

# **Determinants of the use of Personal Protective Equipment: A Literature Review**

## **ABSTRACT**

Workers are exposed to many types of hazards daily, which is dependent on their work type. Employers should ensure that their employees are trained on their workplace hazards, able to identify the hazard, and provided with the tools for preventing and controlling their exposure to hazards. This study aims to identify the determinants of the use of Personal Protective Equipment (PPE).

### **Methodology**

A systematic search was performed using various Electronic databases such as PubMed, Science Direct, *Peer review Journal*, Research gate, and others. We included original studies that evaluated the effect of several determinants on PPE use. Free full-text studies published in English from 2010 – to 2020 were also included. A total of fourteen studies met all the criteria and were selected to be included in this review.

### **Results**

Findings revealed from the review that workers across the board in various disciplines are often without PPE gear for various reasons. These include discomfort, followed by PPE unavailability at work, to affordability. Other factors include a lack of knowledge of the use and importance of PPE and a lack of company policy enforcement.

### **Conclusion**

The main determinants found to affect PPE use can be organized into three categories:

1. Individual factors, such as knowledge, beliefs, attitudes, perception of risk, history, and socio-demographics.
2. Environmental factors, such as availability of equipment.

3. Organizational factors, such as management's expectations, workplace policies, and training and education programs

## **BACKGROUND**

All workers have been exposed to many types of hazards daily depending on their type of work, and the duration of the tasks. These hazards may be physical, biological, chemical, ergonomic, and even psychological [1]. Centers for Disease Control states that to reduce or eliminate the risks workers face, employers should ensure that their employees are trained on their workplace hazards, able to identify the hazard, and provided with the tools for preventing and controlling their exposure [2].

The International Labor Organization (ILO), SUBSIDIARY LEGISLATION 424.21 of 2003, defines Personal Protective Equipment (PPE) as all equipment designed to be worn or held by the worker to protect him/her against one or more hazards that are likely to endanger his health and safety at work [3].

Personal protective equipment (PPE) such as hard hats, goggles, gloves, and boots play a vital role in the prevention of health hazards and promotion of Safety. It is concluded that many scientific data show most of the workers suffering injury were not wearing these types of clothing [4].

[5] a survey, revealed that nearly all of the safety professionals interviewed said that workers in their organizations had at some point failed to wear the necessary safety equipment while on the job. Ward further elaborated that 98% of respondents surveyed by Kimberly-Clark Professional who attended the American Society of Safety Engineers (ASSE) answered "yes" when asked if they had observed workers not wearing safety equipment when they were required to wear these gear.

Another survey revealed that 29% of respondents said that non - compliance with wearing PPE had happened on numerous occasions [6].

Previous studies from the US Department of Labor in a (2020) report, revealed that out of 4,779 worker fatalities in private industry in 2018, 1,008 (21.1%) were in construction — that is, one in five worker deaths last year were in construction.

It is noted that in the Caribbean, there is little or no documentation on research on exposure to and risks from occupational hazards [8].

[9] revealed that during the period 2006 to 2015, there were a total of 102 fatal accidents which occurred in various workplaces across Trinidad. She further noted that the construction industry was cited to have the highest number of fatalities, and it recorded 33 (32.4%) fatal accidents for that period. [10] estimates that the total labor force in Guyana is approximately three hundred eighteen thousand four hundred ninety-eight (318 498) persons, who are aged fifteen (15) years and older.

The Minister of Labor, Mr. Keith Scott 2018, while addressing his audience announced that “There was a total of 560 reported workplace accidents of which 22 (4%) have resulted in the loss of lives during 2018.” His remarks were validated by a number of recent cases. For example, In March 2019, a manganese company was ordered to halt exploration since eight (8) Chinese workers fell ill, with two tests positive for Leptospirosis (“Manganese company ordered to halt exploration”, 2019).

Later, in June, a technician and a driver were electrocuted and two others were injured during the installation of surveillance cameras at the northern side of the Guyana National Stadium [11].

Given the frequency in occurrence of industrial accidents, the principles of occupational health and safety should become even more vital given that Guyana is now an oil-producing nation. This statement was echoed in a press conference by Dr. Karen Cummings according to the news reporter. Further, the health and safety regulations in the workplace are of utmost importance to the well-being of the employee and the employer because a safe and healthy workplace is conducive to workers’ safety [12].

The background data suggests that very little information exists regarding worker health hazards and how they are controlled in developing countries. There is limited information on the use of

personal protective equipment or work-related health problems within the various occupational groups. This problem is evident in the country of Guyana since little information is published concerning these problems in the country, even though the number of small-scale enterprises continues to increase. Thus, this study aims to gather information about the determinants of the use of personal protective equipment (PPE).

