



OCCUPATIONAL HEALTH AND SAFETY PRACTICES IN THE WORKPLACE DURING THE COVID-19 PANDEMIC: A LITERATURE REVIEW

PRAKTIK KESEHATAN DAN KESELAMATAN KERJA DI TEMPAT KERJA SELAMA MASA PANDEMI COVID-19: REVIEW LITERATUR

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ABSTRACT

Background: The Corona Virus Disease 2019 (COVID-19) pandemic, which has impacted the world of work, has necessitated work organizations to prevent transmission and enhance workers' performance. **Purpose:** To find out the implementation of occupational health and safety management during the COVID-19 pandemic across various corporate sectors. **Review:** It was conducted by answering research questions related to the management of safety and health practices in the workplace during the COVID-19 pandemic. The process involved formulating problem questions based on the PICOS framework. After filtering and adjusting the research variables, 21 articles were analyzed, consisting 12 articles from the ProQuest database and 9 articles from the ScienceDirect database. **Result:** Various innovations have been made by companies so that the implementation of Occupational Health and Safety (OHS) management, especially health protocols in dealing with COVID-19, can run optimally. Among them is an increasing number of training sessions for workers on health protocols and awareness, redesigning workplaces according to standards, using smart technology to detect social distancing violations, and improving dialogic communication. Such improvements have been proven to increase communal relations between workers and management, thereby increasing active worker participation in establishing a safe working culture within the workplace. **Conclusion:** The OHS management implemented by the company may change based on workplace COVID-19 prevention regulations.

ABSTRAK

Latar belakang: Pandemi Corona Virus Disease 2019 (COVID-19) yang berdampak pada dunia kerja mengakibatkan organisasi kerja harus dapat mencegah penurunan dan meningkatkan kinerja pekerja. **Tujuan:** Mengetahui penerapan manajemen kesehatan dan keselamatan kerja yang diterapkan dimasa pandemi COVID-19 di berbagai sektor perusahaan. **Telaah pustaka:** Tinjauan literatur ini dilakukan dengan menjawab pertanyaan penelitian tentang mengelola praktik keselamatan dan kesehatan kerja di tempat kerja selama masa COVID-19. Proses merumuskan pertanyaan masalah berdasarkan kerangka PICOS. Setelah dilakukan penyaringan dan penyesuaian variabel penelitian, maka dianalisis 21 artikel yang terdiri dari 12 artikel dari *database ProQuest* dan 9 artikel dari *database ScienceDirect*. **Hasil:** Berbagai inovasi telah dilakukan perusahaan agar penerapan manajemen K3 khususnya protokol kesehatan dalam menghadapi COVID-19 dapat berjalan maksimal. Diantaranya adalah meningkatkan pelatihan bagi pekerja tentang protokol dan kesadaran kesehatan, mendesain ulang tempat kerja sesuai standar, menggunakan teknologi pintar untuk mendeteksi pelanggaran jarak sosial, dan meningkatkan komunikasi dialogis. Peningkatan tersebut telah terbukti untuk meningkatkan hubungan komunal antara pekerja dan manajemen, sehingga partisipasi aktif pekerja dapat meningkatkan penerapan budaya kerja aman di tempat kerja. **Kesimpulan:** Manajemen K3 yang diterapkan oleh perusahaan dapat berubah menyesuaikan dengan regulasi pencegahan COVID-19 di tempat kerja.

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INTRODUCTION

Currently, the COVID-19 pandemic is entering its third year since the first case appeared in Wuhan, China, at the end of 2019. Globally, daily COVID-19 cases have decreased to a controlled level (Rio and Malani, 2022). Based on WHO data, from the beginning of 2022 until August, the highest daily confirmed cases of COVID-19 worldwide occurred on January 17, 2022, with 23.284.848 cases. Most cases have been reported in Europe and America. On August 22, 2022, confirmed cases of COVID-19 worldwide decreased by around 80%, with a recorded 4.651.765 cases (WHO, 2021).

The COVID-19 pandemic not only has impacted health and reduced the health-related quality of life but also has directly affected markets, the supply of goods and services, the investment sector, business, the education sector, and the world of work. Social restrictions, travel restrictions, and the closure of public places have had a drastic impact on companies, particularly on workers (ILO, 2020). Workers must face changes in the work climate and uncertainty. This uncertainty includes changes in work patterns, work schedules, temporary layoffs (forced leave), and permanent layoffs due to the reduction or cessation of the company's production process (Blanuša *et al.*, 2021). A study in Germany and Switzerland found that 31% of workers felt the negative impact of the COVID-19 pandemic on their work life, especially among short-time workers and those who lost their jobs. Meanwhile, 30% of workers felt the negative impact of the COVID-19 pandemic on their personal lives, especially for those who were married and lived in the same house (Tušl *et al.*, 2021).

