Evaluating the Safety and Health Risk of Logistics Workers during the Pandemic

Julianne Mikhaella C. Delos Reyes, Louis Miguel C. Dural, Julia Sofie D. Mangaoang, Gaea Marithe W. Victor, and Ma. Janice J. Gumasing
School of Industrial Engineering and Engineering Management
Mapua University
Manila, Philippines
jmcdelosreyes@mymail.mapua.edu.ph, jsdmangaoang@mymail.mapua.edu.ph,
lmcdural@mymail.mapua.edu.ph, gmwvictor@mymail.mapua.edu.ph,
mjjgumasing@mapua.edu.ph

Abstract

The pandemic has severely affected the way people do things. Necessary rules and regulations have been implemented to ensure the virus would not further spread. The logistics industry is one of the sectors greatly affected by the pandemic since some industries are required to perform their respective work in a face-to-face setting. Meaning the workers have a high chance of being exposed to the virus. The study aims to identify whether workers from various logistics companies have experienced any risks during the pandemic regarding the physical, chemical, ergonomic, and biological extent. Moreover, surveying 250 logistics workers found that most have been experiencing ergonomic risk factors, which has made them perceive their health and safety risks as mild, given the current situation.

Keywords
risk, safety, health, logistics, pandemic

1. Introduction

With a total net worth of USD 13 billion in 2019, the thriving logistics industry has always been a notable element in the Philippine economy. The philippine logistics market was forecasted to develop from 8.2 to 8.8% between 2018 and 2024, according to a study by The Lobien Realty Group (2020). This emphasizes how beneficial the logistics market is, as it provides unconventional services like warehousing, inventory management, freight forwarding, and multimodal transportation. Since the flow of materials between and among countries has become increasingly complex, today's global value chains demand a higher level of resilience and efficiency for companies to function effectively. Companies can do this by outsourcing their logistics operations to third-party logistics service providers, particularly those that can provide coordinated, end-to-end solutions.

China is a massive consumer of agricultural and industrial products worldwide. The influence of COVID-19 was first noticed here, given that its importance in global manufacturing was greatly affected. Being the heart of the pandemic, Wuhan, China, is also the epicenter of more than 200 Fortune Global 500 firms. With the slow response of most countries, the pandemic started to expand globally, resulting in a halt in trade and closure of borders. Integrating additional regulations to maintain worker safety, like physical distancing in warehouses, is attributed to freight bottlenecks.

While allowing unlimited unpaid leave, third-party logistics protect employees' health by establishing new social distancing protocols at warehouses, sanitizing work locations, or supplying protective gear. OSHA standards indicated that the fatal accident rate for the warehousing industry is greater than the state median for all sectors, meaning that health and safety should be addressed for long-term warehouse operations. Identifying all hazards and risks that could cause fatal injury or death is the first step in preventing such things from happening. Although the employer supervises overall hazard assessment, workers must recognize the hazards around them. In the logistics industry, work conditions consistently change, especially for delivery service riders; these workers must be attentive to their surroundings and identify all possible risks on an ongoing basis.

As the COVID-19 continues to halt the operations of many industries, the sector of logistics was primarily affected by these changes as well due to the implementation of the lockdown. Logistics activities weren't just suspended; it has affected the circulation of the products imposed by distributors and merchants (Singh et al., 2020). As the logistics sector is responsible for storing and transferring different types of goods in the economy, it was affected mainly by the COVID-19 outbreak. This field is associated with global manufacturing and requires the flow of goods within various countries (IFC, 2020). Since COVID19 originated in China, which is known for its significant contribution to the economy, disruptions in the manufacturing field were seen, leading to considerable travel backlogs in ports. Despite the negative impact the COVID19 pandemic has brought to the logistics industry, it continued to adopt several measures and alternatives to continue the operations of this sector. Reconfiguration of global chains was carried out to utilize the shortening of supply chains in countries with minimal regulations and policies (Singh, 2020).