UNDER PEER REVIEW

## **PROBLEM STATEMENT**

Labor Laws worldwide require that workers wear protective devices and clothing provided by the employer and report to their employer any absence of or defect in any protective device. However, data proves that this may not necessarily be the case due to the high incidence of workplace injuries and deaths. As such, the researchers decided to execute an investigative study to ascertain where the problem lies and why workers have not been using Personal Protective Equipment as is mandated. This research will ascertain what are the determinants influencing Personal Protective Equipment use.

UNDER PEER REVIEW

## **OBJECTIVE OF THE STUDY**

This study aims to compile the determinants of Personal Protective Equipment (PPE) use in the work environment with a significant incidence of potential hazards such as the construction, medical, automobile, and agricultural fields.

## **SPECIFIC OBJECTIVES**

To achieve the broad objective, the following specific objective will be pursued

- To identify if there are determinants that transcend the boundaries of the various fields of work.
- To determine if there is a specific field that is more likely to be errant in following PPE guidelines.

## **SIGNIFICANCE OF THE STUDY**

It is evident that Personal Protective Equipment (PPE) is essential for a healthy workforce in a conducive environment. The lack of compliance can result in deaths or injuries. Evidence provide, supports the notion that PPE must be provided and worn by all employees.

The findings of this study will play a key role in raising awareness of the use of Personal Protective Equipment and will also foster the development of strategies and regulations to combat the various determinants of PPE use.

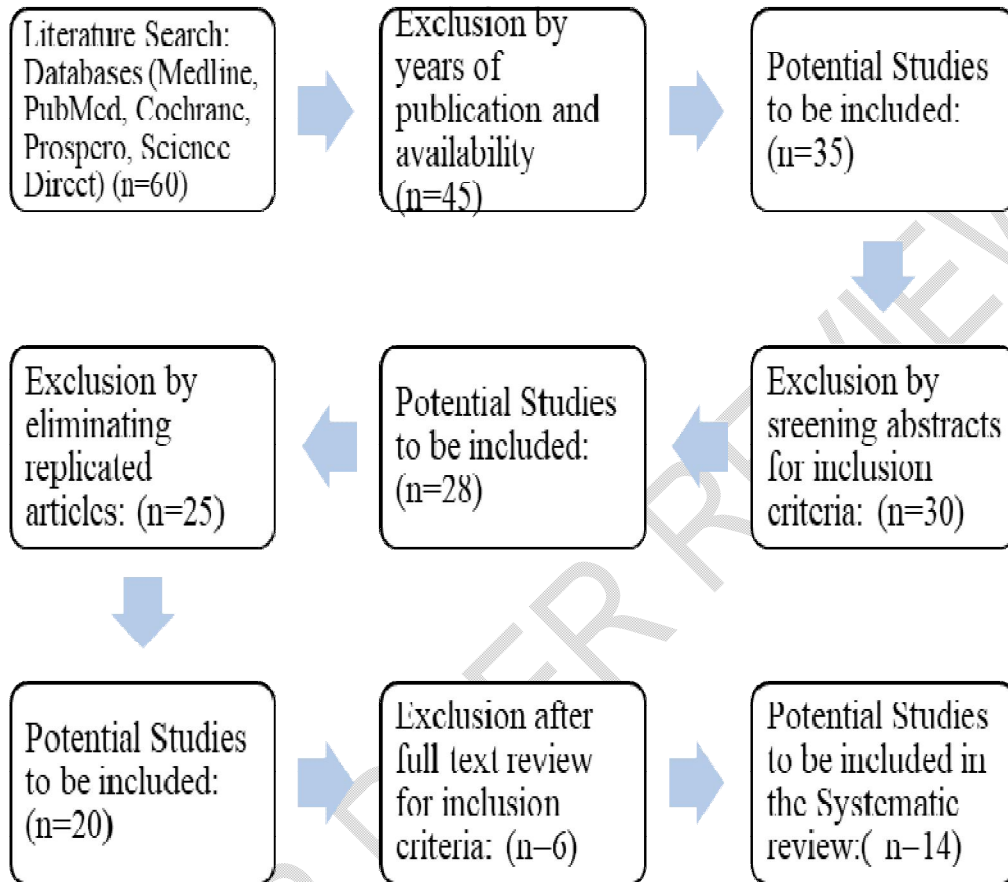
## METHODOLOGY

This literature commences with the development of the question: What are the determinants that dictate if workers wear or refuse to wear PPE? Keywords phrases used in the article search included “Personal Protective Equipment”, “Barriers”, and “Determinants of Use”. Electronic databases such as PUBMED, MEDLINE, Cochrane, Science Direct, PROSPERO, and Google Scholar were utilized from January to August 2020 to source articles related to the topic.

