



Exploration of Frontliners' Experience Wearing PPE during the Covid-19 Outbreak

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Received: 5th January 2021

Accepted: 10th February 2021

Published: 21st February 2021

Abstract

Safety health issues are at the forefront of dealing with infectious diseases during the Covid-19 crisis. In the context of this critical pandemic event, this study focuses on discovering frontliners experiences with Personal Protective Equipment (PPE) during the crisis. A thematic analysis has been used to identify themes and subthemes for this study. Researchers interviewed individuals to understand the experiences and reactions of frontliners dressed in PPE while on duty. The dominant themes documented in the study are as follows; physical discomfort, mental strength, the call of nature, dehydration and sweating, and communication interruption. Idealistic sacrifice and resistance working in difficult times during Covid-19 while serving the country ought to be appreciated and acknowledged by the nation.

Keywords: Frontliners, Experiences, Wearing PPE.

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INTRODUCTION

At hand is an escalating worldwide outbreak of a respiratory infection caused by a novel coronavirus known as Covid-19. This impact of the Covid-19 response in China is encouraging for the many countries where Covid-19 is beginning with small chains of transmission in many countries and large chains resulting in extensive spread in a few countries, such as Italy, Iran, South Korea, and Japan (Roy MA. et al, 2020). Most countries are likely to have spread of Covid-19, at least in the early stages, before any mitigation measures have an impact. The last similar pandemic of such terrible nature was the 1918 influenza outbreak. The recent outbreak of Covid-19 rampantly escalated in China and its universal spread has already impacted global health systems and the economy (European Centre for Disease Control and Prevention, 2020). Even though most Covid-19 cases were originally associated with travel, the intrapersonal spread is now being reported in other places all around the world. Tourists from China then spread the Covid-19 to other countries, causing the World Health Organization (WHO) to declare the epidemic a global health emergency on January 30, 2020 (World Health Organization, 2020). In China approximately 3,400 healthcare workers were infected with Covid-19, with at least 13 dying from the disease (State Council Information Office of the People's Republic of China, 2020). The infection numbers of Malaysian healthcare workers have reached 325, together with three deaths (Syafiqah, 2020). For the Ministry of Health, keeping their employees safe is not an option. Health Ministries around the world have upgraded their advice for healthcare

staff to tell them to wear more protective gear such as personal protective equipment (PPE). There was an exponential rise in reported cases seen in Italy and the United States. According to the Istituto Superiore Sanita, Italy had 12,462 confirmed cases and 827 deaths as of March 2020 (Remuzzi & Remuzzi, 2020). The United States also confirmed cases since February, with 4,226 cases reported 31.0% of cases, 45.0% of hospitalizations, 53.0% of intensive care unit admissions, and 80.0% of deaths occurred among the elderly (Centre of Disease Control, 2019). The pandemic's magnitude, resilience, and rapid transmission caught many by surprise.

LITERATURE REVIEW

According to current evidence, Covid-19 virus is transmitted between people through respiratory droplets and contact routes. The virus that causes Covid-19 is mainly transmitted through droplets generated when an infected person coughs, sneezes, or speaks. These droplets are too heavy to hang in the air. They quickly fall on floors or surfaces. People can be easily infected by breathing in the virus if they are within one meter of a person who has Covid-19, or by touching a contaminated surface and then touching their eyes, nose, or mouth before washing their hands. It may also be spread by infected people who do not show any noticeable symptoms. Because the disease is easily spread, WHO has clear guidelines on the maximum Personal Protective Equipment (PPE) required for healthcare workers and frontliners (World Health Organization, 2020). A few months back most people did not know about PPE. But now, a lot of talks are centered

on insufficient PPE for frontliners during the Covid-19 crisis. Health Ministries all over the world, keeping employees safe is not an option. All frontliners such as doctors, medical assistants, nurses, and cleaners obligatory wear an apron, gloves, mask, and goggles every time they come within two meters of people who might have Covid-19. All healthcare workers working in or out of a hospital should wear a mask if there is a possibility, they are close to someone who might have Covid-19. Healthcare personnel in most Asian countries wear extensive protective gear evocative of that used for hazmat incidents.

The process of putting on and removing PPE is complex and requires practice. PPE for healthcare workers is more complex than that for the public and is dependent on the level of exposure to a Covid-19 patient. A wrong step may easily cause contamination. In China, nearly 3,400 healthcare workers were infected with Covid-19, with at least 13 dying from the disease. As of April 11 (2020), 224 healthcare workers in Malaysia were infected with Covid-19 (Adrian, 2020). A private hospital in Sungai Petani, Kedah had to shut down temporarily after a pregnant patient admitted for delivery failed to disclose that she was close contact with a Covid-19 patient (Gendeh & Wong, 2020). Investigations so far showed that none of these infections were caused by the handling of positive cases at Covid-19 wards, but were from within the community. PPE becomes even more significant in these circumstances. Everyone is presumed Covid-19 positive until confirmed otherwise, meaning that frontliners at the hospital should be permitted to wear PPE's in most situations (Gendeh & Wong, 2020).

