Pertanika J. Sci. & Technol. 34 (S2): 89 - 100 (2026)

PERTANIKA JOURNALS

SCIENCE & TECHNOLOGY

Journal homepage: http://www.pertanika.upm.edu.my/

Enhancing Health and Safety Practices by Complying with SOP Requirements at Construction Sites During the Pandemic

Siti Rashidah Mohd Nasir[1]*, Sulaiman Hasim[1], and Eleanna Guan[2]

[1]Faculty of Civil Engineering, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia
[2]DAL HCM Sdn. Bhd., Petra Jaya, 93050 Kuching, Sarawak, Malaysia

ABSTRACT

Health and safety issues at the construction sites have arisen due to the spread of COVID-19. This paper aimed to identify the ineffectiveness of health and safety measures implemented by contractors at construction sites during the COVID-19 pandemic and to suggest ways to enhance health and safety practices. Questionnaire surveys were distributed to the Grade 7 contractors in Kuala Lumpur who were affected during the COVID-19 pandemic. Non-probability purposive sampling was used to select experts with experience managing construction projects during the COVID-19 pandemic. Descriptive analysis and mean score rank were conducted for data analysis. The findings of this study show that lack of social distancing, inaccurate body temperature measurement, and irregular 'MySejahtera' check-in were the most ineffective health and safety measures implemented by the contractors during the COVID-19 pandemic. This study sheds light on construction practitioners and on the best health and safety practices for complying with SOP requirements at construction sites during a pandemic.

Keywords: Construction site, COVID-19 pandemic, health and safety

ARTICLE INFO

Article history:
Received: 18 June 2026
Accepted: 25 September 2026
Published: 30 September 2026

DOI: https://doi.org/10.47836/pjst.34.S2.08

E-mail address:
sitir015@uitm.edu.my(Siti Rashidah Mohd Nasir)
sulaiman5603@uitm.edu.my(Sulaiman Hasim)
josephineelena99@gmail.com (Eleanna Guan)
* Corresponding author

INTRODUCTION

The COVID-19 pandemic has affected the health and safety of construction workers on construction sites in Malaysian construction projects and caused fatalities. According to the Ministry of Health Malaysia (2020), 88 confirmed COVID-19 cases were identified in three construction sites, which involved 31 cases consisting of 29 Bangladeshi nationals and 2 Indonesian nationals from the Kuala Lumpur Construction site,

e-ISSN: 2231-8526

© Universiti Putra Malaysia Press

13 clusters from all Bangladeshi nationals at the Setia Alam construction site, and 44 cases detected at the second Kuala Lumpur construction site. The increasing number of COVID-19 cases involving construction sites in Malaysia has been identified, with more than 100 construction sites affected and more than 14,000 construction workers confirmed as positive in COVID-19 clusters (Ibrahim et al., 2022). Construction sites had formed the largest cluster of COVID-19 infections due to a lack of discipline and carelessness in implementing the Standard Operating Procedure (SOP) by both employers and employees; less awareness of the procedures and language barriers contributed to undisciplined attitudes faced by the project manager at the site in educating the foreign workers on the SOP (Ibrahim et al., 2022). According to "The COVID-19 Pandemic" (2020), the Construction Industry Development Board (CIDB) issued warnings to around 800 construction sites for failing to follow the Movement Control Order (MCO) standard operating procedures.

Another primary contributing factor to the rising number of COVID-19 cases in Malaysian construction projects is the movement of construction workers between sites (The Sun Daily, 2022). In the construction industry, the health and safety challenges posed by COVID-19 have led to illnesses, injuries, and fatalities among construction workers, as on-site work is conducted in unhygienic conditions with high exposure to infectious diseases (Olanrewaju et al., 2021). This paper aimed to identify the ineffectiveness of health and Safety practices at construction sites during the pandemic, followed by suggestions to enhance health and safety practices among construction workers in compliance with SOPs to effectively mitigate the spread of airborne viruses. This study is imperative for the construction industry to acknowledge government and health authorities regarding the ineffectiveness of the health and safety measures implemented at construction sites during the pandemic. Thus, addressing effective alternatives and solutions in Health and Safety practices during future pandemics.

