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The rationalization of personal protective equipment usage and the solution of its limitation during COVID-19 era



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Covid-19 pandemic is a global burden health problem caused by Coronavirus. The disease can be transmitted swiftly by droplets after sneezing, coughing, or holding stuff (droplet contaminated). The contagion is eased by bad habit like does not wash hand after touching others or stuff. To date, data says that The Covid-19 morbidity rate is still highest in a densely populated place. Even though several mechanisms in the community have been done to prevent the spreading of this disease, but the spread is still relatively high and needs medical treatment intervention in the health care system especially in the hospital.¹ Moreover, the daily hospital treatment of Covid-19 patients' needs appropriate personal protective equipment (PPE) to protect and to minimize the risk of infection to health workers.

The type of PPE which are needed during this pandemic for health workers to treat Covid-19 patients are:²

1. hazmat (with a standard qualification which is not perforating, having tight pores, and covering all body except face and palm)
2. boot (does not perforated and lower-knee-high)
3. short gloves
4. long gloves
5. N95 mask
6. google
7. face shield
8. Nurse cap.

The main problem about the usage of the PPE is the escalated of PPE needs. It is effected by the increment of Covid-19 patients each day. Moreover, the public is also in panic condition, so they buy the PPE and decrease the stock in pharmacy also.

The use of PPE by the subject who are not suitable, rapidly decreasing the PPE stock and rising the limitation to the hospital.

Increasing the PPE production is the main answer to the limitations of PPE, but the policy cannot be carried out immediately, as fast as the development of the Covid-19 cases. Rational use and solutions to limitations need to be done in each

hospital to overcome the limitations of PPE. The WHO has described various rational actions in the use of PPE, such as:

- Forming a medical team that correctly handled Covid-19 to minimize the number of PPE users.
- Delaying the elective procedures and visits of patients with chronic diseases in the hospital to reduce the risk of transmission and transfer of PPE allocation to Covid-19 treatment area.
- The selection of the use of PPE (selective uses to what is truly necessary and is adjusted to the planned procedure).

Preventing the patients with suspected Covid-19 or those that have been confirmed positive, to be visited during the treatment period.³ Furthermore, another procedure to reduce the PPE demand is reusing the PPE (with decontamination and sterilization process) and using another standard substitution PPE.

Not all PPE can be used repeatedly (i.e. hazmat, hand gloves, nurse cap, and face mask), but, within the increment of PPE demand and not followed by the increment of production, the PPE reused must be done especially for N95 mask. To date, no appropriate recommendation is published about N95 cleaning and reusing. Dry heating, covering N95 mask with a surgical mask, and drying under the sun are several alternative ways to reuse the n95 mask.

Several alternative steps are recommended by WHO and HHS to address the limitations of PPE, especially for the use of PPE replacement equipment and the PPE decontamination process. The use of a plastic apron can replace the standard gown used for the care of Covid-19 patients. Decontamination by washing with hot water (at a temperature of 60-90° C) accompanied by soaking in a chlorine solution is also a way for PPE to be reused. Sterilization by UV light radiation is quite useful, but it is at risk of causing high heat in the material which can accelerate the damage of PPE material.^{1,4} These alternatives still increase the risk of transmission to medical personnel who interact directly with

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Covid-19 patients. The decontamination process not only cannot be applied to every type of PPE material, but it also increases the possibility of damage when used.

The most important thing that can be done to prevent Covid-19 transmission besides the use of PPE in the right place and time is to wash the hands properly and avoid close contact with people around. Excessive PPE is used, in addition to increasing supply limitations, it also endangers the user and its surroundings because a certain level of quality of PPE is required for certain maintenance conditions, as well as the proper order of installation/removal of PPE. Rational use of PPE education needs to be echoed continuously to all health workers and the community so that the limitations of PPE can be overcome. The use of cloth masks for ordinary people is one of the results of this education, which increases the availability of surgical masks for use by health workers in hospitals that need them.

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