Apart from the psychological impact due to job uncertainty, workers in the essential business sector who continued to work during the pandemic were haunted by fears of transmitting the SARS-CoV-2 virus in the workplace. This was because the workplace had characteristics that could facilitate the spread of SARS-CoV-2, such as being physically close to colleagues, working in closed spaces, and engaging in social interactions with fellow workers, supervisors, clients, and guests (Falco *et al.*, 2021). In Ontario, Canada, for example, a study revealed that there were 199 outbreaks in the workplace with 1.245 cases. From these data, 68% of the outbreaks and 80% of the cases came from the sectors of (1) Manufacturing, (2) Agriculture, forestry, fisheries, and hunting, and (3) Transportation and warehousing. In addition, 31% of outbreak cases were found to be related to the occurrence of COVID-19 cases in 688 households. According to the same study, this led to a 56% increase in the caseload of workplace outbreaks (Murti *et al.*, 2021).

Responding to the negative impact of the COVID-19 crisis on workers, the international community, through the ILO, has taken several steps. These include collecting various types of data and information as a basis for formulating policy options in the field of employment, compiling a summary of general and economic policies on COVID-19, and creating practical

prevention guidelines for the transmission of COVID-19 in the workplace, as well as guidelines for a safe and healthy return to work (ILO, 2020; Selberg, 2020). In addition to international policies, government policies in each country also have a very important role. Government response is the most important component in crisis/disaster management, as seen in dealing with the COVID-19 crisis (Seaberg *et al.*, 2017; Zhou *et al.*, 2022). Governments in various countries adopt different policies to control the spread of COVID-19. Based on the results of the study, it is known that the government's response has a significant impact on the scale of transmission of COVID-19, leading to varying effects in controlling the virus (Zhou *et al.*, 2022). The same goes for policies at the company level. The management policies for preventing COVID-19 and mitigating its impacts in the workplace are expected to result in different levels of control.

Researchers believe that SARS-CoV-2 will not be completely eradicated. This means that the world's population is required to adapt in order to live side by side with COVID-19 (Rio and Malani, 2022). The world of work must also consistently make adaptations to carry out management control of the spread of COVID-19 and other impacts caused by the COVID-19 pandemic on workers. While working from home can be a solution for workers in the pandemic era, not all workers have the option to do so. There are many sectors that still require workers to be present at work, but workplaces must prepare solutions to stop the spread of COVID 19. Therefore, this research is needed to examine the approaches or methods implemented by various types of corporate sectors in different countries to manage the control of the spread of COVID-19 and mitigate its impacts on workers. This is important for learning and consideration in formulating policies at the workplace level.

LITERATURE REVIEW

The COVID-19 pandemic has been declared a health emergency, radically impacting the world of work. Social restrictions, travel limitations, and the closure of public places have had a drastic impact on companies, especially on workers (ILO, 2020). Workers are facing uncertainty due to changes in the work climate, such as changes in work patterns (working from home) and adjustments to work schedules. Some of them have also been temporarily dismissed (forced to leave) due to reduced company production processes and the absence of production in certain companies. Certain non-essential businesses have even been forced to close (Blanuša *et al.*, 2021). This sense of uncertainty is known as job insecurity, defined as personal worry about the future of work (Van Vuuren *et al.*, 2019). Numerous studies have shown that job insecurity is related to mental health symptoms, such as stress, depression, somatic symptoms, anxiety, and decreased life satisfaction and well-being (Witte *et al.*, 2016).

The mental health symptoms experienced by workers during the COVID-19 pandemic, aside from being caused by job insecurity, were also exacerbated by several factors such as concern for the welfare of oneself, family members, and colleagues who might be infected with COVID-19, incomplete safety equipment to prevent oneself from contracting COVID-19, lack of social support and social networks, the tension between established safety protocols and personal desires (for example in the practice of treating the bodies of families infected with COVID-19), difficulty maintaining activities and self-care, such as healthy eating habits, regular exercise, and adequate rest (WHO, 2018).

The risk of being infected with COVID-19 and suffering from mental health symptoms due to the COVID-19 pandemic varies among different groups of workers. This risk is generally higher for various groups of workers who are at the forefront of the emergency response, such as health workers directly involved in managing the outbreak (ILO, 2020). However, it is essential to note that the source of stress and discomfort due to a pandemic emergency can significantly impact the level of well-being, even among workers with a “low risk of transmission”, especially when they have to return to work in the midst of a pandemic without adequate knowledge (Guidetti et al., 2022). Job insecurity among workers also influences workers’ perception of management commitment to preventing COVID-19. Companies that already have a good *Occupational Health and Safety* (OHS) culture and a positive perception of workers towards management will have a positive impact in dealing with COVID-19. The threat of the danger of COVID-19 has minimal impact because workers tend to always work according to safety regulations and safe work practices in the workplace.