LITERATURE REVIEW

On 30 January 2020, the World Health Organisation (WHO) declared COVID-19 a Public Health Emergency of International Concern and, on 11 March 2022, classified it as a global pandemic (Simpeh et al., 2022). The worldwide COVID-19 infection count was 21 million, with 13 million recoveries and 760,000 deaths as of 14th August 2020 (Amoah & Simpeh, 2021). According to the World Health Organisation (WHO), the rise in both case numbers and fatalities was driven by reduced social mobility and inconsistent adherence to proven public health practices (UN News, 2021).

Impact of COVID-19 on the Malaysian Construction Industry

The Ministry of Health (MoH) has found that the main factors driving the spread of COVID-19 on construction sites are crowded, cramped workers' accommodations, lack

of physical distancing, and insufficient personal and environmental hygiene practices among construction workers, especially foreign workers (Ibrahim et al., 2022). During the pandemic, as of 30th June 2019, around 435,002 foreign construction workers at Malaysian construction sites were found to have poor hygiene practices corresponding to their countries of origin (Ibrahim et al., 2022). The situation became worse when the workers were put in temporary small cabins with few amenities and utilities where each cabin accommodated more than ten workers; this issue made the workers difficult to adopt good hygiene and social distancing and thus enhanced the virus transmission more quickly, these housing areas should be sanitised daily, and the commonly used regions in the construction sites had to be sanitised at least three times daily (Ibrahim et al., 2022). In addition, the ineffective implementation of the SOP at construction sites has enhanced the spread of the COVID-19 virus due to a lack of awareness of the COVID-19 disease among workers, who tended to ignore the significance of SOPs, such as non-use of face masks, not maintaining good hygiene, failure to monitor body temperature, and not practising social distancing while working at the construction sites.

Health and Safety Measures On-site Practices During the COVID-19 Pandemic

The nature of work in construction requires operating in groups and confined spaces, which creates a high potential for the spread of COVID-19 on construction sites (Olanrewaju et al., 2021).

Table 1
Health and safety practices incorporating SOP implemented by contractors during COVID-19

Category of Health and Safety Measures	Description	Source (s)
Hygiene and Movement Control	Provide face masks to workers Provide health education to workers regularly Ensure a regular supply of sanitiser Keep social distancing Self-isolation for workers who fall ill or are sick Display health advisory posters and infographics in a language understood by the workers Contractors conduct COVID-19 screening tests daily for all construction workers	Ibrahim et al., 2022; Nnaji et al., 2022; Olanrewaju et al., 2021; Salami et al., 2021
Protective Equipment and Construction Site Monitoring	Sanitise the construction area frequently as scheduled (daily, weekly, monthly) Disinfect contaminated surfaces and objects at the construction site Provide separate housing facilities for workers based on the project works	Ibrahim et al., 2022; Nnaji et al., 2022; Olanrewaju et al., 2021

Table 1 *(continued)*

Category of Health and Safety Measures	Description	Source (s)
	Time slots for construction workers to minimise the number of workers working on the construction site at one time, while working 24 hours a day, to compensate for the reduction of manpower	
	Foods and drinks are provided on sites where workers are not allowed to eat outside during working hours	
COVID-19 Awareness	Instruct construction workers to wear gloves while working	Nnaji et al., 2022; Olanrewaju et al., 2021
	Provide incentives to sick workers so that they will honestly report their medical status	

To minimise the spread of COVID-19 amid rising case numbers at construction sites, the government, in collaboration with the Construction Industry Development Board (CIDB) and the Malaysian National Security Council (NSC), introduced strict SOPs (Ibrahim et al., 2022). Thus, the health and safety measures taken by the contractors were essential to mitigate the spread of COVID-19 at the construction sites. Table 1 lists the health and safety practices that complied with NSC and MoH SOP requirements during the COVID-19 pandemic, as reported by various researchers.