According to Atombo et al. (2017), as industrialization grows and develops, occupational safety and health have become one of the most critical issues in every industrial job performed in the industries, like accidents, injuries, and fatality rates continue to rise. As a result, there is a need to investigate and analyze people's perceptions of the significance of safety and health when it comes to work and transportation-related activities.

1.1. Objectives

Starting from the time the COVID-19 pandemic has occurred in the Philippines, the lifestyle and behavior of every individual have changed due to the adjustments and measures being implemented. Moreover, each one continues to move forward with their jobs and duties, whether a student or a worker. With that, this study aims to specify and assess the risks of employees working in the logistics industry during the pandemic regarding its biological, physical, chemical, and ergonomic aspects. On top of that, this study also intends to evaluate the risk level of logistics workers regarding their safety and health to address concerns that these workers are experiencing in their workplace.

2. Methods

2.1 Conceptual Framework

As shown in Figure 1, this study focused on how the leading four (4) hazards, namely biological, chemical, physical, and ergonomic hazards, influence the workers' perceived safety and health risks in their line of work. The four (4) hazards are also theoretically associated with the overall occupational safety and health of the workers in the logistics industry.

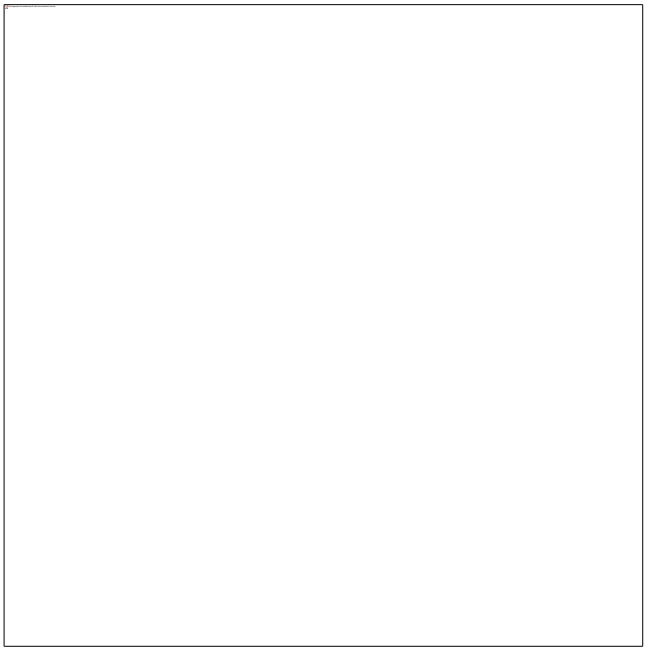


Figure 1. Conceptual Framework

With the use of an online survey, the researchers generated an online survey that consists of three (3) parts that comprise of: the respondents' consent on voluntarily answering the survey, demographic profiling - which asks their name, age range, gender, area of residence, employment status, civil status, and job level, and the exposure to the four main hazards and overall perceived health and safety risk. A 5-point Likert scale was utilized throughout the online survey to measure the variation and frequency for each hazard exposure that ranges between (1) never, (2) rarely, (3) sometimes, (4) often, and (5) always. The researchers also utilized printed survey questionnaires and personally went to different locations of J&T Express, JRS Express, and LBC Express to gather respondents.

The results of this study were analyzed using three (3) statistical analyses. Using One-Way ANOVA initially determined the difference between the four hazard types: biological, chemical, ergonomic, and physical. Subsequently, Pearson Correlation Analysis was utilized to determine the relationship between the different types of hazards to the safety and health risk of an employee in a logistics facility.

3. Results and Discussion

Table 1 shows that out of the 250 respondents, 93% are male, and only 7% are female. According to their age range, 37% are 20 or below, 32% are 21-30 years old, 15% are 31-40 years old, 10% are 41-50 years old, and none of the respondents are 51 or above. Moreover, 41% of the respondents are single, and 78% are married; 1 is widowed, while two are separated. 75% of the respondents reside in the city, particularly NCR, and 25% are from the province. Regarding their employment status, only 9% are casually working, 37% are part-time, and 54% are full-time workers.