This can happen because workers have been equipped with sufficient knowledge and skills through

various OHS training programs. Consequently, companies are expected to always increase positive perceptions about the OHS culture during a pandemic (Guzman et al., 2022). This is in line with Li and Griffin's (2022) research, which stated that a low level of workers’ perception of safety commitment by management would have an impact on workers, such as decreased worker compliance with safety and active participation of workers in an OHS culture. For this reason, management needs to implement comprehensive safety management in dealing with COVID-19 and reevaluate safety and health procedures at work so that they can be adjusted to the regulations required by the government to protect workers.

This literature review was carried out by answering research questions about how to manage safety and health practices in the workplace during the time of COVID-19. The process of formulating problem questions based on the PICOS framework included population (workplace), intervention (practices), comparison (in the time of COVID 19), outcome (health and safety management), and study design (all types of studies). The keywords used from the research question were ‘*Occupational Health and Safety Practices at Workplace during COVID-19*’ or ‘*Health and Safety Management during COVID-19 at Work*’. The inclusion criteria for searching scientific articles included: (1) Articles from peer-reviewed journals that presented the results of original research discussing OHS management in the face of COVID-19, (2) Written in english, (3) Published in 2022; and (4) Available as full-text articles. Article searches were conducted on two databases, namely ScienceDirect and ProQuest. After filtering and adjusting the research variables, 21 articles were analyzed, consisting of 12 articles from the ProQuest database and 9 articles from the ScienceDirect database (Figure 1).

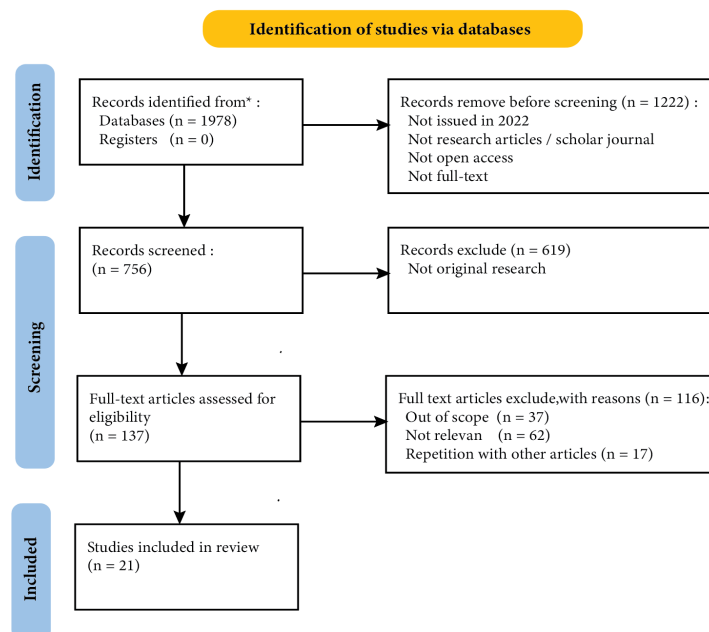


Figure 1. The summary of identification and selection of studies

RESULT

The results of the analysis of 21 articles were described in several sub-discussions, including work sector, methods, year of research, and geographic distribution of research locations. Figure 1 shows the division of the work sector that is the focus of the research. It is evident that the analyzed articles predominantly emphasize research on OHS practices in general sectors, namely 10 articles in various fields (such as mining, transportation, and offices).

Judging from the research method, it is evident that almost half of all articles discussing the application of OHS during the COVID-19 pandemic used the observational analytic method with a cross-sectional design. It was used for an example to describe the relationship of new workplace policies to prevent the spread of COVID-19 with psychosocial factors or with the risk of COVID-19 transmission. The results of the analysis regarding the year of writing the articles under study showed that most of the articles were written in 2022, with only one article written in 2021. This shows that the interest of researchers in the topic of implementing OHS during a pandemic has increased rapidly.

Figure 2 illustrates the distribution of OHS practical research locations during the pandemic. The grouping of research locations is based on continents, which, based on identification results, are categorized into four groups: America, Europe, Asia, and global as shown in Figure 3. Most research locations are in the continent of Asia. This is likely because COVID-19 first occurred

in Wuhan, China, located in Asia, and countries in Asia must immediately anticipate its spread due to their geographical vulnerability. Data analysis was carried out by synthesizing and comparing research variable data with empirical/ theoretical support, and the results are presented in Table 1.