METHODS

The data for this study were collected using a quantitative method, in which questionnaire surveys were distributed to Grade 7 contractors, the highest grade of contractor in the Construction Industry Development Board (CIDB), via social media such as email, WhatsApp, Facebook, and LinkedIn, with no limit on tendering capacity. The respondents were selected from the CIDB list, with the primary selection criterion being ongoing projects in the Kuala Lumpur area during the COVID-19 period. Kuala Lumpur is Malaysia's city centre and is divided into 11 districts: Bukit Bintang, Titiwangsa, Setiawangsa, Wangsa Maju, Batu, Kepong, Segambut, Lembah Pantai, Seputeh, Bandar Tun Razak and Cheras. Kuala Lumpur was chosen in this study for its high number of large-scale ongoing construction projects and the high density of construction workers affected by the COVID-19 pandemic (Anaam & Jailani, 2022). The target respondents are contractors' staff with experience managing the project during the pandemic, i.e., Director, Project Manager, Civil Engineer, Safety and Health Officer, Quantity Surveyor, Site Supervisor, Foreman and others.

A purposive non-probability sampling method was adopted for this study, as there was no equal chance of selecting respondents among Grade 7 contractors at construction sites in Kuala Lumpur (Rahman, 2023). Based on the CIDB Grade 7 contractor list, the

population of contractors who met the criteria was shortlisted to 45. Thus, the required sample size for this study is 40 Grade 7 contractors with ongoing projects during the pandemic (Krejcie & Morgan, 1970).

The questionnaire consists of four sections, i.e., Section A on the respondents' demographic; Section B on the health and safety measures implemented by the contractors during the COVID-19 pandemic; Section C on the effectiveness of health and safety measure practices implemented by contractors during the COVID-19 pandemic; while Section D is the respondents' suggestions to enhance the health and safety practices at the site after the pandemic. However, Section B will not be included in the reporting for this paper.

A 5-point Likert scale was used in Sections C and D of the questionnaire to determine the respondent's degree of agreement and disagreement with the statements provided (Taherdoost, 2019). In Sections C and D, respondent opinion was assessed using the following degree of agreement: 1 – Strongly Disagree; 2 – Disagree; 3 – Moderate; 4 – Agree; 5 – Strongly Agree (Tholibon et al., 2021), while Section C also assesses the respondents' opinion on the degree of effectiveness: 1 – Not at all Effective; 2 – Slightly Effective; 3 – Moderately Effective; 4 – Very Effective; Extremely Effective (Taherdoost, 2019).

The pilot study was conducted with 15 selected experts prior to the full-scale study to assess the questionnaire's reliability. The criteria for selecting the experts for the pilot study include individuals with over 5 years of experience in construction projects to ensure a deep understanding of industry practices; active involvement in managing COVID-19 health and safety measures among construction workers; and knowledge and hands-on experience in handling large construction projects during the pandemic. These criteria are crucial to ensuring that experts can provide valuable insights into health and safety practices, including strategies implemented during this unprecedented period.

Descriptive analysis is conducted to examine the degree of familiarity, frequency, and agreement with a question regarding effective health and safety practices that comply with NSC and MoH requirements at construction sites during the pandemic. While mean score analysis is used to quantify the average responses to questions related to ineffective COVID-19 health and safety measures and suggestions to enhance them, it provides a statistically grounded understanding of these practices.

RESULTS AND DISCUSSION

Demographic Profile

Figure 1 shows the frequency of respondents' job positions: Project Manager (22.50%), Health and Safety Officer and Engineer (20%), Director and Site Supervisor (both at 12.50%), Quantity Surveyor (7.50%), and Site Foreman (5%). The respondents were

directly involved in managing the construction project and monitoring the health and safety measures for construction workers on site during the pandemic. The sample comprises 40 Grade 7 contractors with ongoing projects during the pandemic, meeting the required number of respondents for this study.

