

THE EFFECT OF COVID-19 ON CONSTRUCTION SITE PERSONNEL: PSYCHOLOGICAL AND PHYSIOLOGICAL PERSPECTIVES

Mohd Amizan Mohamed @ Arifin¹, Meor Johan Asmadi Hamzah², Nurul Noraziemah Pauzi³, Nur Shuhada Nor Shahrudin⁴ and Syahirah Intan Mohd Sheffie⁵

^{1,2,3 and 4} School of Civil Engineering, College of Engineering, UiTM Shah Alam, 40450, Shah Alam, Selangor, Malaysia

⁵ Ministry of Education, 62604 Putrajaya, Malaysia

The COVID-19 pandemic has caused a worldwide panic, with countries implementing restriction orders to curb its widespread infection. Aside from health, the pandemic imposed adverse impacts on global economic growth and its impact extended across various sectors, including construction. This study investigated the psychological and physiological effects of COVID-19 on construction site personnel, identified the contributing factors, and explored potential mitigation strategies for such issues. The quantitative study involved the distribution of a questionnaire to 227 construction site personnel in Selangor and Kuala Lumpur, Malaysia. The data were analysed using descriptive analysis via SPSS. It was found that anger, anxiety, and depression are psychological repercussions of insomnia, hypertension, and fatigue among construction site personnel. Factors like increased workload, job insecurity, and concerns about infection or exposure to the virus prompted it. They also expressed considerable apprehension about the possibility of losing their jobs and financial difficulties during the pandemic. This study suggested pre-construction workout programmes to strengthen construction site personnel's muscles and cardiovascular system, leading to better physiological and psychological well-being.

Keywords: COVID-19; pandemic; mental health; personnel; psychological

Introduction

The first case of COVID-19 in Wuhan, China in 2019 marked the beginning of a global pandemic (Hui *et al.*, 2020). By January 2021, the virus had spread to over 200 countries, affecting millions of people and causing significant fatalities (Hendrickson and Rilett, 2020; World Health Organization, 2020). In response, countries like Malaysia implemented Movement Control Orders (MCO) to curb the virus, leading to temporary halts in social and economic activities (Bartik *et al.*, 2020; Hashim *et al.*, 2021). However, these measures had severe economic consequences worldwide, including recessions and declining economic performance (Roy and Das, 2020). The construction sector, like other industries, was heavily impacted by the pandemic, with

¹ amizan8124@uitm.edu.my

disruptions to work and potential income loss for construction workers (Bouchardie and Madalena, 2020; Karimi *et al.*, 2018; International Labour Organization, 2020). Understanding the psychological and physiological effects on construction workers is crucial, particularly in the context of Malaysia, where specific knowledge and practices are lacking.

To address this gap, this study aims to investigate the psychological and physiological effects of COVID-19 on construction workers in Malaysia, identify contributing factors, and provide practical recommendations to address their needs and mitigate the adverse impacts of the pandemic. By improving support systems and preparedness in the construction sector, the findings of this research can contribute to better coping mechanisms and responses to unforeseen events in the future (Choudhari, 2020; Jabeen *et al.*, 2021; Rouhanizadeh *et al.*, 2019; Esa *et al.*, 2020; Gara *et al.*, 2022; Sami *et al.*, 2022; Pamidimukkala and Kermanshachi, 2021; Serafini *et al.*, 2020).

This study is important as it investigates the causes of disruptions in construction activities during the MCO in Malaysia. By identifying these causes, construction companies can develop effective management plans to address crises' psychological and physiological effects. The findings will contribute to establishing robust risk management protocols for smoother project execution during crises and addressing future pandemic concerns. Additionally, this research deepens understanding of construction site personnel and the evolving construction environment during pandemics, benefiting the academic community and policymakers.

LITERATURE REVIEW

Correlation Between Psychological and Physiological

Psychophysiology explores the intricate interplay between mind and body, recognising the crucial role of mind-body communication. This field of study posits that changes in physiological processes can impact psychological responses while psychological experiences can influence physiological measures. By delving into this mind-body connection, the present study elucidates how the COVID-19 pandemic has affected construction site personnel's psychological and physiological well-being. Understanding the reciprocal relationship between these aspects is vital to comprehend crises' comprehensive impact on construction sector individuals. It will allow for a more holistic approach to designing strategies and interventions that address construction workers' psychological and physiological aspects. This integrated perspective can pave the way for more effective responses to unforeseen catastrophes and facilitate the development of comprehensive support systems for construction site personnel ("Psychophysiology" n.d.).