Eligibility criteria for this study included original studies completed within the prerequisite time frame of 10 years (2010 - 2020) on the use of Personal Protective Equipment reported in English. Free Full-text was also included. The criteria were expanded to include studies on specific fields such as Medical, Agricultural, Construction, etc. Exclusion criteria included: articles without a full text, paid articles, and studies conducted more than 10 years ago. The Authors then reviewed the full texts to ascertain their applicability to the topic.

After title and abstract screening, a comprehensive table summarizing the findings of each eligible article was developed to allow for ease of data handling and organization. A total of fourteen studies met all the criteria and were selected to be included in the results of this review.

### Flowchart of Study Selection



## RESULTS

Characteristics and outcomes of articles included in the systematic review

Table 1. Chart of Table summarizing applicable results of the review

Author & Year	Title	Study Design	Country	Sample and Setting	Reported Factors or Hazards
13	Knowledge, attitude, and practice (KAP) of using personal protective equipment (PPE) for chili-growing farmers in Huarua sub-district, Mueang district, Ubonratchathani province, Thailand	Cross-sectional	Thailand	330 chili-growing farmers	Most of the respondents demonstrated a low level of knowledge regarding PPE and pesticide use, were mostly not concerned about it, and demonstrated a fair level of practice in terms of using PPE.
14	Utilization Pattern of Personal Protective Equipment among Industrial Workers of Nawalparasi, Nepal	Cross-sectional	Nepal	187 workers in five industries (Beer, Rio, Chesseball, Chips, and Wafer)	The main reasons for not using PPE were the unavailability of PPE (33.3%) and the necessity of using PPE (66.7%).
15	Occupational Health and Safety Management: The Use of Personal Protective Equipment (Ppe) by Artisans in The Local Automotive Industry in Volta Region, Ghana	Quantitative	Ghana	200 randomly selected artisans.	The key reasons given by most respondents for not using PPE were non-availability of equipment, the PPEs were not designed for hot weather and that the equipment was too heavy causing Inconvenience.
16	Adherence and Knowledge about the Use of Personal Protective Equipment among Manicurists	Quantitative	Brazil	235 manicurists in Brazil.	Poor Knowledge of and adherence to PPE use.
17	Occupational Hazards and Use of Personal Protective Equipment among	Cross Sectional	Zambia	430 small-scale welders	Education was associated with awareness regarding hazards and

	Small Scale Welders in Lusaka, Zambia)				PPE as well as the use of PPE.
18	Knowledge and practice related to Occupational Hazards among Maruti Cement Factory workers in Mirchaiya, Siraha, Nepal	Quantitative	Nepal	100 cement factory workers	The variables having a significant influx in the knowledge and the practice of workers about occupational hazards are education, receiving information about the job-associated hazards, and attending a training course about occupational health and safety.
19	Use of Personal Protective Equipment among Health Workers in a Tertiary Health Institution, South East Nigeria: Pre-Ebola Period	Cross-sectional	Nigeria	511 Health workers	The commonest inhibiting factors to use of PPEs even when available are perception of low risk to hazard, forgetfulness and disturbance with work activity (74.0%, 39.9% and 22.5% respectively)
20	Evaluation of Personal Protective Equipment utilization among Construction Workers in Mombasa county, Kenya	Cross-sectional	Kenya	104 construction workers	Among the participants 45.0% were using the right PPE. More than half of the workers did not have any Personal Protective Equipment (PPEs). About 76.0% of participants had not been trained on PPE use and any other safety training
21	Factors influencing nurse compliance with Standard Precautions	Descriptive Correlational	United States	231 Registered Nurses	Fewer than one-fifth (17.4%) of respondents reported compliance with all 9 SP items. There was a significant relationship between susceptibility of HCV and compliance and between barriers to SP