Table 1. Summary of Demographic Profile

Respondent's Profile	Category	N	%
Gender	Male	232	93%
	Female	18	7%
Age	20 and below	84	37%
	21-30	79	32%
	31-40	38	15%
	41-50	49	20%
	51 and above	0	0%
Area of Residence	City	188	75%
	Province	62	25%
Employment Status	Casual	23	9%
	Part-Time	93	37%
	Full Time	134	54%
Civil Status	Single	103	41%
	Married	144	78%
	Separated	2	0.8%
	Widowed	1	0.4%

3.1. Hazard Assessment Results

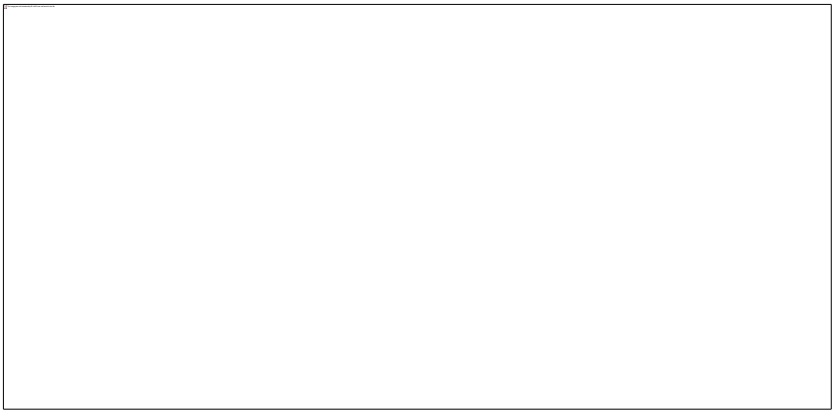
As presented in Table 2, the mean and standard deviation for all factors were used to compute the minimum and maximum range of threshold. Since all factors achieved a range of 1-5, the standard threshold is 2.5; any factors exceeding this are considered significantly crucial to the workers' safety and health. The aspect of ergonomic hazards achieved 5 out of 6 factors that exceeded the threshold of 2.5. Since most respondents are delivery service riders, they are exposed to excessive noise, extreme temperature, awkward posture, static posture, manual material handling, and repetition of tasks. This is followed by biological hazards, with 4 out of 5 factors exceeding the threshold; given this pandemic, most respondents are highly exposed to pathogens, toxins, microorganisms, viruses, and diseases.

Table 2. Summary of Hazard Assessment

Hazard	Item	Mean	Std. Dev	Range
Biological Hazards	Exposure to pathogens	**2.64**	1.32	1-5
	Exposure to microorganisms	**2.68**	1.37	1-5
	Exposure to toxins	**2.61**	1.43	1-5
	Exposure to virus or disease	**3.09**	1.44	1-5
	Exposure to biological waste	1.93	1.06	1-5
Chemical Hazards	Exposure to skin irritants	2.11	1.33	1-5
	Chemicals to fire hazard substance	2.02	1.02	1-5
	Exposure to environmental hazard substance	2.20	1.24	1-5
	Exposure to corrosive substance	2.07	1.28	1-5
	Exposure to respiratory irritants	**2.57**	1.43	1-5
Physical Hazards	Exposure to vibration	**2.50**	1.43	1-5
	Exposure to radiation	2.43	1.36	1-5
	Exposure to high pressure	2.23	1.11	1-5
	Exposure to equipment that can cause injury	2.41	1.10	1-5
	Exposure to electric hazards	2.11	1.01	1-5
	Exposure to falling hazards	2.05	1.19	1-5
Ergonomic Hazards	Exposure to excessive noise	**3.18**	1.31	1-5
	Exposure to extreme temperature	**2.91**	1.50	1-5
	Exposure to poor lighting	2.34	1.29	1-5
	Exposure to awkward posture	**3.34**	1.37	1-5
	Exposure to static posture	**3.75**	1.29	1-5
	Exposure to manual material handling	**2.82**	1.38	1-5
	Exposure to repetitive task	**3.64**	1.42	1-5