Covid-19 Impact on the Psychological Well-Being of Construction Site Personnel

COVID-19 has been linked to anger as a psychological effect, with pandemic-related rage arising from stress, fear, frustration, and other factors (Brooks *et al.*, 2020). While research specifically focused on anger among construction workers is limited, existing studies highlight the prevalence of psychological issues in this group (Cipolletta *et al.*, 2022; Sögütlü *et al.*, 2021). Understanding the causes and manifestations of anger in construction workers during the pandemic is crucial for developing interventions that address their needs. Similarly, the COVID-19 pandemic has led to increased anxiety among workers, with stress, workloads, and self-isolation contributing to heightened nervousness (AGC, 2018; Nawi *et al.*, 2017). This study aims to examine specific anxiety-related issues faced by construction site personnel,

providing insights for alleviating anxiety and promoting mental well-being. Depression rates have also been significantly impacted by the pandemic, particularly among female workers facing increased responsibilities and income loss (Azcona *et al.*, 2020; Wenham *et al.*, 2020). Factors like wages, work schedules, workload, and access to leave have affected mental health in the construction sector (Jahan Nipa *et al.*, 2020). Investigating the causes and consequences of depression among construction workers during the pandemic is essential for implementing effective support systems.

Covid-19 Impact on the Physiological Well-Being of Construction Site Personnel

Insomnia, a sleep disorder characterized by difficulties in falling or staying asleep, is often associated with anxiety disorders (Cherney, 2018). The heightened anxiety during the COVID-19 pandemic can contribute to insomnia among construction workers, affecting their attitude, energy levels, productivity, and overall quality of life. Hypertension, or high blood pressure, has been linked to depression and chronic stress, which can be exacerbated by prolonged periods of stress like those experienced during the pandemic (Patten *et al.*, 2009; Seldenrijk *et al.*, 2015). Construction workers, who already face physically demanding tasks and potential work stress, may be particularly vulnerable to the negative physiological impacts of hypertension. Fatigue, commonly associated with depression, can worsen depressive symptoms, and is influenced by factors like increased workloads, longer hours, and added stressors experienced by construction workers during the pandemic (Ferentinos *et al.*, 2010; Salgado-Delgado *et al.*, 2011). Understanding the relationship between depression, fatigue, and the physiological well-being of construction workers is crucial for implementing interventions to mitigate the impact of COVID-19 on their overall health.

Factors Causing Psychology and Physiology Effects on Construction Site Personnel during COVID-19

Increased workloads in construction can be attributed to project deadlines, implementation of safety protocols, and operational challenges (Umer *et al.*, 2017). The physically demanding nature of construction work exacerbates the impact of increased workloads, leading to fatigue and impairments in attention, concentration, cognitive functioning, productivity, and safety on construction sites. Job insecurity, heightened during the COVID-19 pandemic, particularly affects younger and educated construction workers, leading to psychological challenges, stress, anxiety, decreased motivation, and overall well-being (Giorgi *et al.*, 2020). Concerns about the risk of contracting and transmitting the virus further contribute to insecurity among construction workers, impacting their mental health and well-being. Addressing job insecurity, implementing preventive measures, and providing support systems are crucial for mitigating the negative consequences and promoting better mental health among construction site personnel (Nabe-Nielsen *et al.*, 2021).

Ways to Mitigate the Effect of COVID-19 on the Psychological and Physiological Well-Being of Construction Personnel

Boosting construction workers' morale is crucial for mitigating the psychological and physiological effects of COVID-19 (Bhat, n.d.). Creating a positive work environment, recognizing employees' efforts, and fostering a sense of belonging and purpose can significantly improve morale, leading to better well-being and performance (Cooper and Bevan, 2014). Providing financial support is essential in alleviating the financial pressures caused by the pandemic (Gunnell and John, 2020).

Governments should implement measures like financial aid programs, wage subsidies, and unemployment benefits to reduce financial stress and improve workers' psychological well-being. Encouraging regular exercise before starting work can have physiological benefits for field staff (Angulo *et al.*, 2020). Exercise, particularly aerobic exercise, offers various health benefits, such as reducing the risk of cardiovascular diseases and improving overall health (Izquierdo *et al.*, 2021). Engaging in regular physical activity can also help reduce the risk of severe COVID-19 symptoms and hospitalizations (Sallis *et al.*, 2021). Incorporating exercise into the work routine can improve physical fitness, boost immune function, and enhance workers' ability to cope with the pandemic.