DISCUSSION

The COVID-19 pandemic can change lifestyles, ways of interacting, and working practices, necessitating a healthy and comfortable workplace to ensure employees can continue working safely (Bangwal et al., 2022). Working from home can be a solution for workers in the pandemic era, but not all workers can work from home. Workplaces must adapt to the new normal era and formulate solutions to stop the spread of COVID-19. Each workplace has rules and precautions to fight COVID-19 based on government regulations or mandated health protocols. Management has its own challenges to stop the spread of COVID-19, so the workplace must maximize control programs to ensure the safety and health of its workers (Syamila, 2021).

Factors encouraging companies to comply with health protocols in the new normal era vary but primarily focus on three aspects: (1) As a form of compliance with government directives, (2) To ensure business continuity (by maintaining the health of workers), and (3) To respond to top management’s commitment in addressing COVID-19.

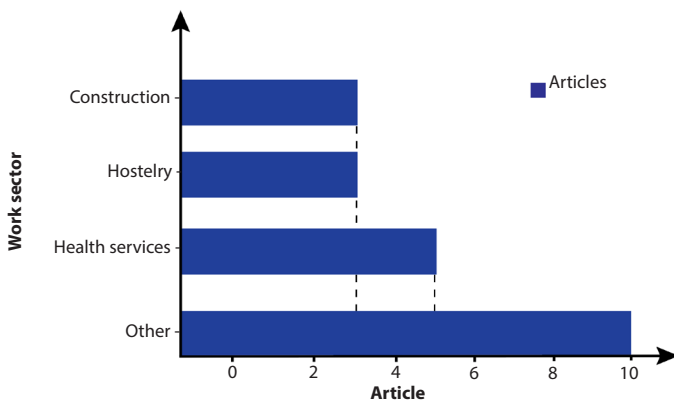


Figure 2. Division of the work sector

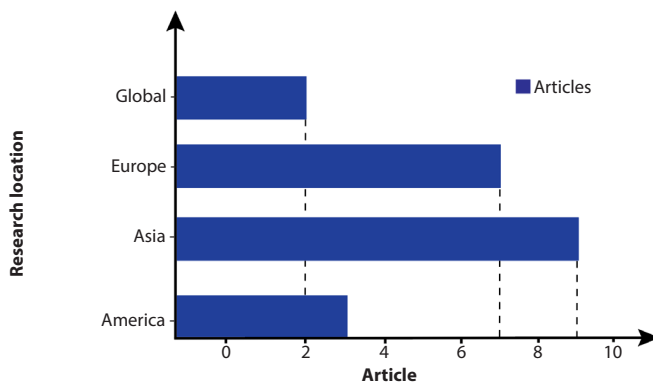


Figure 3. Geographical areas of studies

Table 1. Results of literature review

No	Authors	Title	Population	Method	Result	Conclusion
1	Almohassen <i>et al.</i> (2023)	The effects of COVID-19 on safety practices in construction projects	40 safety construction professionals in Saudi Arabia	Evaluation of safety elements using OSHA standards and surveys	The safety elements that changed during COVID-19 were regarding infection control efforts in workers and reevaluation of safety programs.	The COVID-19 pandemic has had an impact on changes in safety procedures at all levels of workers in construction projects.
2	Nnaji <i>et al.</i> (2022)	Safety and health management response to COVID-19 in the construction industry: A perspective of fieldworkers	187 construction workers across the United States	Cross-sectional study	Social distancing strategies and limiting the number of meeting participants to 10 people are more effective than job site screening.	Field workers are quite satisfied with the health and safety efforts made by the company to prevent and reduce the spread of COVID-19.
3	Bangwal <i>et al.</i> (2022)	Hotel building design, occupants' health, and performance in response to COVID-19	302 hotel employees in a LEED-certified building in India	Cross-sectional study	Workers agree that proper building design can prevent transmission of COVID-19.	Healthy and comfortable buildings are important for the physical and mental health of employees.
4	Guzman <i>et al.</i> (2022)	Evaluating workplace safety in the oil and gas industry during the COVID-19 pandemic using occupational health and safety vulnerability measure and partial least square structural equation modelling	50 professionals working in the oil and gas industry in various companies and countries	Exploratory study	Positive perceptions of OHS culture significantly influence the application of OHS in the oil and gas industry.	COVID-19 will not be a threat to the oil and gas industry, if the workers have a culture.
5	Li and Griffin (2022)	Safety behaviors and job satisfaction during the pandemic: The mediating roles of uncertainty and managerial commitment	515 Occupational Health and Safety Experts	Exploratory study	The COVID-19 pandemic is associated with low job satisfaction, psychological uncertainty, low perceptions of management's commitment to safety, and increased worker safety behavior.	Management's commitment to safety has an impact on reducing workers' participation in safety, but worker's safety behavior has increased due to increased knowledge, awareness and concern about controlling COVID-19.
6	Baek <i>et al.</i> (2022)	Preventive measures against COVID-19 in small and mid-sized enterprises from an early stage of the epidemic in Daegu and Gyeongsangbuk-do	122 micro, small, and medium enterprises with less than 50 employees in Korea	Cross-sectional study	There is a gap between small and large companies in efforts to prevent transmission of COVID-19.	The bigger the company, the more implementations are implemented in preventing the transmission of COVID-19.
7	Lee (2022)	How dialogic internal communication fosters employees' safety behavior during the COVID-19 pandemic	400 full-time workers in the United States	Cross-sectional study	Success in implementing infection prevention by Public Health England is the infrastructure available, satisfaction in training, and the involvement of various parties in communicating COVID-19 to all hospitals.	A work climate that is open to discussion encourages employees to be proactive in creating a safe workplace.

