

**CURRENT CONCEPTS REVIEW**

# A Review of the Strategies and Studies on the Prevention and Control of the New Coronavirus in Workplaces

Ehsan Rafeemanesh, MD<sup>1</sup>; Fatemeh Ahmadi, MD<sup>1</sup>; Maryam Memarzadeh, MD<sup>1</sup>

Research performed at Occupational Medicine Department, Mashhad University of Medical Sciences, Mashhad, Iran  
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**Abstract**

Workplaces are susceptible places for exposure to the new coronavirus (Covid-19) infection due to gathering of many people. Hence, different instructions have been promoted by international organizations regarding high-risk employees and the necessity of implementing health policies to prevent exposure and infection in the workplace. Here we reviewed the required strategies to prevent and control COVID-19 in the workplace. In conclusion, considering the fast spreading and growing prevalence of the new corona virus disease in the world over, all managers, employers, and business owners should receive the necessary information and training on prevention and control strategies based on scientific guidelines and standards.

**Level of evidence:** III

**Keywords:** Coronavirus, COVID-19, Prevention and control, Workplace

**Introduction**

In December 2019, a new type of severe pneumonia was reported in Wuhan, China, which had a high genetic affinity with SARS-CoV and now called Corona virus 2019 disease (COVID-19) (1). Now it is clear that person to person transmission via respiratory droplets is the main transmission route of this virus. Recent reports suggested that infected individuals may be contagious even when they are asymptomatic (2-3). However, according to available data, people with symptoms are more likely to spread the virus. Moreover, it has been suggested that COVID-19 patients may also spread the virus in the convalescent period. Notably, whether patient that have healed from this virus will become infected again upon exposure is still unknown (4). However, the World Health Organization (WHO) is constantly monitoring the epidemiology of the outbreak to increase its knowledge of the virus transmission

cycle and methods of protection and prevention of the disease. Accurate medical information from infected individuals is needed to determine the infectious course of this new disease (5).

Workplaces are susceptible places for exposure to the new coronavirus infection due to gathering of many people. Hence, different guidelines have been promoted by international organizations regarding high-risk employees and the necessity of implementing health policies to prevent exposure and infection control in the workplaces (6).

Given the increasing prevalence of COVID-19, difficulties in prompt case detection and the unknown mechanism of transmission, several workers are at the risk of exposure to this disease. Considering the importance of prevention and infection control in the workplace, here we aimed to review the required strategies to prevent and control COVID-19 in the workplace.

**Corresponding Author:** Maryam Memarzadeh, Occupational Medicine Department, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran  
Email: memarzadehtm961@mums.ac.ir



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### Occupations at the risk of exposure to COVID-19

Because of the wide and rapid spread of this new disease, all jobs have a risk of encountering COVID-19, especially those that involve direct contact with customers and clients. However, some employees, such as health care workers, people working at laboratories, tourism and transport industry, hotel and restaurant staff, and waste workers are at a higher risk due to direct exposure to people and or workplace contamination. Preventive and control measures to protect workers against coronavirus and its exposure depend on the type of work performed and the risk of exposure, including the potential to come in contact with infected people and workplace pollution (7). According to the Centers for Disease Control (CDC) guidelines, occupations that are more exposed to the new coronavirus include (8):

1. Health care workers (HCWs)
2. Staff of the cemeteries and the funeral houses
3. Officials and staff of airports, airlines, railways, subways and all public transport (buses, taxis, etc.)
4. Border guards
5. Solid waste and wastewater workers
6. Employees who travel regularly, especially to contaminated areas

With the increasing incidence of illness and the need for patient health care, HCWs have been identified as a high risk group for this infection. Of the 138 patients treated at Wuhan Hospital, 40 patients (29%) were HCWs. Among these, 31 (77.5%) worked in the general ward, 7 (17.5%) in the emergency department, and 2 (5%) worked in the intensive care unit (ICU). It was apparently a super-spreader patient admitted to the surgical ward with symptoms of abdominal pain who was able to infect more than 10 hospital staff with COVID-19 (9).

Dentists and makeup artists are also at high risk of developing this disease due to face-to-face communication with clients and exposure to saliva, blood and exhaled breath, as well as excessive use of sharp and sharp tools. Therefore, it is important to implement control measures in these jobs to control infection and prevent transmission (10).

Flight and ship crews are also at risk of contact with infected passengers. At least 10 cases were reported among 1,035 crew of Diamond Princess Ship, which was quarantined with about 3,600 passengers from February 3rd to February 19th, 2020 in Yokohama, Japan. A traveler from Hong Kong boarded the ship for a 14-day voyage to Yokohama on January 20th. This passenger traveled from Yokohama to Hong Kong and landed there on January 25th. The ship continued its journey until it received news on February 1st that the passenger had tested positive. The ship returned to Yokohama a day earlier and was quarantined, and guests were isolated in their cabins (11).