					use and compliance.
22	Factors Influencing the Use of Personal Protective Equipment PPE by Motor Vehicle Repair Workers in Kigandaini, Thika	Qualitative and Quantitative (Mixed)	Kenya	80 motor vehicle repair workers.	Unavailability, discomfort during use, decreased work speed, expensive, to conform/fit in, work does not require PPE.
23	Barriers and Factors Affecting Personal Protective Equipment Usage in St. Mary's Hospital Lacor in Northern Uganda	Cross-sectional	Uganda	65 respondents but 6 were invalidated. Hence, 59 health workers. Uganda.	Poor-fitting and PPE, frequent stock-outs inadequate PPE as well as lack of training in PPE.
24	Assessment of personal protective equipment use and occupational exposures in small industries in Jeddah: Health implications for workers	Quantitative	Saudi-Arabia	102 workers from 28 small-scale industries.	The survey shows that policies and measures for the delivery of OSH services are limited and deficient for the studied population. Even though the laws, regulations, and policies are in place but their implementation, inspection, and audits for proper adherence to standards are needed to be improved in the studied workshops.
25	Knowledge, attitude and practice related to chemical hazards and personal protective equipment among particleboard workers in Ethiopia: a cross-sectional study	Cross-sectional	Ethiopia	159 particleboard factory workers and 13 management personnel.	The reasons for not using any type of PPE were reported to be lack of access (59%), lack of knowledge of its importance (33%), not comfortable (3.9%), not useful (1.9%), and 1.9% said that PPE was easily damaged.
26	Issue of Compliance with Use of Personal Protective Equipment among Wastewater Workers across the Southeast Region of the United States	Qualitative & Quantitative (Mixed).	Southeast Region of the United States	272 Wastewater workers.	Discomfort, interferes with the ability to do job, unavailability, coworkers make fun of PPE user, supervisor seldom wears PPE when required, too inconvenient.

After reviewing a number of databases including Cochrane and PROSPERO, four were selected for use because they were appropriate for conducting this systematic review. These databases are Research Gate, PubMed, Semantic Scholar, and Google Scholar. A total of 14 articles were accepted for the systematic review out of the initial identification of 60 possible studies from the databases aforementioned. Research Gate is a professional network for scientists and researchers. Over 17 million persons from around the world use it to share, discover, and discuss research. It is guided by the mission to connect the world of science and make research open to all. A Research Gate search showed a list of publications with the corresponding authors and dates. The result of a Keyword search in Research Gate provided 10 citations. After excluding articles by selecting free full text and full text, as well as years of the publication including 2010 to 2020 (exclusion 1), 3 articles remained to be reviewed. After the title and abstract reviewing process for meeting the other inclusion criteria and relevance to the studied topic (exclusion 2), all 3 articles were retained.

PubMed is a free resource database that supports the search and retrieval of biomedical and life sciences literature and aims to improve health—both globally and personally. The PubMed database contains more than 30 million citations and abstracts of biomedical literature. A PubMed search is a list of citations (including authors, title, source, and often abstract) to journal articles and an indication of free electronic full-text availability. Keyword search when using the PubMed database showed 13 citations. After excluding articles by selecting free full text and full text, as well as years of the publication including 2010 to 2020 (exclusion 1), 8 articles remained to be reviewed. After the title and abstract reviewing process for meeting the other inclusion criteria and relevance to the studied topic (exclusion 2), 6 articles were identified for the systematic review.

Semantic Scholar is designed to be an AI-backed search engine for academic publications. It adds a layer of semantic analysis to the traditional methods of citation analysis and extracts relevant

information from papers. Semantic Scholar highlights the most important and influential papers and identifies the connections between them. Keyword search when using Semantic Scholar showed 6 citations. After excluding articles by selecting free full text and full text, as well as years of the publication including 2010 to 2020 (exclusion 1), 4 articles remained to be reviewed. After the title and abstract reviewing process for meeting the other inclusion criteria and relevance to the studied topic (exclusion 2), 2 articles were retained for the systematic review.

Google Scholar provides a simple way to broadly search for scholarly literature. One can search across many disciplines and sources: articles, theses, books, abstracts, and court opinions, from academic publishers, professional societies, online repositories, universities, and other websites. Google Scholar helps researchers to locate relevant work across the world of scholarly research. Keyword search when using the Google Scholar database showed 15 citations. After excluding articles by selecting free full text and full text, as well as years of the publication including 2010 to 2020 (exclusion 1), 10 articles remained to be reviewed. After the title and abstract reviewing process for meeting the other inclusion criteria and relevance to the studied topic (exclusion 2), 3 articles were identified for the systematic review. In total, 14 articles were included in this systematic review.

A quality assessment including checks for a clearly defined purpose, detailed description of the sample, relevant background and literature, applicability of the study to the research topic, and results with statistical significance, was conducted on the 14 articles included in the systematic review. This assessment revealed that all 14 of the articles corresponded with four of the five checks. On the issue of results with statistical significance, only 4 articles were quantitative and the results were reported using confidence intervals and P-values. Of the articles that remained 7 were cross-sectional, 1 was Descriptive and 2 were mixed. As such the remaining studies did not attract any statistical significance.

Geographical location was not limited to any specific territory and thus studies were conducted in many countries including the United States and Africa, Saudi Arabia, and Brazil. Also, most studies were conducted during the period of 2010 to 2020 and focused on the barriers or factors that influence the use of Personal Protective Equipment.

Data collection methods included questionnaires, interviews, focus groups, and observation. Also, the most common factors that influence the use of PPE were discovered to be unavailability, insufficient training, discomfort, and a lack of company policy and enforcement. See figures 1-4 to support these areas of influence.