The continuation of Table 1

No	Authors	Title	Population	Method	Result	Conclusion
8	Hanley <i>et al.</i> (2022)	Implementation of Public Health England infection prevention and control guidance in maternity units in response to the COVID-19 pandemic	16 workers in the maternity unit	Qualitative study	Success in implementing infection prevention by Public Health England is the infrastructure available, satisfaction in training, and the involvement of various parties in communicating COVID-19 to all hospitals.	The importance of effective communication and the need for consistent control guidelines can facilitate the workplace in implementing the COVID-19 control program in accordance with applicable guidelines.
9	Goh <i>et al.</i> (2022)	Management of safe distancing on construction sites during COVID-19: A smart real-time monitoring system	Public housing construction site in Singapore	Experimental study	The monitoring system that is carried out can detect unsafe behavior of workers such as violating safe distance rules and crowding when working as an effort to prevent transmission of COVID-19.	Computer vision-based smart monitoring system is applied to implement behavior-based safety in the workplace. The safe behavior of workers can be improved.
10	Rao <i>et al.</i> (2021)	Occupational exposures and mitigation	106 homeless shelter workers	Cross-sectional study	Mitigation management is implemented to reduce the risk of exposure to COVID-19 in workers. For example: wearing a mask, washing hands, keeping your distance, and not touching or sharing things	Homeless shelter workers are workers with high-risk potential for exposure, so the mitigation measures that have been taken need to be strengthened by training the workers.
11	Lestari <i>et al.</i> (2022)	COVID-19 in the workplace in Indonesia	4 industries and 6 stakeholders	Cross-sectional study	Health protocols in large companies can be more comprehensive, fast and effective. The drivers for complying with Health Protocols in the new normal era vary, but focus on three things namely as compliance with the government, to ensure business continuity, and as a form of top management commitment in dealing with COVID-19. Barriers and challenges: lack of clear direction from government agencies; rapid change of rules in a short time; poor worker's awareness and compliance; ongoing concern; and limited organizational resources.	It is necessary to strengthen the coordination and integration of related institutions in the handling of COVID-19 so that there is consistency in the messages conveyed. There is also a need for harmonization of regulations for all industries. Policy makers should also consider schemes for providing funds and/or other resources to assist organizations, especially SMEs, in their efforts to comply with the Health Protocol.
12	Guidetti <i>et al.</i> (2022)	Safety management and well-being during COVID-19: A pilot study in the manufactory sector	220 full time workers	Cross-sectional study	Worries about COVID-19 can be a source of stress and fatigue for workers. This has a significant impact on the level of workers' welfare. It is interesting to note that variable safety climates can reduce fatigue.	To deal with psychological stress and discomfort during the pandemic period, organizations should monitor the physical risks and psychosocial risks related to concerns about exposure to COVID-19.

