Perception of preventing behavior against COVID-19 among Indonesian industrial workers

by Iwan Muhamad Ramdan

❏ 98

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Iwan Muhamad Ramdan[1], Krishna Purnawan Candra[2], Muhammad Sultan[1]
[1]Department of Occupational Health and Safety, Faculty of Public Health, Mulawarman University, Samarinda, Indonesia
[2]Department of Agricultural Product Technology, Faculty of Agriculture, Mulawarman University, Samarinda, Indonesia

Article Info

ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic is continuing, but companies have been allowed to continue their business with the obligation strictly to apply health protocol. A cross-sectional study aimed to examine the perception of COVID-19 and its prevention behavior based on the health belief model was conducted on 285 industrial workers from eight company types sampled by online survey. The results show that most workers have poor COVID-19 perceptions (54.7%). However, the workers showing good behavior (61.1%) in preventing COVID-19 transmission. Gender (p=0.009), education background (p=0.017) and company types (p=0.001) were related to the COVID-19 perception. In addition, the perceptions related to the behavior in preventing COVID-19 transmission (p=0.000). Except cues to action, all perception components, i.e., perceived susceptibility (p=0.000), seriousness (p=0.005), benefit (p=0.000), barriers (p=0.000), and self-efficacy (p=0.000) related to behavior to prevent COVID-19 transmission. However, the perception components show a weak correlation with preventing behavior (r=0.167-0.234). The information types were related to perceived barriers (p=0.046) and cues to action (p=0.007). Maintain a safe distance (p=0.029), using a face mask (p=0.039), and eat nutritious food (p=0.019) related to information types. The increase of COVID-19 perception is the key to improve industrial workers' behavior to prevent the COVID-19 transmission.

Corresponding Author:

Iwan Muhamad Ramdan
Department of Occupational Health and Safety, Faculty of Public Health, Mulawarman University
Jl. Kuaro, Gn. Kelua, Kec. Samarinda Ulu, Samarinda, East Kalimantan 75119, Indonesia
Email: iwanmuhamadramdan@gmail.com

1. INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic has not ended yet. Until now, the incidence rate in each country is still fluctuating. The COVID-19 incident and the death rate are still high on various continents. For example, in African countries, there were 8,501,011,761 cases (218,156 deaths), in Asia, 69,766,048 cases (1,081,704 deaths), in America, 93,872,479 cases (2,300,096 deaths), in Europe 74,760,195 cases (1,403,622 deaths) and Oceania 3,956 cases (1,383 deaths) [1].

Several studies have concluded that the cause of not ending the COVID-19 pandemic is a factor in people's behavior that does not comply with social isolation [2], [3] and determinants of community behavior, among others, are due to low perceptions about social isolation to prevent COVID-19 transmission [4], [5]. In other health problems before the COVID-19 pandemic, various studies have concluded that the most dominant determinant of behavior is individual perception of the disease [6], [7].

The COVID-19 pandemic has had severe economic impacts worldwide, including changes in ways of doing business and consumer behavior [8]. In this condition, many countries keep allowing their workers to work to maintain economic stability and survival by strictly practicing the health protocols issued by world institutions, e.g., International Labor Organization (ILO) [9], World Health Organization (WHO) [10] and United States Department of Labor [11]. However, the policy to work increases the risk of COVID-19 transmission among workers, family members, and their communities.

Like the community outside the workplace, worker behavior is the primary key to preventing the transmission of COVID-19 in the workplace. The Health Belief Model (HBM) is the theory most widely used to predict public health behavior [12], [13]. However, there have not been many studies analyzing worker behavior in preventing COVID-19 transmission in the workplace and determinants of behavior (workers' perceptions of COVID-19). This study explores workers' behavior to prevent COVID-19 transmission in the workplace and their perceptions of COVID-19 and related factors based on the HBM.