In another study conducted in February 2020, migrant workers were considered another group at risk of infection with the new coronavirus. The study said that these people face more barriers in accessing health services in the host country (such as access to insurance services). In addition, mental disorders are more common in these people and is exacerbated by quarantine due

to the new coronavirus epidemic and job loss which ultimately leads to a lower quality of life. Likewise, due to the lack of reliable information in their language, they may not understand the seriousness of the epidemic and how to protect themselves against it. Therefore, it is recommended that migrant workers have greater access to health services during epidemics, and public health campaigns should be available for various languages as soon as possible through various communication networks (12).

Although COVID-19 has been reported to cause severe disease in patients without underlying risk factors, the risk of developing fatal disease with this new virus is higher in the old adults, patients with underlying diseases such as cardiovascular diseases, diabetes, respiratory disease and cancer, or people that have occupational exposure to hazardous chemicals such as vapors and gases (13). Therefore individuals with risk factors for a severe disease should also be kept in mind even if they are not involved in any of the mentioned risk groups.

### Preparing the workplaces to respond to COVID-19

Employers should implement infection control strategies based on an accurate and technical risk assessment using the views of health professionals in the workplace to prevent illness in the organization's staff. Of course, the risks associated with COVID-19 are not the same for everyone and everywhere. For example, employees at occupational health centers or workers exposed to hazardous chemical agents are at greater risk. Having a direct contact with infected or suspected COVID-19 patients increases the risk of infection and particular attention should be paid to high-risk cases in this regard (14). However, given the technical, political and economic conditions and considerations, the risk of infection should be assessed and appropriate control measures should be undertaken. Many of these control solutions are inexpensive and can be implemented in the workplace without the use of special equipment or tools. The most important measures to control the spread of corona virus disease based on the principles of occupational health in the workplace are summarized in figure 1.

Continuing to work despite having symptomatic disease, which is called "Presenteeism", is a major issue during an epidemic (15). Therefore employees must be encouraged to stay at home during sickness and not come to work until they are completely healthy and non-contagious. Extending the sick leave with salary is a way to motivate sick workers. Moreover, providing a high quality health insurance is helpful, especially in these difficult times.

Implementing engineering controls is also of utmost importance. Separating the symptomatic people from others and their isolation help to halt the spread of the disease. Moreover, in places (e.g. banks, pharmacies) that have many costumers or clients, separation of the staff from costumers using plastic and glass barriers and providing optimal ventilation is critical.

Administrative controls also have an undeniable utility in prevention and control of infectious diseases. Employers must provide accurate and practical