UNDER PEER REVIEW

## DISCUSSION

The purpose of this review was to determine the factors that influence the use of Personal Protective Equipment (PPE) in the working environment. The focus areas were the medical, construction, agricultural, automobile, and manicurist fields. The results from the 14 articles in this systematic review suggest that the most common barriers to PPE use in the medical, agricultural, construction, food, wastewater and manicuring industries are that the PPE are uncomfortable, PPE unavailability at work as factors that influence PPE use. Other factors include the lack of knowledge about PPE use, and the lack of company policy enforcement by top management.

These personal protective equipment including goggles and glasses, gloves, face shields, gowns, head covers, shoe covers, respirators, and masks. The PPE protects users against low, medium, and high-level hazards. In the hierarchy of controls (elimination, substitution, engineering, administration, and PPE), personal protective equipment is considered the least satisfactory method in the prevention of work-related injury or illness. PPE should be used to supplement or augment other means of hazard control, to further minimize the risk of injury [27].

Small scale industry employees are regularly and routinely exposed to numerous physical, chemical, and accidental hazards, which makes them a vulnerable occupational group. This is because, in developing countries, most of the workforce is employed in small and medium-scale industries that do not meet the minimum standards and guidelines set by the World Health Organization (WHO) and the International Labor Organization (ILO) for occupational health, safety, and social protection [28].

[17] showed that individual workers' personal characteristics such as level of education, age, gender, and work experience, also affect the use of personal protective equipment. Several studies have documented the barriers to PPE compliance due to the lack of these characteristics.

Additionally, the lack of time, and the perception that the use of PPE interferes with the ability to

perform the job, physical discomfort/difficulty communicating when wearing some of these gears such as masks.

[29] admonished employees that though their employers may be responsible for providing them with the correct and fully functioning PPE as part of their right for the work, it does not give them the right to violate the compliance policy of wearing and adhering to safety regulations. He outlined and noted that it is the responsibility of the employees to ensure that they are educated and trained on how and when to fit and wear their PPE properly. It is also noted that they must acquire knowledge on how to clean, maintain, store, and dispose of it, before he or she begins to work.

According to the Workers' Compensation Board of British Columbia, workers are to wear all PPE required for the job; check that the PPE does not compromise their health and safety (for example, interfere with breathing, vision, communication, or mobility); take care of their PPE- clean, maintain and store it properly; inspect their PPE for wear and tear and other damage before use; make sure PPE is repaired or replaced as necessary and report any damage to the supervisor or employer.

### **Motor Vehicle Repair Workers**

Figure 1. shows that the results from the study reveal that the majority of workers, 33 to 38% to be exact, were not using all the required Personal Protective Equipment due to its unavailability. Another 13.8% of the respondents cited the cost of the PPEs as a barrier to them not wearing them while 37.5% cited discomfort while using PPE as their reason for not using it. Further, 31.2% of the respondents said that their jobs did not require them to use PPEs. A focus group discussion with the respondents revealed that these workers were ignorant of the hazards relating to their job activities and therefore saw no need for them to use protective gear. A mere 7.5% said that PPEs interfere with or restrict their speed while performing tasks, and thus, decided to not use them. Data also revealed that in an effort to fit in and conform to the norms in the workplace, 6.2% of the respondents did not wear PPEs [30].