2. METHOD

A cross-sectional survey-based study (using online Google Form) was conducted in January - March 2021 (during a new norm phase to avoid the spread of COVID-19). There were 285 workers were sampled from eight different types of industrial companies in Indonesia. Based on the construct of the HBM [14], a valid and reliable questionnaire (Cronbach's alpha=0.86) was adapted from a previous similar study [15], [16], was used to assess workers' perception about COVID-19. The questions include perceived susceptibility, seriousness, barriers, benefits, cues to action, and self-efficacy. Respondents' answers used a Likert scale consisting of five alternative answers anchored from (1) strongly disagree to (5) strongly agree. The perception of workers is categorized as good or poor if the individual score the worker is above or below the group mean, respectively (Kolmogorov Smirnov test=0.360; mean=77.25). The research framework is presented in Figure 1.
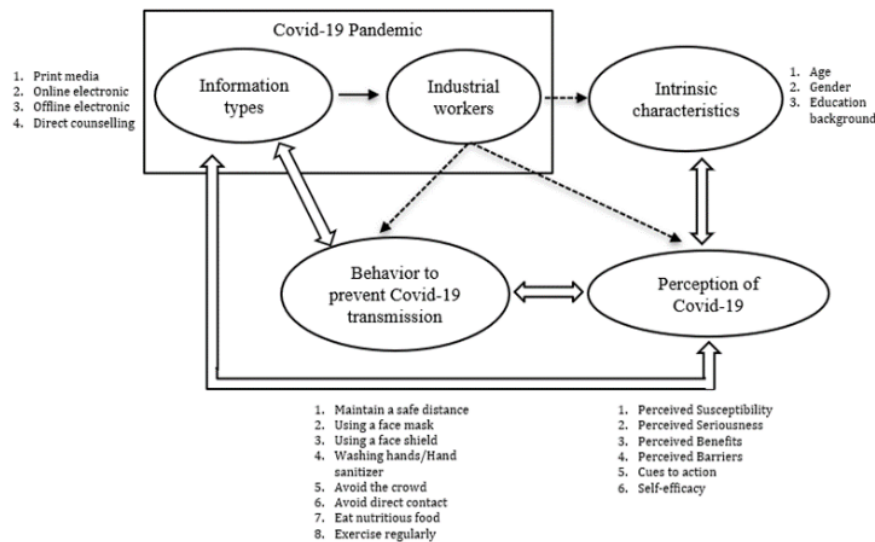

Figure 1. The research framework
(The meanings of the arrows are: "effect on," "collecting data by a questionnaire," "association analysis using Phi test")

Eight leading indicators measure the behavior to prevent COVID-19 transmission: maintaining a safe distance, using a face mask, using a face shield/mask, washing hands/hand sanitizer, avoiding the crowd, avoiding direct contact, eating nutritious food, and exercising regularly. Respondents' answers also use a Likert scale with three alternative answers (yes, sometimes, and never). Preventive behavior by workers is categorized as good if all health protocols are practiced. If workers violate two or more preventive measures, then the behavior is classified as poor. The correlations between independent variables (age, gender, education

background, and information source) and workers' perceptions of COVID-19 as well as the behavior to prevent COVID-19 transmission were analyzed by x^2 test (p<0.05). In addition, the correlation between workers' perceptions of COVID-19 and their behavior to prevent COVID-19 transmission was also analyzed by the Phi test (p<0.05).

3. RESULTS AND DISCUSSION

3.1. Correlation of workers characteristics with the perception and behavior to prevent transmission of COVID-19

The intrinsic characteristics of workers, i.e., age, gender, and education background, are dominated by 17-29 years old (47.7%), male workers (53.0%), and higher education (57.7%). The intrinsic characteristics are significantly correlated with the perception of COVID-19 (p=0.009-0.017), except age (p=0.075). In addition, the intrinsic characteristics are insignificantly associated with behavior to prevent COVID-19 transmission (p=0.055-0.061) as seen in Table 1. This finding is following the HBM. It is in line with the previous results that sociodemographic factors affect individual perceptions of disease [17]. Specifically, gender affects the components of perception, i.e., affective or emotional, affecting individual behavior [18]. In addition, education affects health perceptions and behavior because high formal education allows one to understand something better, thus forming more positive perceptions and behaviors [19]. This result supports previous studies on the general population which concluded that community characteristics such as age, marital status, gender, level of education, and employment were statistically related to behavior in COVID-19 prevention [20], while in the working population also obtained the same results, that the level of education and age affect the perception of danger in construction workers [21].