As shown in Figure 2, ergonomic hazards are the most significant factors for logistics workers, especially delivery service riders and supervisors. Given their line of work, it is inevitable to be experiencing these types of hazards as they are exposed to static posture and repetitive tasks, given that they ride their motorcycles for a living, especially for full-time workers. Some delivery service couriers also require their workers to lift the customer's parcel manually, and they habituate an awkward posture. Being on the road for a long time exposed to cars and motorcycles with modified mufflers may give off a long-term effect on one's hearing as most motorcycles produce noise of 97 decibels (Pahunang et al., 2018). Given the Philippines' geography, it is very vulnerable to the climate crisis, and people are exposed to extreme heat or intense hurricanes; despite this situation, many delivery service riders continue to work during bad weather to make ends meet.

Figure 2. Summary of Hazard Exposure



3.2. Overall Perceived Risk

Figure 2 displays the summary of the risk assessment on how employees in the logistics industry perceive their risk in terms of their safety and health. As shown in the figure, 36.4% of the respondents perceive their safety risk as mild, while 20.5% of the respondents perceive their safety risk as moderate. Perceiving safety risk as mild to moderate implies that they consider their work of action as tolerable and not disruptive to their everyday lives. Even though it's regarded as a mild risk, this can still negatively affect the employee's performance. According to Dzissah (2019), jobs in this industry require one to manage and transfer goods for an extensive amount of time which increases the employees' exposure to different ergonomic-related risks such as back pain and awkward posture. Moreover, the safety risk of these employees has been discovered to be at stake due to the ergonomic problems mentioned. As for the health risk, 40.9% of the respondents perceived their health risk as mild, while 20.5% perceived it as high. This is because the country is still experiencing a pandemic due to the spread of the COVID-19 virus despite the strict measures every worker needs to follow. As Singh et al. (2020) have stated in their study, the government continued to adopt several measures and alternatives to continue the operations in the logistics sector. According to Atombo et al. (2016), people prioritize their health. Still, the level of integration of the knowledge with the OSH standards is not mainly implemented. Thus logistics company higher-ups need to conduct training programs and seminars to help the employees mitigate their risk of being a worker in the logistics industry.

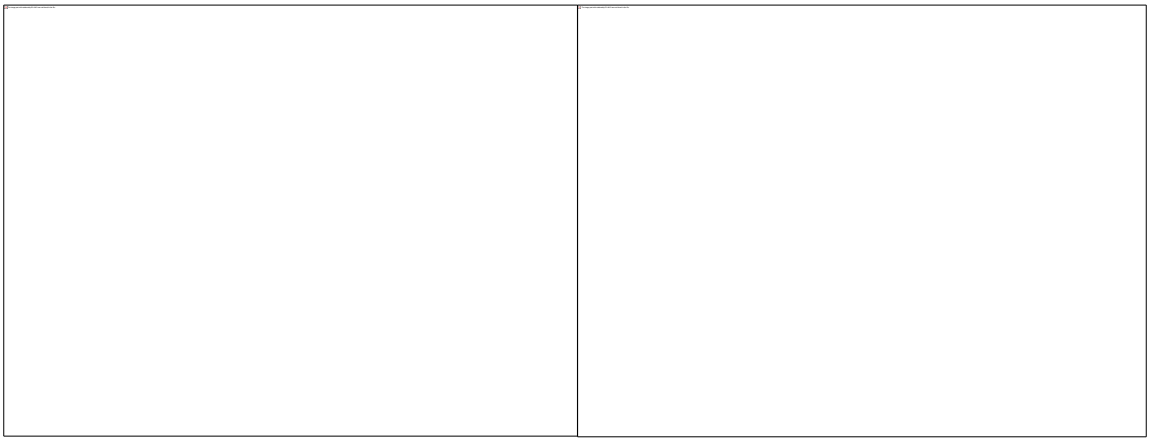


Figure 2. Overall Perceived Safety & Health Risk

3.3. Correlation Analysis

In performing the Pearson Correlation test, the different types of hazards are tested for correlation with safety and health risks. With the summary of results shown in Table 6 regarding safety risk, ergonomic hazards obtain the highest Pearson Correlation value resulting in 0.648. This result indicates a high association between two variables which connotes that once people's exposure to ergonomic hazards increases, their perception of safety risk also increases. This means that people tend to be more mindful of their safety conditions once they are more exposed to ergonomic