METHOD

Research Process

This study employed the quantitative design involving the use of a questionnaire survey. Figure 1 shows the flow of the research. In this study, the non-probability criterion, a simple random sampling, was used to select the samples (i.e., participants) from a diverse population of construction workers in Malaysia. The Krejcie and Morgan table determined that 227 samples were sufficient for this study (Krejcie and Morgan 1970). All participants were asked to complete a survey questionnaire that was administered through both online and in-person formats. It contained close-ended questions with multiple-choice options and comprised three sections as follows:

- Section A: To investigate the effects of COVID-19 on construction site personnel (20 questions)
- Section B: To identify the factors causing psychological and physiological effects on construction site personnel during COVID-19 (8 questions)
- Section C: To explore the strategies used by construction personnel to mitigate the psychological and physiological effects of COVID-19 (5 questions)

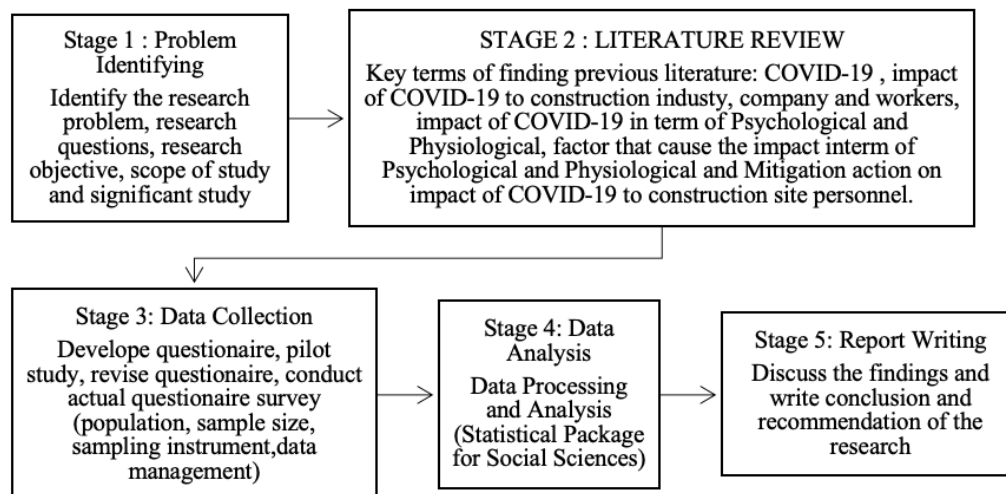


Figure 1: Flow of Research

Data Analysis

This research aimed to examine the impact and factors of COVID-19 on the psychological and physiological well-being of construction workers and explore their strategies to mitigate these effects. Data was collected from 227 participants working on construction sites in the Klang Valley, and analysis was conducted using IBM

SPSS software. The reliability and internal consistency of each item were assessed using Cronbach's alpha value.

Table 1: Results for Research Objective 1

Questions	Mean (μ)	Rank
I feel restless while working on the construction site during the COVID-19 pandemic.	3.76	1
I have daytime tiredness or sleepiness due to working on the construction site during the COVID-19 pandemic.	3.68	2
I experience shortness of breath while working on the construction site during the COVID-19 pandemic.	3.67	3
I have problems controlling my worry while working on the construction site during the COVID-19 pandemic.	3.63	4
I feel anxious working on the construction site during the COVID-19 pandemic.	3.59	5
I need better concentration while working on the construction site during the COVID-19 pandemic.	3.57	6
I have sore or aching muscles due to working on the construction site during the COVID-19 pandemic.	3.56	7
My heart rate increased rapidly while working on the construction site during the COVID-19 pandemic.	3.56	7
I feel angry working on the construction site during the COVID-19 pandemic.	3.55	8
I lost interest or pleasure in hobbies or activities while working on the construction site during the COVID-19 pandemic.	3.54	9
I have vision problems due to working on the construction site during the COVID-19 pandemic.	3.52	10
I have hypertension due to working on the construction site during the COVID-19 pandemic.	3.49	11
I have thoughts of death or suicide, or suicide attempts while working on the construction site during the COVID-19 pandemic.	3.45	12
I feel depressed working on the construction site during the COVID-19 pandemic.	3.44	13
I feel striking out verbally or physically during working on the construction site during the COVID-19 pandemic.	3.42	14
I feel sad, anxious, or "empty" while working on the construction site during the COVID-19 pandemic.	3.40	15
I have difficulty maintaining my sleep time due to working on the construction site during the COVID-19 pandemic.	3.39	16
I have fatigue due to working on the construction site during the COVID-19 pandemic.	3.35	17
I have insomnia from working on the construction site during the COVID-19 pandemic.	3.34	18
I have sleeping problems while working on the construction site during the COVID-19 pandemic.	3.22	19
I have nosebleeds from working on the construction site during the COVID-19 pandemic.	2.62	20

Objective 1 concerns the psychological (anger, anxiety, and depression) and physiological (insomnia, hypertension, and fatigue) effects that COVID-19 had on construction site personnel as shown in Table 1.