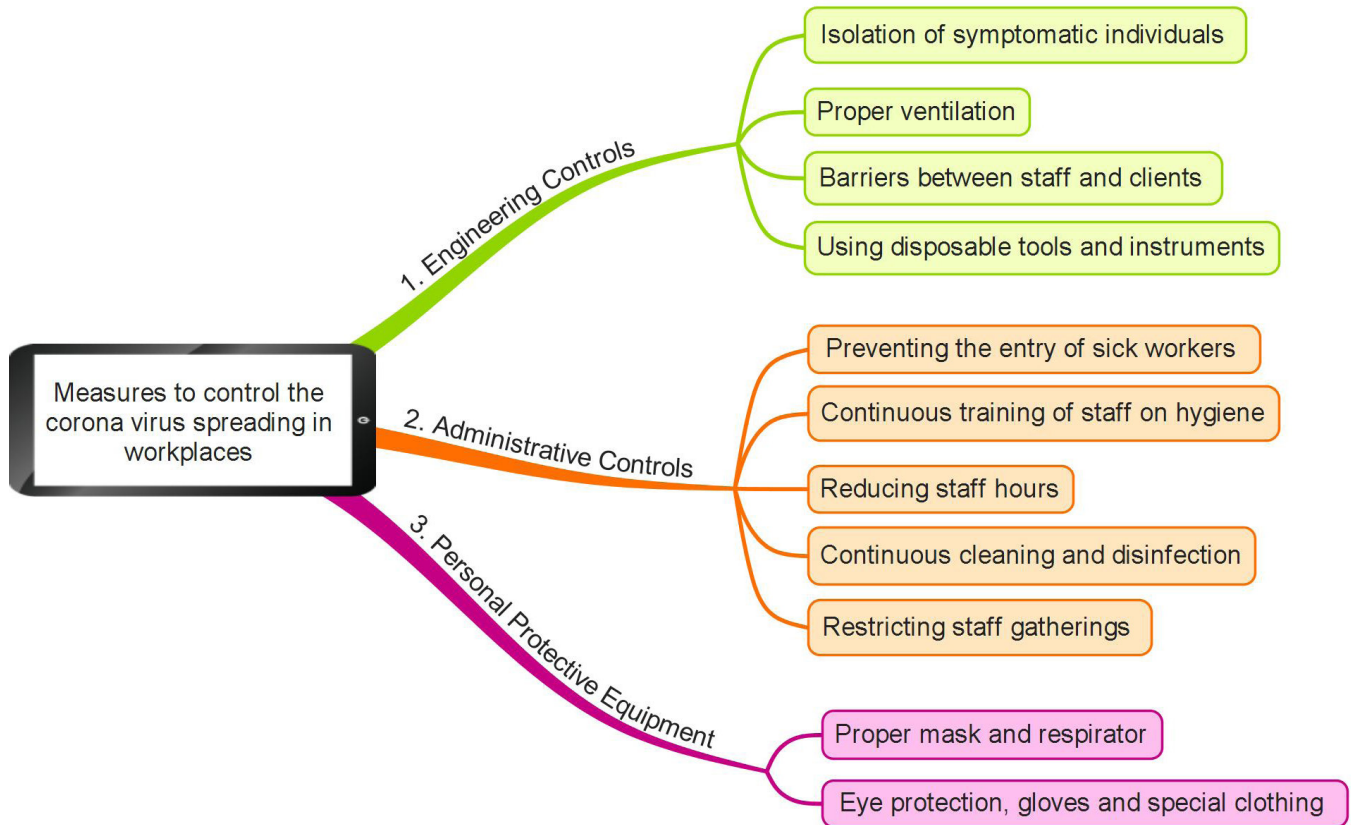


Figure 1. Measures to control the corona virus spreading in workplaces.

information regarding personal hygiene and ways to prevent infection using flyers, poster, pamphlets and orientation meetings. Following advices from healthcare professionals and occupational medicine experts is helpful in this regard. Moreover, employers must limit the number of personnel in the workplace by implementing teleworking strategies and reducing the work hours or even temporary shutting down the occupation. Continuous cleaning and disinfection of the surfaces and equipment is also necessary, however using disposable tools and instruments is more beneficial if possible. Notably, avoiding to hold ceremonies, conferences and in-person meeting is also important. A multinational company held an international business meeting for 109 employees in Singapore from January 20 to 22, 2020. At this event, Healthy Company staff interacted with other affected participants, leading to the transmission of the virus to three Singapore-based employees. In addition to those infected from Singapore, an employee from Malaysia, two participants from South Korea and an employee from England were also infected. They were reported as cases after leaving Singapore (16).

The use of personal protective equipment (PPE) is always the last way to control the harmful factors in the workplace, but for the new coronavirus due to the rapid spread of the disease and the high contagiousness,

it is recommended to use integrated control methods i.e. a combination of substitution, engineering and administrative controls plus personal protective equipment in the workplace (17). In this regard, it is essential to use expert opinions such as environmental and occupational health practitioners.

### Discussion

The spread of coronavirus has reduced the manufacturing activities globally. According to available statistics, if the outbreak continues, due to its direct and indirect effects on business environments, economic indicators are likely to decline in the near future. Therefore, given the involvement of almost all countries of the world in this disease and its progressive trend, the World Health Organization (WHO) and International Labor Organization (ILO) have recommended that all countries should be prepared to prevent and control the disease. Due to the different socioeconomic status and patterns of life in different countries, the prevalence of the disease varies from country to country, and it is necessary for each country to take appropriate measures as there is no single strategy to fight this disease (8, 18).

The results of a study in Japan in 2020 showed that the most important factor in encouraging health

care personnel to work in critical situations such as epidemics is having confidence in the support of the state, government and hospital management, and trust between staff and organizations (19). Another study in this regard in Thailand suggested that a sense of trust enhances social interactions and cooperation among health personnel and also improves motivation, performance and quality of care (18). One way to increase trust between the organization and healthcare staff is to provide staff with frequent information. In addition, the frequent contact of government officials and employers with staff and encouraging them creates a sense of security. Paying compensation if HCWs get infected can also be an incentive to improve employees' work quality. Adequate protective equipment and psychological support should also be available to staff in an epidemic (20).

In the absence of an appropriate cure for this virus, the best strategy is to prevent the spread of infection and control the sources of infection. The main strategies based on WHO recommendations are timely diagnosis and reporting of the disease, continuous examination of the epidemiological pattern of the disease, isolation of patients, supportive treatments and community-based control measures. All components of the society,

including employers, managers and employees, must be fully prepared to fight the Corona virus, even if the corona epidemic has not yet reached that country or region. This has a significant impact on reducing lost work days, staff absences and slowing the rate of virus spread if an epidemic reaches the region (21).

Given the increasing prevalence of new corona virus disease in the world over the past few weeks, it is imperative that all managers, employers, and business owners receive the necessary information and training on prevention and control strategies based on scientific guidelines and standards. This can be effective in reducing the number of people infected and preventing the spread of the virus throughout society.

**Conflict of Interest:** Not declared

Ehsan Rafeemanesh MD<sup>1</sup>

Fatemeh Ahmadi MD<sup>1</sup>

Maryam Memarzadeh MD<sup>1</sup>

<sup>1</sup> Occupational Medicine Department, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

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