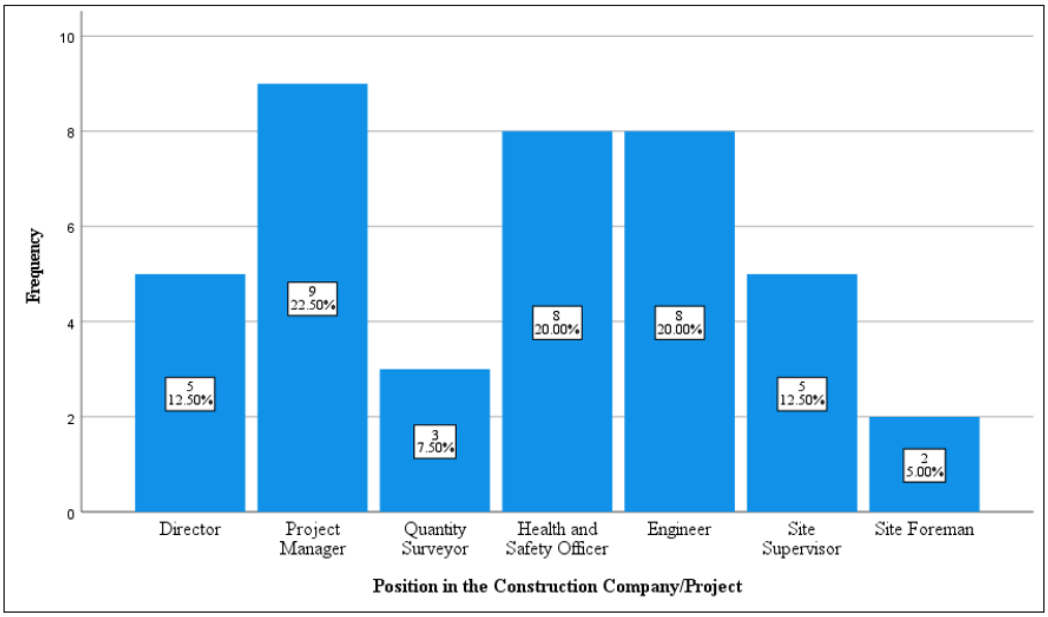

Figure 1. Frequency of respondents based on job position in the construction project

Figure 2 shows the average daily workforce at construction sites by location. The construction projects that had less or equal to 200 workers are as follows: Bandar Tun Razak (22.50%), Bukit Bintang (17.50%), Titiwangsa (12.50%), Cheras (10%), Lembah Pantai and Wangsa Maju (7.50%), Setiawangsa (5%), Segambut (5%), Batu (5%) and Seputeh (2.50%). On the other hand, construction projects with 201 to 300 workers are in Bukit Bintang and Kepong, both at 2.50%.

The data on the average daily workforce in construction sites reflect the intensity and scale of development across various locations. Bandar Tun Razak, leading with 22.50%, showcases rapid construction, including high-rise buildings, public facilities, and infrastructure like the Hospital Kuala Lumpur MRT Station and new highways. Bukit Bintang, at 17.50%, highlights major projects such as the Merdeka 118 building. Titiwangsa (12.50%) is noted for the significant construction of the MRT station amid the COVID-19 pandemic. Cheras (10%) also maintained robust development during the pandemic. Lembah Pantai and Wangsa Maju, each at 7.50%, had several active projects during the pandemic. Setiawangsa, Segambut, and Batu (5% each) are densely populated with residential and housing projects.