Most participants agreed that working on a construction site during the COVID-19 pandemic made them restless ($\mu = 3.76$). They also agreed that working on a

construction site during the COVID-19 pandemic made them feel daytime tired or sleepy ($\mu = 3.68$) and that working on a construction site during the COVID-19 pandemic caused shortness of breath ($\mu = 3.67$). The results suggest that working on a construction site during the COVID-19 pandemic caused insomnia, sleeping problems, and nosebleeds among the third minority of the respondents.

Table 2: Results for Research Objective 2

Questions	Mean (μ)	Rank
I am insecure about losing my job with my current construction company during the COVID-19 pandemic.	4.60	1
I am worried about my financial difficulties during the COVID-19 pandemic.	4.59	2
I am insecure about being infected and affected by others from the COVID-19 virus on the construction site.	4.49	3
My workload on the construction site increased during the COVID-19 pandemic.	4.28	4
I feel hard to adapt to the working environment and working pressure on the construction site during the COVID-19 pandemic.	4.19	5
My working hours on the construction site have been prolonged during the COVID-19 pandemic.	3.74	6
I fear non-optimal management to respond to the crisis on the construction site during the COVID-19 pandemic.	3.73	7
My rest time on the construction site has been shortened during the COVID-19 pandemic.	3.70	8

Objective 2 focuses on factors causing the psychological and physiological effects on construction site workers during the COVID-19 pandemic as shown in Table 2. These factors include their workload, job insecurity, and insecurity about being infected or affected by the virus.

Most respondents were concerned about losing their jobs with the construction company ($\mu = 4.60$) and financial difficulties during the COVID-19 pandemic ($\mu = 4.59$). The third prominent factor was their concern about being infected by the virus or affected by other people on the construction site ($\mu = 4.49$).

As shown in table 3, Objective 3 focuses on mitigating the psychological and physiological effects of COVID-19 on construction site personnel using strategies like boosting the workers' morale, providing financial support, and exercising before working. It is essential to minimise these effects to reduce and eliminate their detrimental impacts on various sector components. During the COVID-19 pandemic, most respondents believed that their companies should conduct exercise sessions before they began working ($\mu = 3.93$). They also agreed that construction companies should encourage employees to express their concerns to the supervisors ($\mu = 3.87$) and that the Malaysian government should provide financial support for construction workers ($\mu = 3.77$).

This study investigated how COVID-19 affected construction site personnel and proposed strategies to reduce those effects. However, it focused on construction workers in the Klang Valley. Future research should include construction workers across Malaysia, use interviews alongside surveys for data collection, and aim for larger sample sizes and longer research periods to enhance the findings' applicability.

Table 3: Results for Research Objective 3

Questions	Mean (μ)	Rank
My company provides exercise sessions before starting work on the construction site during the COVID-19 pandemic.	3.93	1
I can share my feelings and problems with my superiors during the COVID-19 pandemic.	3.87	2
The Malaysian government provides financial support to construction workers during the COVID-19 pandemic.	3.77	3
My company provides construction workers with mental and physical health consultations during the COVID-19 pandemic.	3.44	4
My company acknowledges and rewards my working efforts during the COVID-19 pandemic.	3.43	5

CONCLUSION

This study aimed to understand how COVID-19 affects construction site workers psychologically and physically, identify contributing factors, and suggest ways to mitigate the effects. The findings show that the pandemic has had a significant impact on workers' psychological well-being, leading to symptoms such as anger, anxiety, and depression, which can be associated with insomnia, hypertension, and fatigue. Factors like increased workload, job insecurity, and concerns about infection contribute to these effects. To mitigate the impact, the study recommends measures like implementing pre-construction workout programs, promoting open communication, and providing financial support through government initiatives. These findings are valuable for policymakers, construction companies, and stakeholders to develop targeted interventions and support systems for workers' well-being. Further research and collaboration are needed to refine and implement these strategies effectively.

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