



## PERSONAL PROTECTIVE EQUIPMENT AND ITS IMPORTANCE IN LABORATORY, PHARMACY AND NURSE WITH PHYSICIANS

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### Abstract:

In the fight against COVID-19, healthcare professionals (HCPs) such as physicians, nurses, pharmacists, and laboratory personnel are at the forefront of the struggle. They are also at an elevated risk of becoming infected with the coronavirus. Utilizing the appropriate personal protective equipment (PPE) is one way to reduce the likelihood of contracting an illness. HCPs will be able to use personal protective equipment (PPE) effectively and save unnecessary costs if they have a better understanding of its role. This will also ensure that the nurse-patient relationship continues to be the primary focus of treatment. It is essential for health experts to effectively adopt preventative and control measures in order to bring the dangerous COVID-19 epidemic under control.

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### **Introduction:**

There is currently a massive epidemic of the COVID-19 pandemic that is extremely contagious from person to person transmission worldwide. This pandemic is currently affecting the entire world. In addition to this pandemic, there have been additional reported instances of excessive exposure to microorganisms that are typically transmitted through blood, body fluids, and other potentially infectious materials. These germs include Ebola hemorrhagic fever, hepatitis B, hepatitis C, and the human immunodeficiency virus [1]. During a crisis of this nature, healthcare workers (HCWs) are confronted with a multitude of obstacles pertaining to patient care. These challenges include the handling of infectious samples for diagnostic purposes and the potential health concerns that can arise from direct contact with sick patients. The usage of personal protective equipment (PPE), which includes clothing, respirators, gloves, and covering materials, is employed to prevent the transmission of pathogens and body fluids. This is done in order to ensure safety and protection that is provided. Protective equipment (PPE) is utilized in a planned manner in healthcare facilities to reduce the transmission of germs to both patients and healthcare workers [2]. Personal protective equipment (PPE) is essential for healthcare workers (HCWs) because it serves as a barrier to the spread of infections [3]. In spite of this, personal protective equipment (PPE) and its standards have not evolved over the past few years to accommodate the requirements of the healthcare setting. Much awareness of personal protective equipment (PPE) for frontline healthcare workers (HCWs) has been raised as a result of the current COVID-19 outbreak. According to a recent poll conducted by the American Nurses Association with over twenty thousand healthcare workers (HCWs), during the COVID-19 outbreak, seventy-six percent of HCWs reported having extreme concerns regarding their personal protective equipment (PPE), and eighty-five percent were concerned about ensuring that their families were protected from becoming infected. Therefore, it is of utmost importance to do significant study on the design of personal protective equipment (PPE) for healthcare workers (HCWs) in order to ensure their safety and the overall health of the public [4]. As a result of its lower effectiveness in comparison to other control methods and its high cost over the long term, personal protective equipment (PPE) is typically listed at the bottom of the hierarchy of infection control measures. As a result, the majority of guidelines for infection control propose the use of personal protective equipment (PPE) in conjunction with other administrative and

environmental control measures. On the other hand, personal protective equipment is essential during the early stages of an outbreak or a pandemic, when treatments, vaccines, and other preventative measures are either unavailable or access is restricted. A face mask, respirator, gloves, goggles, or face shield are examples of personal protective equipment (PPE) that are frequently used to guard against respiratory infections. Face masks, also known as medical masks, and respirators are the personal protective equipment (PPE) that are utilized the most frequently in hospital settings to protect against influenza and other respiratory infections. It is important to note that these two items are not identical [5].

### **Review:**

It has been established via extensive research that the correct utilization of personal protective equipment (PPE) and the material that is used for PPE have a significant impact in reducing the transmission of germs and viruses. This provides reassurance that the utilization of PPE is an essential component of isolation precaution. The current personal protective equipment (PPE) is not ideal for the needs of healthcare workers because it has limitations in terms of protection and comfort. These limitations include insufficient capture of airborne pathogens, difficulties in communication through materials, the possibility of fluid penetration, poorly executed fit and sizing, and complicated procedures for donning and doffing [6].

However, despite the fact that the Centers for Disease Control and Prevention (CDC) offers detailed instructions on how to put on and take off personal protective equipment (PPE) in order to safeguard healthcare workers (HCWs) from the severe infectious environment, the urgency of the work environment makes it difficult to adhere to this regulatory guideline, which consequently makes them extremely susceptible to the risk of infection. As a result of the absence of human factors considerations within the current design of personal protective equipment (PPE) and the inappropriate layout and location of donning and doffing stations, proper donning and doffing is also a challenge. This has led to a research inquiry to develop an innovative PPE that allows for protection efficiency and greater efficiency in the process of donning and doffing. Other groups, such as firefighters, agricultural workers, and construction workers, have been the focus of these personal protective equipment (PPE) development techniques; nevertheless, there is a dearth of information concerning the design and

development of PPE for healthcare workers (HCWs). It is of the utmost importance that there be a further evaluation of personal protective equipment (PPE) for healthcare workers (HCWs) because they are the ones who spend the most substantial amount of time in an infectious environment with the most infectious persons [7].