The continuation of Table 1

No	Authors	Title	Population	Method	Result	Conclusion
13	Berger-Estilita <i>et al.</i> (2022)	Health promoting quality of life at work during the COVID-19 pandemic: a 12 month longitudinal study on the work-related sense of coherence in acute care health-care professionals	520 health professionals	Longitudinal study (survey)	In April 2020, healthcare professionals with higher reported Work-Related Sense of Coherence (Work-SoC) scores displayed lower levels of COVID-19 related anxiety, perceived vulnerability, depression, and psychological trauma symptoms compared to their counterparts with an average or lower Work-SoC measurement score.	Field workers are quite satisfied with the health and safety efforts made by the company to prevent and reduce the spread of COVID-19.
14	Lu and Gan (2022)	Evaluation and prevention and control measures of urban public transport exposure risk under the influence of COVID-19 taking Wuhan as an example	Development of a public transport network	Spatial analysis methods	High-risk epidemic sites are mainly concentrated in the core area within the jurisdiction of Wuhan City, and towards the urban outer circle. Based on differences in public transport exposure risk levels, a hierarchy of public transport control measures is formulated.	According to the difference from the level of public transport exposure risk, prevention and control of public transport is carried out, so as to provide decision-making advice to carry out risk management and formulate policies.
15	Tarif <i>et al.</i> (2022)	Infection prevention and control risk factors in health workers infected with SARS-CoV-2 in Jordan: A case control study	A total of 358 participants (102 cases and 256 controls)	Case control study	Practice hand hygiene becomes one of the most cost-effective measures to combat the spread of viral infections.	The findings from this study reinforce infection prevention and control measures that have been highlighted by WHO during the pandemic, such as the importance of hand hygiene, use of PPI, keeping distance from patients and providing routine PPI training to health workers.
16	Chafi <i>et al.</i> (2021)	Post pandemic officework: perceived challenges and opportunities for a sustainable work environment	53 participants in Sweden	Qualitative studies	WFO employees have higher expectations of flexibility with time and place of work. The results present a mixed picture of the new way of working, exemplifying the new possibilities and challenges posed by the WFO model of work from employee, managerial, and organizational perspectives.	Management is expected to redesign physical and digital workplaces to suit the needs of new and emerging employees in a hybrid work model.
17	Roberts <i>et al.</i> (2022)	Occupational safety and health guidelines in relation to COVID-19 risk, death risk, and case-fatality proportion: An international, ecological study	400 full-time workers in the United States	Cross sectional study	The WHO COVID-19 OHS guidelines used are more WHO COVID-19 OHS guidelines than COVID-19 OHS guidelines from countries that focus on the general population, including "Providing Personal Protective Equipment to workers" and "Establishing a Workplace Policy to Wear Personal Protective Equipment" in countries. COVID-19 OHS guidelines are significantly associated with a reduced risk of COVID-19, risk of death, and/or case fatality proportion.	Country COVID-19 OHS guidelines should include WHO guidelines, focus on workers, and cover "Provide Personal Protective Equipment for workers" and "Establish Workplace Policies for Wearing Personal Protective Equipment."

The continuation of Table 1

No	Authors	Title	Population	Method	Result	Conclusion
18	Brborović <i>et al.</i> (2022)	The COVID-19 pandemic crisis and patient safety culture: a mixed-method study	228 health workers at the frontline hospital for COVID-19	A cross-sectional study using mixed method technique	The COVID-19 pandemic has put enormous pressure on health workers in hospitals. Healthcare workers are under chronic emotional stress, affected by fatigue, moral stress and interpersonal problems with peers or superiors during the pandemic. All of these can lead to a decrease in patient safety.	The future of healthcare requires an environment that is safe and supports trust and empowerment for healthcare workers, along with the support from supervisors/managers that is equally available and visible on the front lines in the face of COVID 19.
19	Kamińska-Berezowska and Suchacka (2022)	Safety and work organization management in the early days of the COVID-19 pandemic in the lignite mining and energy sector in Poland	23 mining and energy industry employees	Qualitative research with individual in-depth interviews	In a pandemic situation, employees experience safety through several dimensions including changes in work organization, sanitation, health safety challenges in interpersonal relationships and contacts, creating new organizational forms of job security, remote and hybrid work organizations, and economic security challenges.	The COVID-19 pandemic forced an immediate change in the management of work organizations. The workplace is responsible for OHS and production. The possibility of reducing the spread of the pandemic hinges on safe work arrangements and strict adherence to sanitation.
20	Gritzka <i>et al.</i> (2022)	The impact of the implementation of preventive measures due to COVID-19 on work design and early childhood professionals' well-being a qualitative study	27 German childcare managers	Qualitative research with semi-structured interviews	The preventive measures put in place by the childcare policy pose widespread challenges in their daily work activities as well as with regard to preparations for the re-opening of childcare establishments. High demands and low control paired with low social support affect caregivers' well-being.	The psychosocial work environment at the childcare center is deteriorating due to rules for implementing health protocols that are deemed not suitable for children. Management ensures that children and caregivers remain in good health while still implementing health protocol rules without reducing the effectiveness of the care process.
21	Chano <i>et al.</i> (2022)	Serology suggests adequate safety measures to protect healthcare workers from COVID-19 in Shiga Prefecture, Japan	1237 health workers from nine public hospitals designated for COVID-19 in Shiga Prefecture, central Japan	A quantitative research, cross-sectional study	The inevitable outbreak of SARS-CoV-2 occurred in a hospital's terminal care unit before identifying and isolating this group of cases safely. Binomial logistic regression of the individual and seropositive questionnaires predict a significant correlation with N95 mask application under aerosol conditions and duration of action in the red zone. Institutional questionnaires show that PPI education is correlated with reduced seropositivity in hospital.	This study shows that the application of safe PPE and PPI re-education is critical to prevent health facilities from infection with SARS-CoV-2.