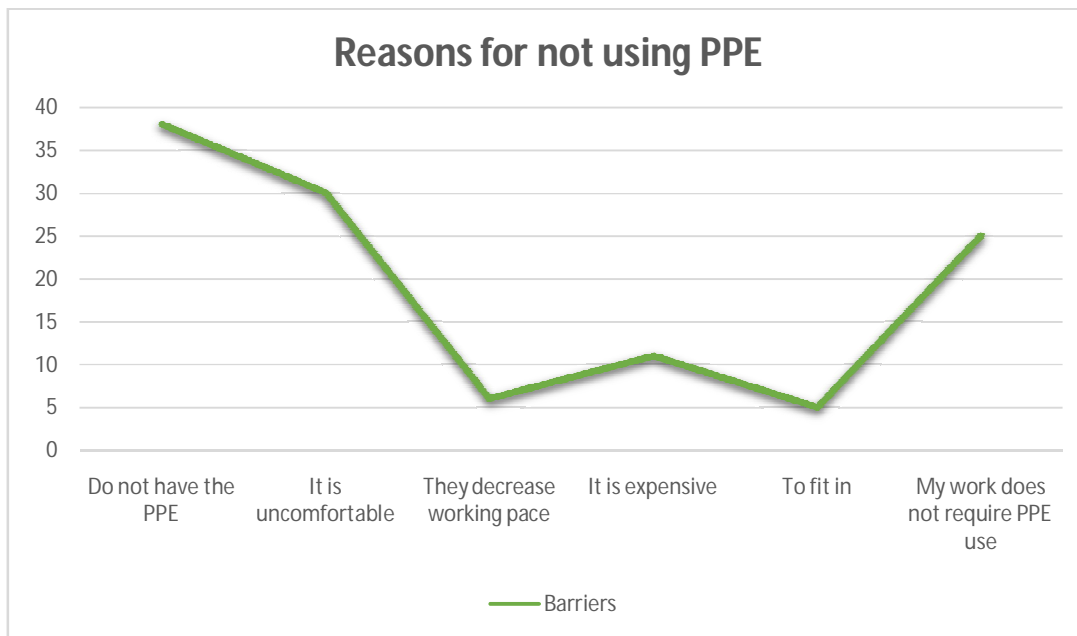


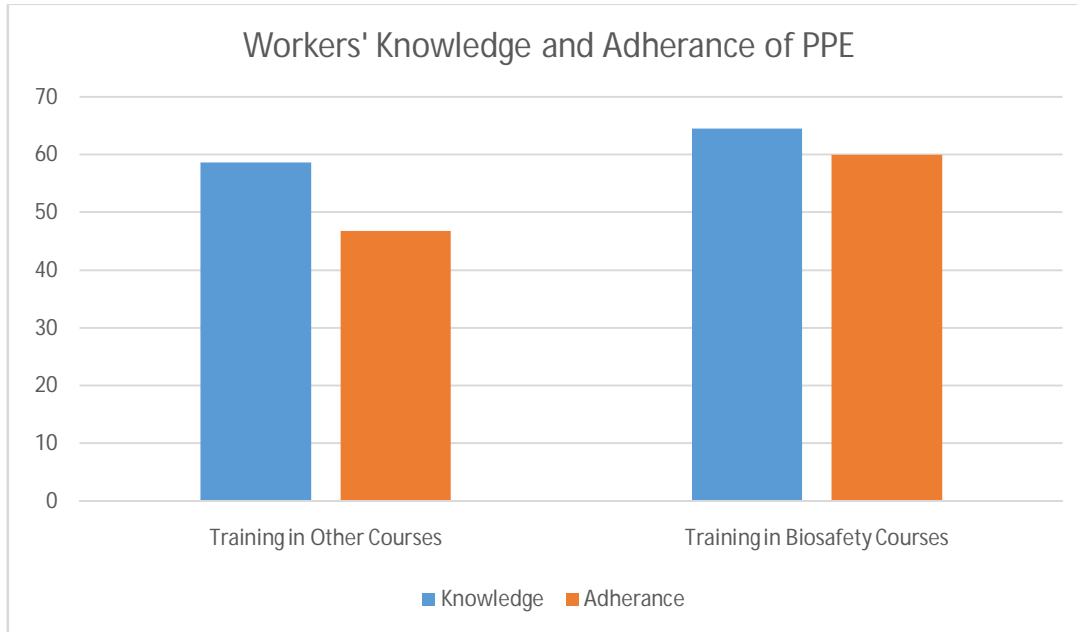
Figure 1: Line Graph showing the barriers to PPE use among Motor Vehicle Repair Workers

### Artisans

The column graph in figure 2, shows that manicurists who claimed to have training in areas other than biosafety had less knowledge about PPEs, and as such did not adhere to its use. Findings reveal that 58.6% of those respondents had some knowledge about PPEs, and 46.8% of them actually adhered to their use. Conversely, those that revealed that they had done a biosafety course showed greater adherence and knowledge of PPE. 64.6% of those workers gained knowledge after completing courses on biosafety and as such, 60% of them adhere to the training and make use of their PPEs. The results of this study were taken from [16] with 235 manicurists. Results were calculated, and revealed a 95% confidence interval, a standard deviation of 0.5, and a maximum estimated error of 0.05 [16].

Another study done by [15], found that the key reasons given by most respondents for not using PPE were non-availability of equipment, the PPEs were not designed for hot weather, and the

equipment is being too heavy, causing inconvenience. This study was conducted in Ghana with 200 artisan workers and, the value of the Cronbach alpha test was 0.823.