Table 1. Characteristics of industrial workers and their relationship with perceptions of COVID-19 and behavior to prevent COVID-19 transmission

Variables	n (%)	Perceptions of COVID-19		Behavior to prevent COVID-19 transmission	
		r*	p*	r*	p*
Age (years)		0.13	0.075	0.65	0.055
17-29	136 (47.7)				
>29-41	97 (34.0)				
>41-57	51 (17.9)				
Gender		0.171	0.009	0.354	0.061
Male	151 (53.0)				
Female	85 (29.8)				
Education background		0.169	0.017	0.548	0.056
Secondary high school (graduated 9th class)	7 (2.5)				
Senior high school (graduated 12th class)	114 (40.0)				
Higher education/college graduate	164 (57.7)				

3.2. Correlation of company and information types with the perception and behavior to prevent transmission of COVID-19

Types of a company (p=0.001, r=0.302) and information (p=0.030, r=0.175) related significantly to the perception of COVID-19 but not to the preventing behavior of COVID-19. Table 2 presents the COVID-19 perception among the industrial workers is poor (54.7%). Four of eight company types were becoming dominant respondents in this study, i.e., oil and gas (19.6%), water treatment (19.3%), logistics/warehousing (17.9%), and health and safety service (16.1%). On the other hand, most workers get information about COVID-19 (99.6%), which online electronic media (49.8%) and direct counseling (23.9%) were the two dominant information types coming. The perception of COVID-19 is related significantly to behavior to prevent COVID-19 transmission (p=0.000, r=0.257).

This result is quite understandable because there has been a significant change in information technology where most people have switched from print media to online electronic media. These results align with previous research on general health issues, which concluded that social media, which is the most widely used today [22] and believed could improve employee performance [23], impacts the perception of public and physical health [24], [25]. This research implies that workers' perceptions can be enhanced with health education through online social media available and famous today and through direct counseling (such as safety meetings or safety talks) by health and safety practitioners in the company.

Table 2. Company and information types and their correlation with workers perception and workers behavior in preventing COVID-19 transmission

Variables	n (%)	Perceptions of COVID-19		Behavior to prevent COVID-19 transmission	
		r*	p*	r*	p*
Type of company		0.302	0.001	0.163	0.388
Oil and gas	56 (19.6)				
Customer good	21 (7.4)				
Coal mining	28 (9.8)				
Precast concrete product	19 (6.7)				
Health and safety service	46 (16.1)				
Water treatment	55 (19.3)				
Marine service	9 (3.2)				
Logistic/warehousing	51 (17.9)				
Information types)		0.175	0.030	0.310	0.114
Print media	46 (16.1)				
Online electronic	142 (49.8)				
Offline electronic	28 (9.8)				
Direct counseling	68 (23.9)				
Perception of COVID-19				0.257	0.000
Good	129 (45.3)				
Poor	156 (54.7)				

Note: *Phi test (φ) **Print media (newspapers, magazines, banners, posters, leaflets, booklets), Online electronic (online articles, Facebook, WhatsApp, Instagram, Telegram, YouTube), Offline electronic (television and radio), Direct counseling (explanation of COVID-19 and prevention by health and safety officers at the company).

3.3. Correlation of workers perception with behavior to prevent COVID-19 transmission

Table 3 shows the profound elaboration about the correlation of perception and the behavior to prevent COVID-19 transmission among the industrial workers. All perception components are significantly related (p=0.000-0.005; r=0.167-0.234) to the behavior to prevent COVID-19 transmission except cues to action, which is very close to being related considerably (p=0.053, r=0.116). Thus, this study proves that workers' perceptions are significantly associated with preventing behavior of COVID-19 transmission. Perception variables that have been shown to have a significant relationship with COVID-19 transmission prevention behavior in the workplace are perceived susceptibility, perceived seriousness, perceived benefits, perceived barriers, and self-efficacy. This result is quite aligned with the original construct of the health belief model, which states that action benefits, barriers to action, self-efficacy, cues to action, and risk- susceptibility severity can predict health behavior [13]. However, the cues to action in this study were not proven to affect the behavior to prevent COVID-19 transmission. The findings of this study are in line with previous research on health care workers who found a significant correlation between perceptions of health workers and the behavior of preventing COVID-19 transmission in the workplace [26], and a study in the general population that found self-efficacy and perceived benefits increased the scores of preventive behavior from COVID-19 in Iran [27].