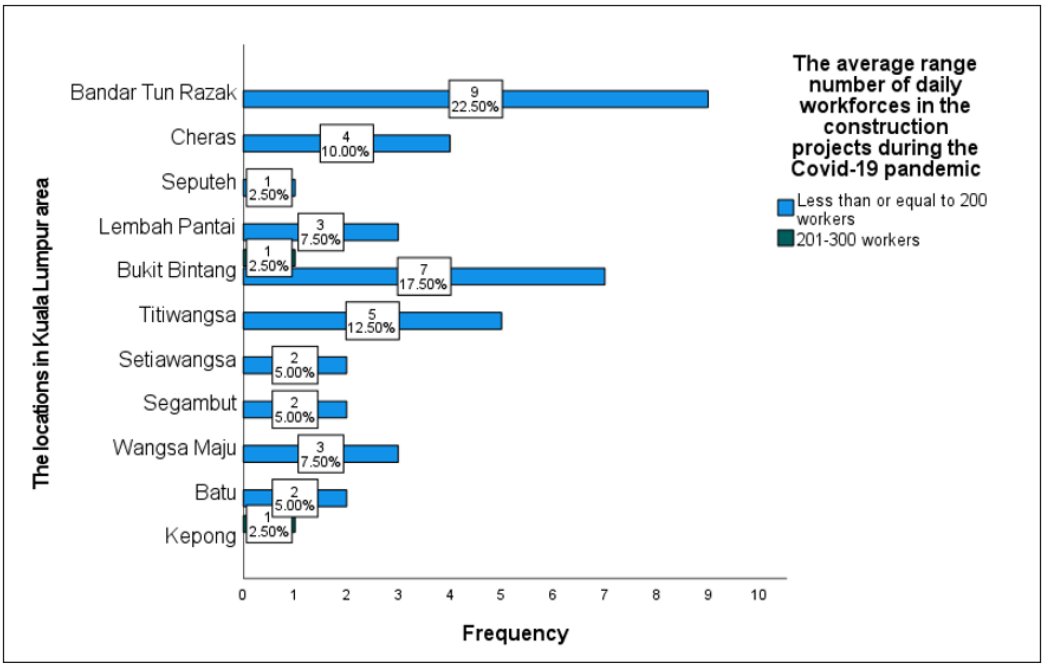

Figure 2. Average daily workforces based on the location of the construction site during the COVID-19 pandemic

In contrast, Seputeh, with the lowest at 2.50%, reflects fewer projects due to its lower population. Lastly, Bukit Bintang and Kepong, each at 2.50%, indicate the presence of larger workforce projects, aligning with their extensive residential developments.

Ineffective Health and Safety Measures at the Construction Site

Table 2 presents an analysis of ineffective COVID-19 health and safety measures practised at construction sites to mitigate the spread of COVID-19. Lack of social distancing and inaccurate body temperature reading received the highest mean score of 4.95 (SD = 0.221).

Figure 3 shows the level of agreement on ineffective health and safety practices. This suggested that 38 respondents (95%) strongly agreed that 'lack of social distancing' is difficult to practice at construction sites, which require heavy work and machinery. This is supported by Chandwani et al. (2021), Pamidimukkala and Kermanshachi (2021), and Shafii et al. (2022), who stated that construction work requires workers to work in confined spaces. 34 respondents (85%) agree that the lack of monitoring of social mobility and movement control among workers (mean score: 4.15, SD = 0.362) leads to a lack of social distancing. Figure 3 shows 36 respondents (90%) and 24 respondents (60%) strongly agree that irregular use of face masks and lack of COVID-19awareness among the construction