*Figure 2: Column Graph Showing Training in PPE Use and Adherence against Training in Other areas and Adherence*

### **Medical Workers**

The pie chart in figure 3 shows that 75% of the hospital staff did not respond to the question of always wearing protective equipment. However, 15% of the staff cited the inadequate number of PPEs as the reason they do not use them. Another 5% of the respondents cited frequent stock-outs of PPE as their reason for not complying with its use. Further, 3% responded that the PPEs are too big in size and as such, they are unable to use them while 2% stated that it is a lack of training that is responsible for their non-compliance [21]. The commonest inhibiting factors to the use of PPEs even when available are the perception of low risk to hazard, forgetfulness, and disturbance with work activity (74.0%, 39.9%, and 22.5% respectively) [19]. In Northern Uganda 59 health workers

showed that where poor fitting and PPE, frequent stock-outs, and inadequate PPE as well as, lack of training in PPE are barriers to PPE use [23].

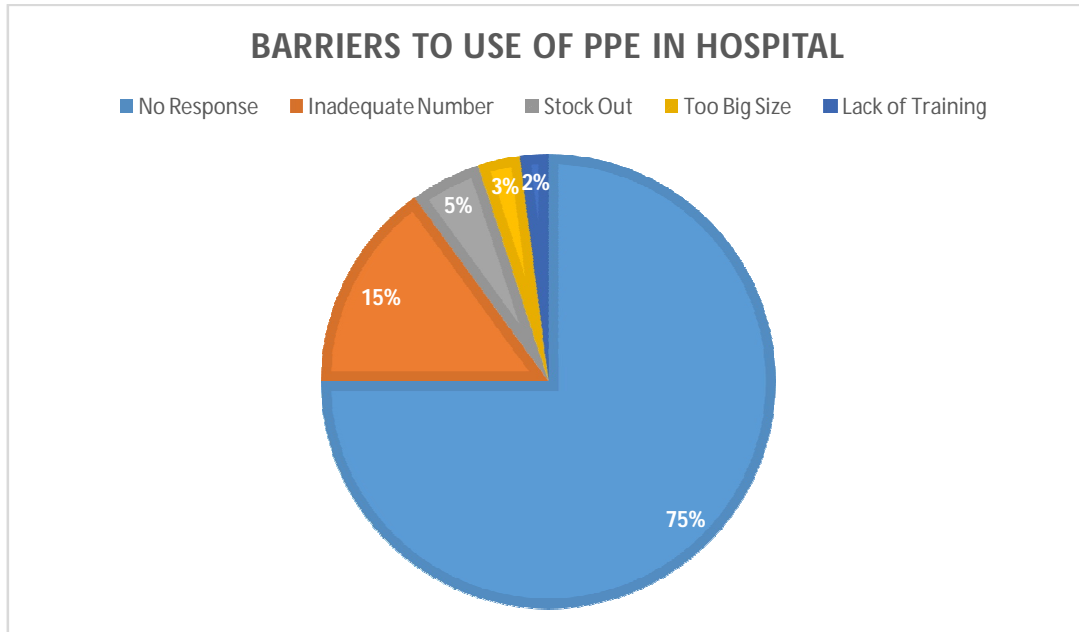


Figure 3: Pie Chart Showing Barriers to PPE Use in a Hospital

### Wastewater Workers

[26] in a study, reveal data collected from 272 Public wastewater workers located at 33 wastewater facilities across the southeast region of the United States. When asked about the barriers that prevented the participants from wearing PPE, the participants “agreed” and “strongly agreed” that uncomfortableness was a barrier to wearing PPE (43.7%).

The table in figure 4 displays 39.7% of the respondents agreed that wearing PPE is uncomfortableness. 19.1% agreed that PPE interferes with their ability to execute their jobs. 11.4% agreed that PPE is not always available to them while 4.8% agreed that coworkers would make fun of them for wearing PPEs. 8.5% of the respondents also agreed that their supervisors seldom wear PPE when required and 3.7% agreed that wearing PPE is just too convenient. These results clearly

show that many wastewater workers choose not to wear their personal protective equipment because of a lack of comfort.

<i>Perceived Barrier</i>	<i>Strongly Agree (%)</i>	<i>Agree %</i>	<i>Neither Agree nor Disagree %</i>	<i>Disagree %</i>	<i>Strongly Disagree %</i>
<i>Wearing PPE is uncomfortable</i>	4.0	39.7	30.5	22.1	3.1
<i>PPE interferes with my ability to do my job</i>	0.4	19.1	34.2	39.3	7.0
<i>PPE is not always available to me</i>	2.7	11.4	9.6	45.2	30.9
<i>My coworkers would make fun of me for wearing PPE</i>	1.1	4.8	6.6	51.8	35.7
<i>My supervisor seldom wears PPE when required</i>	4.0	8.5	18.0	42.3	27.2
<i>Wearing PPE is just too inconvenient for me</i>	1.1	3.7	9.6	54.8	27.2

Figure 4: Table 1 Showing wastewater workers perceived barriers to wearing PPE

**Farming and Food**

Data from among 330 chili-growing farmers showed that most of the respondents demonstrated a low level of knowledge regarding PPE and pesticide use, were mostly not concerned about the use, and demonstrated a fair level of practice in terms of using PPE [13]. Data from another study conducted [14] among 187 workers of five industries (Beer, Rio, Chesse-balls, Chips, and Wafer) in Nepal, concluded that the main reasons for not using PPE were unavailability of PPE (33.3%) and no necessity of using PPE (66.7%) [14].

