the implications of fatigue can be notably serious, leading to incidents, accidents, and even fatalities [3,4].

*Corresponding author : vena.jaladara@gmail.com

Understanding the various factors contributing to fatigue is essential for the creation of successful and thorough interventions. Within the mining industries, operators have to engage in rotational shifts, typically spanning two to three shifts with extended working periods of up to 12 hours daily, leading to potential cumulative fatigue [2,5]. It is, however, often disregarded that these physical aspects may instigate psychosocial components that worsen fatigue. Prolonged working hours, in conjunction with stringent rest protocols, generate heightened levels of occupational stress, inadequate social support, and an unsatisfactory work-life equilibrium—all factors that may contribute to the psychological and emotional pressure felt by the operators [6,7]. Moreover, the absence of opportunities for professional growth and career progression could dampen motivation and job satisfaction, further escalating the sensation of being ensnared in an exhausting routine.

This article aims to illuminate the considerable influence of psychosocial elements on the fatigue faced by heavy vehicle operators in the mining industries. Through an examination of how extended work hours and strict rest protocols interplay with these psychosocial stressors, a thorough comprehension of the matter can be attained. Additionally, the main focus of this article is to highlight the harmful consequences of disregarding chances for self-improvement, which not only impacts the well-being of individual drivers but also carries wider ramifications for safety and efficiency in the workplace. By tackling these issues, potential remedies and precautionary actions can be identified to improve the general health and job contentment of heavy vehicle drivers, consequently resulting in a safer and more effective mining sector. These perspectives are aimed at promoting further research to enhance understanding of effective approaches in addressing psychosocial factors among heavy vehicle operators in mining industries.

2 Discussion

2.1 Work Patterns Among Heavy Vehicle Operators

Since mining operations run 24 hours a day, heavy vehicle operators are required to work according to the mining industry's operational hours. Working hours for heavy vehicle operators in the mining sector are typically extensive, often involving 10 to 12-hour shifts, including night shifts, which can lead to significant fatigue and associated health risks [8–10]. For instance, haul dump truck operators in mining production activities typically work in 12-hour shifts. Similarly, at a coal mining site in East Kalimantan, Indonesia, high dump truck operators (HD operators) work continuously, including night shifts. Additionally, shift schedules are usually rotated, combining workdays with rest days, such as a pattern of 7 working days followed by 7 days off, to provide a balance between work and rest [11]. The working conditions in mines are particularly challenging, with harsh environments such as extreme weather, dust, and high noise levels. Furthermore, the remote locations of mining sites present their own unique challenges and issues for the operators [12].

The long working hours and challenging conditions in the mining industry not only affect the physical health of operators, leading to fatigue and an increased risk of injury, but also have a significant impact on their mental health [2,8]. Stress and burnout are common issues, especially due to night shifts that disrupt natural sleep rhythms, resulting in prolonged and recurrent fatigue [8,11]. The limited time available for activities outside of work can also lead to feelings of stagnation and lack of fulfilment, which can further diminish mental well-being. Extended working hours reduce opportunities for interaction with family and friends, leading to

social isolation. This social isolation, along with limited time to spend with loved ones or to engage in personal development activities such as hobbies and other interests, exacerbates the mental strain on workers [7,13,14].

Unfortunately, the efforts to prevent and manage fatigue have not adequately addressed the importance of recognizing workers as whole individuals, not just in their roles as employees. These efforts have primarily focused on controlling accidents and fatigue within the workplace, but often overlook the fact that triggers for accidents or fatigue can also stem from factors outside of work, such as personal and psychosocial aspects in the workers' living environments.

2.2 Implications of Elevating Workers' Psychosocial Aspects

The focus on workers' self-development in the mining industry has significant implications for motivation, safety, and health in the workplace. In the challenging and high-risk environment of the mining sector, the well-being of workers should be a top priority. When special attention is given to workers' self-development, such as providing training, skill enhancement programs, opportunities for further education, and better career prospects, it not only improves their technical competencies but also enhances their self-esteem and job satisfaction [15]. Workers who feel valued and are given opportunities to grow tend to be more motivated. They are more enthusiastic about their daily tasks, feel more engaged in their work, and demonstrate a stronger commitment to the company [16].

In some cases, the implementation of self-development programs in high-stress mining environments has been shown to significantly impact workers' mental health and well-being by addressing various psychological and social factors. For instance, the Australian mining sector, known for its high stress-related productivity impairment costs, benefits from targeted health promotion strategies that engage stressed employees, particularly those with low desire for stress management assistance [17]. Contemporary intervention frameworks, which adopt holistic approaches to promote well-being and improve functioning, have shown to provide a wide range of health, social, and economic benefits, moving beyond merely preventing psychological ill-health [18]. The Integrated Approach to Health, Wellbeing, and Productivity at Work (ITASPA) intervention, which focuses on improving the psychosocial work environment, has demonstrated significant reductions in sleep problems and tendencies towards improved relaxation and reduced sadness among workers, highlighting the positive effects of such programs on mental health [19].

Additionally, the importance of self-regulation as a condition for ensuring psychological security in professional activities is emphasized through reflexive seminars, which enhance workers' awareness and self-regulation capabilities, thereby contributing to their overall psychological safety [15]. Furthermore, peer-based mental health programs like MATES in mining, combined with supervisor training, have proven effective in reducing mental health stigma, improving help-seeking behaviors, and enhancing the perception of workplace commitment to mental health. These programs increase workers' confidence in identifying and supporting colleagues with mental health issues, fostering a supportive work environment. Collectively, these self-development programs not only mitigate stress and improve mental health but also enhance the overall well-being and productivity of workers in high-stress mining environments.

Worker self-development impacts safety and health in the mining industry by aligning with their intrinsic values to protect their well-being. The study utilized self-determination theory to demonstrate that miners are motivated to engage in dust-reducing practices not merely for compliance, but because of their personal values [18,20]. This intrinsic motivation fosters sustainable changes in behavior and practices, highlighting the importance of addressing

workers' psychological needs for health maintenance. By focusing on self-development and intrinsic motivations, organizations can effectively support workers in enhancing safety and health outcomes in the mining industry [14]. This increased motivation directly impacts workplace safety, as motivated workers are more likely to adhere to safety procedures and remain vigilant to potential hazards around them. Furthermore, attention to self-development also has a positive impact on workers' mental and physical health. Effective self-development programs often incorporate elements of holistic well-being, such as stress management and work-life balance. Workers who have opportunities for self-development outside of their jobs tend to experience better mental health, as they can pursue interests and hobbies that bring them happiness and balance.

3 Conclusion

The psychosocial aspect plays a crucial role in influencing work-related factors. However, issues related to psychosocial aspects are often unidentified, leading to inadequate handling and mitigation. In fact, these issues can have long-term negative implications on work productivity. Attention to and opportunities for personal development for workers in the mining industry not only benefit the individuals themselves but also create a positive domino effect on motivation, safety, and health in the workplace. Companies that adopt this approach will experience enhanced operational performance and an improved reputation in the eyes of employees and the broader community.

This perspective article emphasizes the importance for companies to view employees as whole individuals and to prioritize both their physical and mental safety and health. This consideration should extend beyond the immediate work environment to also include their living and social conditions, acknowledging the inevitable interconnection between work and social life. Therefore, further studies on how to fully humanize workers as individuals within a community are needed in the future, to understand how to achieve a balance between work and personal life for the enhancement of both productivity and worker well-being.

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