Meanwhile, significant obstacles and challenges in implementing health protocols include the lack of clear directions from government agencies, rapid rule changes in a short time (resulting in less time for disseminating information and taking action), poor worker's awareness and compliance, with an emphasis on pandemic fatigue behavior, ongoing vigilance and problem enforcement, and limited organizational resources to implement the desired (and/or necessary) actions.

Construction companies

Almohassen *et al.* (2023) explained in their research that new safety procedures had been implemented in the workplace, including social distancing, wearing masks, wearing gloves, virtual meetings, and COVID-19 quarantine procedures. These measures were in accordance with the efforts made by the Government of Saudi Arabia to control the spread of COVID-19. However, virtual meetings might not be feasible in construction work as it requires the physical presence of workers.

This is quite a challenge for the construction industry because compliance with health protocols, such as provision of *Personal Protective Equipment* (PPE), addition of sanitation facilities, and screen curtains requires quite a large amount of cost. In addition, fulfilling other health protocols, such as regulating the distance between workers, setting work hours, disinfecting equipment before and after work consumes a lot of time which can result in construction work being delayed (Briggs *et al.*, 2022). In line with research conducted by Olanrewaju *et al.* (2021) that the construction industry experiences its own challenges in complying with health protocols, resulting in increased project costs, diminished worker productivity, and prolonged project completion times.

Construction companies that require the presence of workers to come directly to the workplace need to be supervised to ensure the implementation of health protocols. Goh *et al.* (2022) initiated to conduct experiments using a smart real-time monitoring system to detect unsafe worker's behavior, such as failure to maintain a minimum distance of 1 meter while working and disregarding crowd regulations. If workers violate safe working distances or engage in crowding, a warning signal will be sent to the supervisor or manager via telegram. Statistical data related to the number of safety distance violations and crowding rules can be used by management to assess the effectiveness of the behavior-based safety program implemented in efforts to prevent COVID-19. These data can further support efforts to implement health protocols in the construction sector.

Hostelry companies

Efforts to implement health protocols were also carried out in several hotels. Several companies in India believe that redesigning hotel buildings can improve the health of workers' performance in the context of fighting COVID-19. Changes in hotel building design requirements in the future also need to be considered such as sanitation systems to minimize infection, the provision of touchless technology facilities, the provision of physical and mental health facilities, and proper waste management (Bangwal *et al.*, 2022). Brborović *et al.* (2022) also states that infrastructure is a new dimension for implementing a patient safety culture. The condition of hospital buildings, the quality of water resources, and the completeness of equipment are also seen as part of efforts to implement a patient safety culture. The results of research by Tarif *et al.* (2022) indicate that the risk of transmission of SARS-CoV-2 in health facilities may increase due to aspects such as the lack of adequate isolation facilities and the increased demand for hospital beds for patients. Therefore, companies are also expected to redesign work facilities suitable for jobs requiring the presence of workers directly to minimize the transmission of COVID-19 (Chafi *et al.*, 2021).

In line with the research by Waheeb and Hemeida (2022) highlighting that humans during a pandemic experience quarantine in apartments, so they need a good ventilation system, natural lighting, and green open spaces. The bad impact of this non-ideal condition is a decrease in the mental and physical health of apartment residents. Furthermore, there is a risk of infection transmission through the air from individuals positive for COVID-19 due to the lack of control at the entrance to the apartment gate. This has initiated researchers to redesign traditional apartment buildings by increasing natural ventilation during the day for energy consumption efficiency and increasing the availability of green open space.

Health services

The implementation of health protocols is also applied to homeless shelter workers who also have frequent contact, such as nurses in health facilities. Rao *et al.* (2021) explained that homeless shelter workers face a high-risk potential for exposure due to direct contact with the homeless. Efforts made by management include implementing health protocols according to government recommendations or regulations. However, there are still many positive tests for SARS-CoV-2 related to workers still having contact with homeless people's belongings or sharing things with each other. Mitigation measures need to be strengthened by conducting training for workers so that efforts to prevent transmission of COVID-19 can run optimally. The provision of repeated education regarding infectious

disease prevention measures, such as maintaining distance, adopting the habit of handwashing, changing clothes after work, and implementing other health protocols can effectively reduce exposure to the COVID-19 virus (Chano *et al.*, 2022).