The appropriate techniques of wearing and doffing personal protective equipment (PPE) in accordance with infection prevention and control standards are essential in order to safeguard healthcare workers, patients, and their families from unintentional exposure to COVID-19. This is because the transmission rate, morbidity, and fatality rates associated with the virus are high with this strain. When it comes to the fight against COVID-19, having adequate personal protective equipment (PPE) is of the utmost importance and is a vital component of infection prevention control (IPC). Ethiopia, where there is a dearth of human power and personal protective equipment (PPE), is experiencing a tremendous increase in the epidemic, with 264,960 confirmed cases and 3951 deaths. The gaps that are associated to the use of personal protective equipment (PPE) may be made more complicated by a lack of understanding and training regarding the fundamental notion of PPE use. Health systems, and in particular the preparedness of healthcare workers to respond to pandemics, are essential to the containment of disease spread. This is because pandemics are frequently unpredictable, and in addition to mitigation and suppression tactics, health systems are also essential. In spite of this, low-resource countries such as Ethiopia were facing multilayered obstacles to readiness as a result of their limited resources and inadequate health care infrastructure. There is a correlation between the inadequate preparedness of healthcare workers (HCWs) to respond to an outbreak (24–57%) and the workers leaving their posts owing to the fear of infection and the community's hatred of hospitals and healthcare workers. Being a nurse, being female, having an isolated ward, being familiar with COVID-19 management, having good contact with management, and having more than ten years of work experience were all associated with the utilization of personal protective equipment [8].

There have been numerous studies that have shown that the spread of COVID-19 has resulted in an excessive amount of hospital overload, a lack of health care resources, an excessive amount of work for professionals, a fear of transmission, burnout, and a scarcity of face masks, sanitizers, and gloves, all of which may cause an additional barrier to

communication and the expression of compassion. As a result of the tremendous workload at the forefront and the discomfort that comes with wearing personal protective equipment for extended periods of time, nurses working in departments with particularly high workloads, such as the emergency department, have been experiencing significant short-term and long-term problem burdens related to their mental health. The psychological problem is the most significant effect for staff members who are delivering health care in the midst of the COVID-19 epidemic. These staff members could present with symptoms such as depression, anxiety, insomnia, and general discomfort. Certain factors were shown to be connected with psychological discomfort. These factors included educational level, increasing workload, age between 20 and 40 years, working at an emergency unit, poor precaution measures, being a nurse, being female, and having direct contact with patients. The findings of the investigations also demonstrated that the negative effects of COVID-19 were exhibited by the poor mental health status of health professionals, including symptoms such as feelings of isolation, depression, anxiety, and disruptions in sleep [9].

HCPs are at danger of getting the virus and infecting other healthcare workers as well as their family members if they do not have the required personal protective equipment (PPE). It was reported that this issue was not only present in Ethiopia, but it was also reported from China [10] and other nations. The majority of the shortfall was reported in protective facemasks, according to one study conducted in Jordan [10]. Only 18.5% of frontline clinicians stated that all personal safety equipment (PPE) was available. When treating suspected or confirmed cases of COVID-19, healthcare professionals had a minimal risk of infection (11), according to a number of studies that stressed the importance of good training, proper usage, and uninterrupted availability of adequate personal protective equipment (PPE).

The lack of personal protective equipment (PPE) is especially concerning for the N95 respirators that are regularly utilized. On the other hand, there are already suggestions available that suggest using surgical or medical masks in situations where there is a shortage of N95 [11]. On the other hand, the researchers strongly recommended the preservation of N95 respirators for high-risk, aerosol-generating procedures during COVID-19 when its supply is inadequate [12]. A recent systematic review and meta-analysis demonstrated that medical masks are not inferior to N95 respirators when it comes to

protecting healthcare workers against viral respiratory infections during routine care and procedures that do not generate aerosols. Studies have shown that the scarcity of appropriate personal protective equipment (PPE) could be alleviated by reusing it in the appropriate manner or by using it for longer periods of time. There is evidence to suggest that N95 respirators continue to provide protection even when used for extended periods of time; nonetheless, it is not recommended to use them for more than four hours because doing so can cause significantly greater pain [13]. As a result of the fact that the level of protection offered by personal protective equipment (PPE) and the risk of exposure both play a role in the selection of PPE, it is essential to have a thorough awareness of both of these factors [13]. With this in mind, the WHO International Public Health Committee's recommendations have proven to be a useful resource, and they have been swiftly adopted and put into action in a number of nations as they prepare their response to the COVID-19 pandemic. As a consequence of this, the World Health Organization's (WHO) guidance on the rational use of personal protective equipment (PPE) for COVID-19 has issued acceptable criteria for selecting and utilizing appropriate PPE in a variety of circumstances where there is a shortage of PE [14].

### Conclusion:

A positive correlation was found between the utilization of personal protective equipment (PPE) and the following factors: being a nurse, pharmacist, laboratory or physician professional; frequently sanitizing hands and medical equipment; having national COVID-19 management guidelines; taking COVID-19 training; and having a feeling that one will eventually receive COVID-19 at the workplace. The study also found that the utilization of personal protective equipment (PPE) by healthcare workers was negatively associated with a lack of a sense of safety at work when customary precautions were being taken. In the case of COVID-19 high-risk personnel such as healthcare workers, the prevention tactics and measurements must to be adhered to in a stringent manner and put into practice. Therefore, the government needs to strengthen the efforts of mobilizing the stakeholders and encourage the prevention practices of the healthcare workers through various forms of communication. This can be accomplished by enforcing the rules that have already been stated and making them strict, particularly in all health facilities, with the goal of preventing the health system from collapsing and addressing the

transmission of the virus from the community as a whole. The type of healthcare worker and the working environment both play a role in the selection and operation of personal protective equipment (PPE). Gloves and face masks were the most popular types of personal protective equipment (PPE) used to guard against respiratory and other illnesses. Compliance with the usage of personal protective equipment (PPE) was low overall, and there were reports of both non-availability and reuse of PPE. Large-scale prospective research are required to acquire additional evidence regarding the utilization of personal protective equipment (PPE) in healthcare settings. The majority of the studies were observational.

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