Table 3. Company and information types and their correlation with workers perception and workers behavior in preventing COVID-19 transmission

Perception's components	n (%)	Behavior to prevent COVID-19 transmission	
		r*	p*
Perceived susceptibility		0.234	0.000
Good	134 (47.0)		
Poor	151 (134)		
Perceived seriousness		0.167	0.005
Good	139 (48.8)		
Poor	146 (51.2)		
Perceived benefits		0.213	0.000
Good	119 (41.8)		
Poor	166 (58.2)		
Perceived barriers		0.212	0.000
Good	159 (55.8)		
Poor	126 (44.2)		
Cues to action		0.116	0.053
Good	104 (36.5)		
Poor	181 (63.5)		
Self-efficacy		0.218	0.000
Good	100 (35.1)		
Poor	185 (64.9)		

Note: *Phi test (φ)

HBM is the theory most widely used to predict public health behavior. However, the HBM components indicating this behavior are not the same (no steady result). For example, in computer workers, it is proven that only perceived susceptibility, perceived barriers, and self-efficacy affect employee's security behavior [28] in health care workers in Jordan, only past vaccination behavior. The perceived benefit, which can be used as predictors of intentions to vaccinate against influenza in the next season [12], among airport taxi drivers in Iran, only cues to action and perceived benefits were positively correlated with safe driving behaviors [29].

Although different results were obtained from various researches based on the HBM theory, a necessary implication of the results of this study is that to improve the behavior to prevent COVID-19 transmission in the workplace. It is required to improve workers' perceptions (perceived susceptibility, perceived seriousness, perceived barriers, perceived benefits, cues to action, and self-efficacy). These workers' perceptions can be enhanced through risk communication and good health education of industrial workers.

3.4. Role of information types on workers perception and behavior to prevent COVID-19 transmission

Unfortunately, the perception of industrial workers on COVID-19 pandemic issues is poor (Table 1). We believe that information is the key to delivering good knowledge [30]. Table 4 and Table 5 elaborate the critical side of information type in providing the health protocols practice among the industrial workers against the COVID-19 pandemic.

Among the six perception components, the percentage of workers who stay in the good category is only one component, i.e., perception barriers (55.8%). On the other hand, the rest perception components (perceived susceptibility, perceived seriousness, perceived benefits, cues to action, and self-efficacy) are only 45.1-47.0%, as displayed in Table 4. Type of information is related significantly to two (perceived barriers, p=0.046; and cues to action, p=0.007) of six perception components. Perceived barriers show a strong relationship (r=0.890), while cues to action show a weak relationship (r=0.204).

Table 4. Association between types of information and industrial workers' perceptions component on COVID-19 (n=285)

Perception component	Type of information (print media, online electronic, offline electronic, direct counseling)		
	n (%)	r*	p*
Perceived susceptibility		0.521	0.089
Good	134 (47.0)		
Poor	151 (53.0)		
Perceived seriousness		0.765	0.054
Good	139 (48.8)		
Poor	146 (51.2)		
Perceived benefits		0.126	0.210
Good	119 (41.8)		
Poor	166 (58.2)		
Perceived barriers		0.895	0.046
Good	159 (55.8)		
Poor	126 (44.2)		
Cues to action		0.204	0.007
Good	104 (36.5)		
Poor	181 (63.5)		
Self-efficacy		0.105	0.370
Good	100 (35.1)		
Poor	185 (64.9)		

Note: *Phi test (φ). Detailed information about the type of information, see the notice in Table 2

On the other hand, Table 5 reveals three (maintain a safe distance, p=0.029; using a face mask, p=0.039; and eat nutritious food, p=0.019) of eight behavior variables to prevent COVID-19 transmission are associated significantly with the type of information. Specifically, good preventive behaviors are meant if the workers have a "yes" answer in maintaining a safe distance, using a face mask, washing hands, avoid the crowd, avoiding direct contact, eating nutritious food, and exercising regularly. The association level of the behavior variables and the information type are weak for maintaining a safe distance (r=0.178) and eating nutritious food (r=0.188). At the same time, a strong relationship shows by using a face mask (r=0.935). The workers show good behaviors prevent the COVID-19 transmission in all behavior variables (65.6-93.0%), except using a face shield (22.1%).