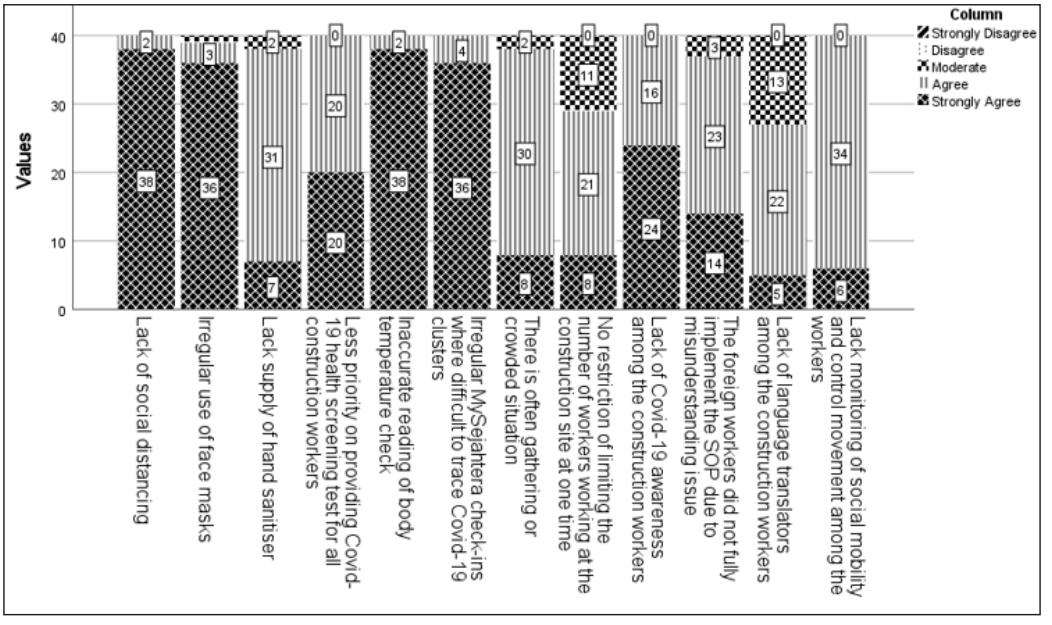

Figure 3. Level of agreement on the ineffective health and safety measure practices

Table 2
Mean score analysis of ineffective COVID-19 health and safety measure practices

Item	Description	Mean	Standard Deviation (SD)
1	Lack of social distancing	4.95	0.221
2	Inaccurate reading of body temperature	4.95	0.221
3	Irregular MySejahtera check-ins had difficulty tracing COVID-19clusters	4.90	0.304
4	Irregular use of face masks	4.88	0.404
5	Lack of COVID-19awareness among construction workers	4.60	0.496
6	Less priority in providing COVID-19health screening tests for all construction workers	4.50	0.506
7	The foreign workers did not fully implement the SOP due to a misunderstanding of the issue	4.28	0.599
8	There are often gatherings or crowded situations	4.15	0.483
9	Lack of monitoring of social mobility and control of movement among the workers	4.15	0.362
10	Lack of supply of hand sanitiser	4.13	0.453
11	No restriction on the number of workers working at the construction site at one time	3.93	0.694
12	Lack of language translators among the construction workers	3.80	0.648

workers, with mean scores of 4.88 (SD = 0.404) and 4.60 (SD = 0.496), respectively, as shown in Table 2, had a significant influence on the spread of COVID-19. Respondents claimed that the workers were reluctant to use face masks while working at the site, even though face mask regulations exist, and were uncomfortable, especially in hot weather and when sweating profusely. This statement was supported by Shafii et al. (2022).

Although body temperature monitoring was mandatory and conducted daily at the construction site entrances, respondents stated that the frequent occurrence of systematic error in the body temperature measuring tool had caused inaccuracy of body temperature which resulted in ineffective health and safety practices at the site as Chen et al. (2022) stated that the discrepancy in body temperature reading is due to the systematic uncertainty of the measuring tool which could not be prevented. Irregular MySejahtera check-ins have difficulty tracing COVID-19 clusters and received the second-highest mean score of 4.90 (SD = 0.304), as shown in Table 2.

Table 2 shows that 36 respondents (90%), as shown in Figure 3 strongly agree that the failure of the construction workers to use the MySejahtera application regularly has a significant effect on the effectiveness of health and safety measures, which contributed to the increasing number of infections, as it is difficult for relevant parties to trace their locations and health status ("Malaysians Should Be More Disciplined," 2020). Figure 3 shows that 20 respondents (50%) agree that the lack of priority in providing COVID-19health screening tests for all construction workers contributed to the ineffective measures. The COVID-19 screening test must be provided to workers to detect asymptomatic cases, as unidentified COVID-19 clusters have been found among construction workers with no symptoms (Ibrahim et al., 2022). This was confirmed by the unidentified clusters with no symptoms at the Damanlela construction site, which had been moving around and spreading COVID-19 as it was transmitted from one site to another, resulting in more than 2,000 workers becoming infected (Ibrahim et al., 2022). In addition, the lack of screening tests is due to their high cost, which has increased project costs (Krishnan, 2021).

Meanwhile, Table 2 shows that the lack of language translators among the construction workers had the least impact on the spread of COVID-19, with a mean score of 3.80 (SD = 0.648), as language translators were unnecessarily required, and the contractors should be responsible for effectively delivering COVID-19 awareness among the construction workers. This shows that the contractors can educate foreign workers on SOP procedures and raise COVID-19 awareness among them (Ibrahim et al., 2022).