Homeless shelter workers, who have similar duties to child caretakers also have their own challenges in dealing with the COVID-19 pandemic. After the daycare temporarily closed and started to reopen, there was concern from management and caregivers about the various requirements that needed to be met. This is because the policies implemented are deemed inappropriate and ineffective in parenting. The application of social distancing cannot be carried out intensely because the caregiver will contact with the child in the care process. Other health protocols that are still possible for caregivers to carry out are the use of masks and frequent hand washing. Management also ensures that caregivers and children remain in good health (Gritzka *et al.*, 2022).

Other companies

Research conducted by Kamińska-Berezowska and Suchacka (2022) stated that mining workers observed changes in work safety management during this pandemic from several perspectives, including changes in work organization, especially related to sanitation, safety threats in interpersonal relationships, the formation of a new work system, namely working from home or in a hybrid model, and financial security. Changes in work organization are mainly related to changes in working hours, the regulation of work traffic and distance between individuals in the workplace, scheduling the use of machines, sanitation facilities at the entrance, and the provision of personal hygiene equipment and masks. But it turns out that these changes also have adverse effects. For example, workers are afraid to take public transportation from the company and prefer private vehicles where the costs are reimbursed from the company.

This is in line with the research conducted by Lu and Gan (2022), which considers the spread of COVID-19 from one area to another via public transportation. To mitigate this, public transportation users can shift to private modes of transportation, such as foot, bicycle, car or other means of transportation. Apart from that, you can use special transportation equipment from the company, and free the mobility of workers due to changes in work at home. Moreover, users of public transportation are expected to avoid congested traffic jams. Changes in work patterns and the use of vehicles for work have also initiated companies to provide vehicles for their workers (Hossain *et al.*, 2023).

Adapting quickly to changing health and safety standards due to COVID-19 presents a challenge for workplace organizations in ensuring that their workers understand these changes. The rapid evolution of COVID-19 prevention guidelines also impacts on workplace barriers to implementing COVID-19 control

programs (Hanley *et al.*, 2022). Consistent guidelines and effective communication really help the organization in implementing the COVID-19 control program according to the guidelines (Lee, 2022). Hanley *et al.* (2022) also mentioned that the role of communication can help the successful implementation of infection prevention and control guidelines from *Public Health England* (PHE) in maternity hospitals in England.

The active role of workers in expressing opinions and building mutual trust with management can encourage an open work climate for discussion. Communal relationships between workers and management, facilitated by effective dialogic communication, can increase workers' self-efficacy to comply with the COVID-19 health protocols and behave safely at work (Lee, 2022). This is in line with research by Brborović *et al.* (2022), which states that the lack of support from management for efforts to have a safety culture has resulted in the culture of working safely declining, especially in the face of COVID-19.

Kamińska-Berezowska and Suchacka (2022) aimed to determine the impact of COVID-19 on interpersonal relationships, revealing that such relationships have experienced significant disturbances. There are many restrictions and separations to minimize contact, leading workers to adapt to the absence of direct contact with others during work. Consequently, this has resulted a work climate that is less open to discussion and active participation in dealing with a pandemic. This finding is consistent with the research by Brborović *et al.* (2022), which states that there is a decrease in information disclosure resulting in reduced participation in a culture of safety. Various innovations have been implemented to overcome interpersonal communication disorders so that effective communication between employees and management continues to run well. Research by Konno *et al.* (2021) gives the result that workers who work at home experience problems, namely a lack of communication with co-workers which is related to increased stress. Ideally, communication between workers and their families is still needed during a pandemic because of the limited number of workers present at the workplace or in public places.

Most workplaces from various sectors have undergone changes and adaptations due to the pandemic. However, the implementation of safety management in dealing with this pandemic has not been fully implemented by small-scale companies. Small companies consider that the safety procedures carried out are less effective compared to medium-large companies due to resource constraints (Nnaji *et al.*, 2022). In line with research by Baek *et al.* (2022) on the gap between small and large companies in efforts to prevent COVID-19 which shows that prevention efforts increase in line with company size. Established large organizations/companies have more comprehensive management systems and are better able to implement COVID-19 policies and procedures quickly and effectively (Lestari *et al.*, 2022).

CONCLUSION

The rapid transmission of COVID-19 has led to regulations that change easily, requiring workplace organizations to adapt quickly to deal with the impact on the workplace and its workers. This has resulted in several elements of OHS management implemented by the company being changed to be able to implement health protocols to the fullest. Efforts to reevaluate and improve several elements of safety in preventing COVID-19 are also implemented by companies. These efforts include preventing the transmission of COVID-19, training in health protocols, using smart technology, redesigning workstations, and increasing dialogic communication. Some of the obstacles and results of the evaluation of management policies in implementing OHS practices can be used as lessons and considerations in formulating policies at the workplace level in the future.

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