Table 5. Association between workers' behavior to prevent COVID-19 transmission and information types

Behavior variables	Type of information (Print media, online electronic, offline electronic, direct counseling n (%)	r*	p*
Maintain a safe distance		0.178	0.029
Yes	187 (65.6)		
No	96 (33.7)		
Using a face mask		0.935	0.039
Yes	253 (88.8)		
No	32 (11.2)		
Using a face shield		0.564	0.080
Yes	63 (22.1)		
No	222 (77.9)		
Washing hands/Hand sanitizer		0.107	0.350
Yes	265 (93.0)		
No	20 (7.0)		
Avoid the crowd		0.103	0.390
Yes	228 (80.0)		
No	54 (18.9)		
Avoid direct contact		0.155	0.078
Yes	223 (78.2)		
No	59 (20.7)		
Eat nutritious food		0.188	0.019
Yes	225 (78.9)		
No	60 (21.1)		
Exercise regularly		0.566	0.085
Yes	192 (67.4)		
No	92 (32.3)		

Note: *Phi test (φ). Detailed information about the type of information, see the notice in Table 2

In this study, the most sources of information about COVID-19 came from online electronic and direct counseling by health and safety officer, and it was proven to affect workers' perceptions, especially in the perceived barrier and cues of action (Table 2 and Table 4). Although most sources of information about COVID-19 come from online electronics, when interacting with health and safety officer, the workers can confirm the truth of the information. The results of similar studies in the general population obtained the same results that currently the sources of information about COVID-19 and prevention of transmission are mostly obtained from television, print media, and websites (online sources), followed by government and public health websites, unfortunately, the researchers did not analyze the relationship with the perception and behavior of prevention in community [31]. Our finding is in accordance with previous research which concluded that workers' sources of information affect perceptions and risk behavior. Information sourced from the project manager, safety and health manager, and workmates is more accurate in influencing the perception of danger and risk behavior. From this information source, workers are more confident because there is two-way communication and can give each other feedback [32].

4. CONCLUSION

In general, workers' perceptions regarding COVID-19 are still classified as poor, while workers' behavior in preventing COVID-19 transmission in the workplace is quite good. Gender, education background, and types/sources of information significantly correlate with workers' perceptions about COVID-19. In addition, workers' perceptions are significantly related to COVID-19 transmission prevention behavior in the workplace. Perception components based on HBM theory related to preventing COVID-19 transmission in the workplace are perceived susceptibility, perceived seriousness, perceived barriers, perceived benefits, and self-efficacy. To improve the worker's behavior of preventing Covid-19 transmission in the workplace, company management is advised to be more active in conducting health education with the Health Belief Model approach. Health education should be done through direct counseling (safety talk, safety briefing, and safety meeting), or by using online electronic media that are the most preferred and most widely used by workers today.

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BIOGRAPHIES OF AUTHORS

Iwan Muhamad Ramdan is Occupational Health and Safety specialist, is an Associate Professor and Head of the health and safety department at the Faculty of Public Health, Mulawarman University since 2005, Dr. Ramdan received a Postgraduate scholarship (Master and Doctoral program) from the Directorate General of Higher Education, Ministry of Education, Culture, Research and Technology of the Republic of Indonesia. Master's and doctoral degrees were obtained from Gadjah Mada University. His research focuses on health and safety including work-related diseases, work-related accidents, safety management, industrial hygiene, industrial toxicology, industrial psychology, and patient safety. He can be contacted at email: iwanmuhamadramdan@gmail.com; iwan.m.ramdan@fkm.unmul.ac.id.

Krishna Purnawan Candra is an agricultural product technologist, is a Professor at Agricultural Product Technology Department of Faculty of Agriculture of Mulawarman University since 2013, and is Vice Director of Graduate Program of Mulawarman University. Previously he was Head of Natural Resources Research Center of Mulawarman University Research Institution, was Vice Dean for Academic Affairs of Faculty of Agriculture at Mulawarman University. Dr. Candra received a Sarjana degree (equivalent to Bachelor's degree) in Agroindustrial Technology and a Magister Sains degree (equivalent to Master of Science degree) in Food Science from Bogor Agricultural University, Indonesia. He received fellowship from DAAD for Doctor degree in Food Science and Nutrition from Christian-Albrecths University, Germany. His research focuses on Agricultural Product Technology including ergonomic and work safety in agroindustrial activities. He can be contacted at email: candra@faperta.unmul.ac.id.

Muhammad Sultan is is a Senior lecturer at the Faculty of Public Health, Mulawarman University. He completed his undergraduate and postgraduate studies at Hasanuddin University. His research focuses on health and safety including transportation safety, patient safety, and health safety of the informal sector. He can be contacted at email: muhammadsultan812@gmail.com.

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