### **Construction and Factory**

In Kenya data from 104 construction workers showed that among the participants, 45.0% were using the right PPE. However, more than half of the workers did not have any Personal Protective Equipment (PPEs). About 76.0% of participants had not been trained on PPE use and any other safety training [20]. A study in Ethiopia found that among 159 particleboard factory workers and 13 management personnel, the reasons for not using any type of PPE were reported to be lack of access (59%), lack of knowledge of its importance (33%), not comfortable (3.9%), not useful (1.9%), and 1.9% said that PPE was easily damaged. These results were presented using Chi-square tests, *T* tests and Correlation analyses for categorical and continuous data in this study. [18] in a study conducted in Nepal among 100 cement factory workers showed that the variables of having significant influence on the knowledge and practice of workers about occupational hazards were education, receiving information about the job-associated hazards, and attending a training course about occupational health and safety. These findings were supported by [25] in similar findings. Meanwhile, a study was conducted in Saudi Arabia among 102 workers from 28 small-scale industries. The survey shows that policies and measures for delivery of OSH services were limited and deficient for the studied population. Even though the laws, regulations, and policies are in place, their implementation, inspection, and audits for proper adherence to standards need to be improved in the studied workshops [32]. Another study conducted in Zambia among 430 welders, showed that education was associated with awareness regarding hazards and PPE as well as the use of PPE.

Descriptive statistics were used in the analyses of this data, and Chi-square and ANOVA tests were used for comparing study variables [17].

Clearly, the main recurring cry of workers across the board is that PPE is uncomfortable, followed by unavailability at work, as the main factor that influence PPE use. Other factors include the lack of knowledge about PPE use and the lack of company policy of enforcement by top management.

### **CONCLUSION**

An Institute of Medicine (IOM) report, and other studies including this one, show that there are a range of factors that influence PPE-related behaviors and compliance [33]

It must be highlighted that the attitudes, and beliefs of workers regarding the efficacy of Personal Protective Equipment, as well as work environment factors like the availability of PPE and training on its use, contribute significantly to workers' decisions in regard to PPE use.

It was found that workers' use of PPEs is suboptimal and this, therefore, results in exposure to many hazards. As such, the training of workers in health and safety, and PPE use, which also entails hazard identification and measures of eliminating those hazards is vital. Heightened awareness in this area will foster positive attitudes towards the use of Personal Protective Equipment among all workers, which would lower the risk of hazards, and the destruction of companies' names.

Finally, individual factors such as knowledge, beliefs, and attitudes; environmental factors including availability of equipment; and organizational factors e.g. workplace policies and training/education programs, are the important barriers to workers' use of Personal Protective Equipment in many privately-owned and operated businesses.

## RECOMMENDATIONS

Occupational risks can be greatly reduced and even avoided through the implementation of good Occupational Health and Safety Practices, especially the use of Personal Protective Equipment. These can significantly enhance the well-being of workers while improving their productivity at the same time. Therefore, the maintenance of PPE awareness and compliance is necessary, especially in the private or informal sector where oversight by Government safety departments is lacking. As such, the researchers recommend the following:

- The more extensive the workers' inclusion in every stage of the program, the smoother the program will be to enforce and actualize. Thus, users must be educated about why the PPE should be worn and be trained on how to properly use it.
- Designation of a program coordinator will aid in ensuring the success of a PPE program in the workplace. The coordinator will be responsible for ensuring that each of the elements of a PPE program is in place and operational.
- Employers should seek to provide the required PPEs in various sizes to cater to the needs of all employees.
- Commendations should be given when workers are compliant with PPE requirements or use.
- Regular inspections should be done to ensure that workers are using their PPEs and using them correctly. Failure to comply should involve some form of discipline.

## ACRONYMS

ASSE - American Society of Safety Engineers

CDC – Centers for Disease Control

ILO- International Labor Organization

IOM - Institute of Medicine

OSHA- Occupational Safety and Health Act

PPE- Personal Protective Equipment

WHO- World Health Organization

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## APPENDIX

### DEFINITION OF TERMS

1. Personal Protective Equipment- is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses [35].
2. Workplace- a place where people work, such as an office or factory [36].
3. Worker- one that works especially at manual or industrial labor or with a particular Material [37].
4. Private Sector- the part of the economy run by individuals and companies for profit and is not state-controlled [38].

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