Suggestions to Enhance Compliance with SOPs and Health and Safety Practices During the Pandemic

Table 3 shows several suggestions to enhance the health and safety practices compliance with SOP during the pandemic, where all respondents agreed that the contractors should

be entirely restricted to SOP by strictly implementing all the measures at the construction site according to government and MoH requirements, even after the COVID-19 pandemic, with a mean score of 5.00.

According to Olanrewaju et al. (2021), contractors should strictly follow all government guidelines and regulations on construction site safety protocols to avoid being fined or penalised and to be COVID-19 risk-free; other suggestions, such as exposure to health warning signs and regular updates on COVID-19 information were also essential to be implemented so that the construction workers would be more aware of the COVID-19 risk. These mitigation measures were essential to ensure that staff and construction workers worked in healthy conditions and to effectively prevent the spread of COVID-19.

Table 3
Mean score analysis on the suggestions to enhance health and safety practices compliance with SOP during the pandemic

Item	Description	Mean	Standard Deviation
1	The contractors should be entirely restricted to SOP as required by the Government and the Ministry of Health Malaysia (2020)	5.00	0.000
2	Expose health warning signs and infographics as reminders of the COVID-19 risk	5.00	0.385
3	The contractors should provide good hygiene housing facilities and health care to construction workers	5.00	0.501
4	The contractors should adapt the effective health and safety measures implemented by other countries to be applied at the local construction site	5.00	0.597
5	The contractors should routinely update the health information regarding COVID-19 to the workers at the construction site	5.00	0.506

CONCLUSIONS

This paper addresses the lack of health awareness regarding COVID-19 and the transmission of construction workers from site to site, contributing to ineffective health and safety practices at construction sites. Hence, the findings of this study should be duly acknowledged by the relevant authorities on alternative health and safety practices that contractors should implement during the pandemic to maintain hygiene and combat infectious diseases. However, a limitation of this study is its constrained geographic scope, which limits the generalisability of the findings. Future research endeavours would benefit from adopting a more expansive geographical framework, potentially yielding more comprehensive insights. Additionally, the target respondent may not accurately reflect the plurality of experiences and perspectives that exist in the broader population. To address this, subsequent studies should strategically recruit participants from a more diverse array of backgrounds, including varying socioeconomic statuses, professions, and educational

levels, to foster a richer, multidimensional understanding of the attitudes and behaviours surrounding the implementation of health and safety measures amid a pandemic. Such efforts could facilitate a more nuanced comparison of different perspectives and foster a deeper understanding of the multifaceted implications of pandemic responses.

ACKNOWLEDGEMENT

This research was supported by Universiti Teknologi MARA under MyRA research grant [600-RMC/GPM ST 5/3 (047/2021)].

REFERENCES

Amoah, C., & Simpeh, F. (2021). Implementation challenges of COVID-19 safety measures at construction sites in South Africa. *Journal of Facilities Management, 19*(1), 111-128. https://doi.org/10.1108/JFM-08-2020-0061

Anaam, A., & Jailani, J. (2022). The impacts of the pandemic COVID-19 on construction industry in Kuala Lumpur. *Recent Trends in Civil Engineering and Built Environment, 3*(1), 1695-1705. https://doi.org/10.30880/rtcebe.2022.03.01.189

Chandwani, N., Shrigiriwar, M., Jaiswal, S. V., & Dwidmuthe, S. (2021). Knowledge, attitude, and practice (KAP) towards social distancing in pandemic COVID-19 among construction workers in Central India. *Annals of the Romanian Society for Cell Biology, 25*(6), 19746–19757. https://annalsofrscb.ro/index.php/journal/article/view/9839

Chen, A., Zhu, J., Lin, Q., & Liu, W. (2022). A comparative study of forehead temperature and core body temperature under varying ambient temperature conditions. *International Journal of Environmental Research and Public Health, 19*(23), Article 15883. https://doi.org/10.3390/ijerph192315883

COVID-19 pandemic leaves lasting scar on Malaysian construction sector. (2020, December 22). *The Sun Daily*. https://thesun.my/business-news/covid-19-pandemic-leaves-lasting-scar-on-malaysian-construction-sector-FL5782315