hazards. On the other hand, regarding health risk, chemical and ergonomic hazards obtain the highest Pearson Correlation value resulting in 0.577 and 0.654, respectively. Both results indicate a high association between two variables, which connotes that once people with chemical and ergonomic hazards exposure increases, their perception of health risk also increases. This means that people tend to be more mindful of their health once exposed to these hazards.

Table 3. Result of Correlation Analysis

Factors	Pearson Correlation	95% CI for P	P-Value	Remarks	Level of Correlation
Biological → Safety Risk	0.469	0.288, 0.618	<0.001	Significant	Moderate Association
Chemical → Safety Risk	0.605	0.453, 0.723	<0.001	Significant	High Association
Physical → Safety Risk	0.407	0.216, 0.568	<0.001	Significant	Moderate Association
Ergonomic → Safety Risk	0.648	0.507, 0.755	<0.001	Significant	High Association
Biological → Health Risk	0.568	0.407, 0.695	<0.001	Significant	High Association
Chemical → Health Risk	0.577	0.418, 0.701	<0.001	Significant	High Association
Physical → Health Risk	0.313	0.111, 0.490	0.003	Significant	Moderate Association
Ergonomic → Health Risk	0.654	0.515, 0.760	<0.001	Significant	High Association

4. Conclusion

The logistics sector has thrived exponentially in the Philippines, forecasting a growth of 8.8%. This increase shows that logistics benefits the economy since it focuses on providing services such as warehousing, inventory management, freight forwarding, and multimodal transportation. Being the most crucial sector in the market, the continuous growth of employees and workers within the work environment is beneficial for a quick and smooth operation and transportation flow. However, as we are in a pandemic sector, the logistics operation makes it their priority to establish protocols and sanitation systems and utilize protective gear to ensure the safety of their employees. Furthermore, workers must also recognize these types of hazards to protect themselves from injuries and accidents. In addition to aiding workers and establishments in the importance of safety and health, this study targets to specify and assess the risk of employees working in a logistics industry within the Philippines during the pandemic. This will ensure that workers will be protected, and establishments can create plans and safety guidelines to guarantee the well-being of their workers. Results were gathered from different logistics companies using an online survey and printed questionnaire. The gathered results show that ergonomic and chemical hazards are the most significant factors contributing to workers' safety and health risks. Since most of the workers in the logistics sector are delivery riders utilizing motorcycles, they are exposed to awkward posture and repetitive tasks in their arms, hands, and risk.

Furthermore, since motorcycles are rear-wheel vehicles, delivery personnel are exposed to bacteria, chemicals from smoke, and environmental factors. Additionally, when workers were asked about their working conditions, they considered them tolerable. Though, once they are exposedto these types of hazards, workers become mindful of their safety and make it their priority to protect themselves from these kinds of risks. These results and findings show that safety and health assessment is crucial as it prevents not only minor health problems but also long-term medical issues.

Results show that factors under ergonomic hazards have a high correlation based on the workers' activities, followed by biological hazards, especially in exposure to virus or disease, given that COVID-19 is still a threat. The respondents perceive their work under mild risk in terms of safety and health, this may seem moderate, but this can significantly affect one's work performance and productivity. Safety management must be taken seriously by employers, and

improvement for safety and health management must be mandated by companies, requiring stricter safety practices and seminars. Companies may combine forces with the Department of Labor and Employment (DOLE) in directing stricter health and safety protocols to prevent future occupational injuries and diseases. Safety climate in the logistics industry was always in a struggle; tremendous effort and participation of the employees are required. With these efforts, employees will habituate safety practices, develop camaraderie, and create a harmonious environment in the workplace. For future research, it is recommended to gather more respondents with different employment statuses and try to gather respondents outside NCR.

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