Ibrahim, F. S., Esa, M., & Mustafa Kamal, E. (2022). Strategies to minimise the impact of COVID-19 on the construction industry: A case study of construction site clusters in Malaysia. *Construction Economics and Building, 22*(3), 21-42. https://doi.org/10.5130/AJCEB.v22i3.8064

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607-610. https://doi.org/10.1177/001316447003000308

Krishnan, D. B. (2021, February 2). Reduce COVID-19 test price to encourage screening. *New Straits Times*. https://www.nst.com.my/news/nation/2021/02/662277/reduce-covid-19-test-price-encourage-screening

Malaysians should be more disciplined in using MySejahtera app. (2020, August 4). *The Malaysian Reserve*. https://themalaysianreserve.com/2020/08/04/malaysians-should-be-more-disciplined-in-using-mysejahtera-app/

Ministry of Health Malaysia. (2020, May 26). *Press statement Ministry of Health Malaysia: Updates on the coronavirus disease 2019 (COVID-19) situation in Malaysia*. https://covid-19.moh.gov.my/terkini/052020/

situasi-terkini-26-mei-2020/Kenyataan%20Akhbar%20KPK%20COVID-19%20(26%20Mei%20
2020)%20-%20EN.pdf

Nnaji, C., Jin, Z., & Karakhan, A. (2022). Safety and health management response to COVID-19 in the construction industry: A perspective of fieldworkers. *Process Safety and Environmental Protection, 159*, 477-488. https://doi.org/10.1016/j.psep.2022.01.002

Olanrewaju, A., AbdulAziz, A., Preece, C. N., & Shobowale, K. (2021). Evaluation of measures to prevent the spread of COVID-19 on the construction sites. *Cleaner Engineering and Technology, 5*, Article 100277. https://doi.org/10.1016/j.clet.2021.100277

Pamidimukkala, A., & Kermanshachi, S. (2021). Impact of COVID-19 on field and office workforce in construction industry. *Project Leadership and Society, 2*, Article 100018. https://doi.org/10.1016/j.plas.2021.100018

Rahman, M. M. (2023). Sample size determination for survey research and non-probability sampling techniques: A review and set of recommendations. *Journal of Entrepreneurship, Business and Economics, 11*(1), 42-62.

Salami, B. A., Ajayi, S. O., & Oyegoke, A. S. (2022). Coping with the COVID-19 pandemic: An exploration of the strategies adopted by construction firms. *Journal of Engineering, Design and Technology, 20*(1), 159-182. https://doi.org/10.1108/JEDT-01-2021-0054

Shafii, H., Mohd Radzi, N. A., Md Yassin, A., & Masram, H. (2022). Implementing COVID-19 standard operation procedure (SOP) in Malaysia construction industry: Challenges and strategies. *International Journal of Property Sciences, 12*(1), 37-53. https://doi.org/10.22452/ijps.vol12no1.3

Simpeh, F., Bamfo-Agyei, E., & Amoah, C. (2022). Barriers to the implementation of COVID-19 safety regulations: Insight from Ghanaian construction sites. *Journal of Engineering, Design and Technology, 20*(1), 47-65. https://doi.org/10.1108/JEDT-03-2021-0153

Taherdoost, H. (2019). What is the best response scale for survey and questionnaire design; review of different lengths of rating scale/attitude scale/Likert scale. *International Journal of Academic Research in Management, 8*(1), 1-10. https://hal.science/hal-02557308/document

Tholibon, D. A., Md Nujid, M., Mokhtar, H., Abd Rahim, J., Abdul Aziz, N. F., & Ahmad Tarmizi, A. A. (2021). Relative importance index (RII) in ranking the factors of employer satisfaction towards industrial training students. *International Journal of Asian Education, 2*(4), 493-503. https://doi.org/10.46966/ijae.v2i4.187

UN News. (2021, July 14). *'Early stages' of COVID third wave, amid Delta surge: WHO chief*. https://news.un.org/en/story/2021/07/1095882