Jonathan S. et al. and Wang et al., (2020) stated there are five main risk factors of Covid-19 transmission among healthcare workers been reported. The risk factors are the lack of personal protective equipment (PPE), proximity to contaminated patients, overload of work, poor control of infection, and the pre-existing medical conditions. As a significant risk factor for Covid-19 is inadequate PPE and Covid-19 risk factor among healthcare workers was exposure to infected patients, primarily through work in high-risk departments and contaminated fluid. Heinzerling A. et al. (2020) asserted that healthcare workers need to use PPE to minimize high risk of them exposure to the Covid-19 spread. Yansen (2020) also supported the work overload resulted in lack of rest, long-time exposure to infected patients and working under pressure also risk factors to healthcare workers. In addition, extended working hours also contributed to transmission of Covid-19 in Wuhan, China.

We have caught a glimpse of a brief explanation of Covid-19 crisis from the beginning of its transmission to the rational use of PPE in healthcare settings. The purpose of this survey is to understand and feel the experiences of frontliners dressed in PPE during the Covid-19 crisis.

METHODOLOGY

The method used for this study is qualitative in nature using thematic analysis. Thematic analysis was the most relevant to the aim of this study. It was believed a principally useful approach as it specifically identifying, analysing, reporting patterns and decodes numerous aspects of research issues (Braun & Clarke, 2006). The researchers conducted a qualitative study consisting of transient interviews to understand the experiences and emotions of frontliners

dressed in PPE while on duty during the Covid-19 crisis. Because of time being limited to working hours, to interview them properly was impossible. Permission granted earlier from the management and head of unit from the frontliners departments.

SAMPLING AND RECRUITMENT

The researchers recruited frontliners from different professions working in private health premises in Kuala Lumpur. A purposive sample of frontliners included those who were having experienced working during the outbreak of Covid-19 during the past two months from February to March 2020. The sample was derived from staff who have a break during lunch hour and volunteer to participate in the study. Following primary contact, participants were given an information sheet about the study. When they agreed to participate, consent forms were provided and received before arrangements were made for interviews. The participant was given the opportunity to ask questions both prior to and on the day of the interview. Written informed consent was obtained before each interview session to record and transcribe the interviews. Participants were informed that they could withdraw from the study at any time. To ensure confidentiality data was anonymized. The main goal of this survey was to focus on the characteristics of a population of interest, which will best enable researchers to address their research uncertainty. Inclusion criteria were designed to ensure that all frontliners were eligible to share their experience, affliction, and sacrifice. As a result, participants were from two different professions even with a small number of respondents.

DATA COLLECTION

The researchers conducted semi-structured interviews in the Malay language during the final week of April 2020. The interview guides were developed in English, then translated into Malay, then back-translated. The researchers then transcribed interviews word by word. Interviews conducted in Malay were translated into English after transcription. The researchers manually analyzed the transcriptions on a case-by-case basis, followed by a cross-case analysis of shared themes.

DATA ANALYSIS

Demographic characteristic

There were six female participants in this study. The participants' ages ranged from 25 to 48 years old. The socio-demographic characteristics are shown in Table 1. Four of the participants are married and on each was divorced and single. The majority of frontliners were in nursing (n=4), followed by general workers or cleaners (n=2) in the department. Most had been working in the department for over 5 years.

Table 1: Demographic characteristics of participants

Demographic	Frequency	Percentage (%)
Gender		
Female	6	100
Ethics		
Malay	4	66.7
Indian	2	33.3
Age		
25 - 48	6	100
Marital Status		
Married	4	66.7
Single/Widow/Divorce	2	33.3
Professions		
Nursing	4	66.7
General worker/cleaner	2	33.3

The questions primarily asked participants to explain their feeling and experiences wearing PPE while working for the past two months during the Covid-19 crisis. The participants reported details of their experience in PPE while working in the department handling Covid-19. We analyzed the interviews by assigning codes to mean units, structural and surfacing information, and views expressed in conversation. For applied thematic analysis, codes were grouped into subthemes and themes. These themes corresponded to the specific familiarity of wearing PPE during the Covid-19 crisis among frontliners. All researchers independently coded the data manually through case by case and cross-case analyses. The disagreement was infrequent and resolved through discussion. In this survey, researchers explored frontliners' reactions and experience dressing in PPE while handling potential Covid-19 patients. Exemplar quotes for each theme are displayed in Table 2. The results and analyses of the interview data revealed five major themes in the discussion of unpleasant of wearing PPE as follows:

- i. Physical discomfort
- ii. Mental strength
- iii. The call of nature
- iv. Dehydration and sweating
- v. Communication interruption

1. Physical discomfort

All study participants experienced a significant amount of unease when dressed in PPE while working in the department. Most of them reported feeling uncomfortable, especially when they must treat patients and doing several tasks, such as difficulty maintaining tactile sensitivity through gloves and moving from one place to another. Not only that, frontliners have faced challenges in wearing PPE, including difficulties in verbal communication and interactions with patients and family members. They said that in February 2020, during the beginning of the Covid-19 crisis in the country, most of them felt pressure to dress in PPE although it was not a common practice while treating the patients. In this study, all of the respondents were of a consensus that wearing PPE for 8 hours is exhausting due to the humid temperature of the country. The following quotes from the participants show that they have experienced similar problems.

- "And we need to be like this for 8 hours for one shift.... too long."

- "I have to wear this suit several pieces you know.... and my attire. Please imagine I have to wear this for the whole day and sometimes I have to work more hours."
- "Can you imagine dress in PPE you need to control to go to the toilet and cannot drink lots of water. And of course, you will feel exhausted."

All of them said that they were required to conserve PPE clothing by reducing the number of times they put it on, since PPE was in short supply, resulting in fatigue and discomfort. Many reports emphasized that pain or discomfort such as headache, facial pain, and ear lobe pain arising from tight-fitting face masks caused in limited permissibility for a prolonged period. Failing to meet their physical and emotional needs brought a sense of vulnerability.

2. Mental strength

Regardless of profession, all the participants in this study were of a consensus that they must be strong mentally while dealing with the situation, dress in PPE during the Covid-19 crisis. As general workers working in the crisis department, participants have the opinion that PPE is used to guard them against infection with the Covid-19 virus. They must tolerate the situation although they are uncomfortable and drenched in sweat.

Wearing PPE for a lengthened duration may result in dehydration among the staff. All the frontliners among the study participants involved with Covid-19 were required to attend training and demonstrate competency in putting on and removing PPE. They also have been required to follow the procedure to put on the PPE in a designated area. All the participants approved these circumstances. For those who work in the department, they must reorganize their life. Examples include drinking less water, consume healthy food, and cutting down on bathroom breaks with the purpose of preserve the PPE. The issues raised by the participants in these interviews showed that they must be more tolerant and endure the situation well. We have seen the emergence of psychological resilience, as the staff remain calm during the Covid-19 crisis and move on from the potential negative effects of PPE-related stressors. The following statements from the participants address these issues.

- "When all of this starts, we have to change our lifestyle in terms of food intake. And toilet training.....hahaha try to avoid the toilet."
- "I love to drink. Begin from now on, I have to train myself psychologically to drink less water and get rid of the toilet."
- "Now to wear the outfit we may take 2 to 3 minutes and we have to wear it in the particular location assign by the department. Another concern is, when you want to remove the clothes there is a procedure you need to follow."

The responsibility of risking their life while on duty need to be understood

In real world practice, donning of the PPE is often felt burdensome and uncomfortable by the frontline healthcare workers, especially if a long period of exposure to such equipment is necessary during the outbreaks of emerging infectious diseases.

3. The call of nature

All participants declared that they were worried about the toilet issues at the beginning of the crisis when the PPE was compulsory. They should manage and adapt well to the circumstances with resilience. One of the nurses mentioned that they must prevent habitual drinking and do that after tasks are complete. She continued by saying that less drinking is better to stop us from going to the toilet. The general workers added that most of the staff needs to eat, drink, and use the toilet before putting on PPE. All of them stated that they must train their stomachs and avoid toilet breaks. This situation is very challenging, but after a certain period of handling Covid-19 with PPE, most of them became accustomed to the circumstances and did not need a toilet break. Below are illustrative responses that were transliterated under this theme.

- "I have to do all the business with the toilet before I get into PPE. Or else, I will be in trouble."
- "Please get ready with nature's call. Organize our needs properly. I mean food as well. Try and avoid to pee and the major one after dressing in PPE."
- "It's a new thing and avoids the toilet especially when we are older than the rest of the staff. But, we manage to learn and organize ourselves to stay away from the toilet."

The participants felt helpless in the initial weeks of the outbreak, as little information about the disease and the methods of control were available from their previous education and training. Especially for the toilet issue, they too worried if they need to go the toilet while working. They avoid from having heavy meals before starting their task when on duty.

4. Dehydration and sweating

One of the major issues raised by the participants which are a subset of the comfort element is dehydration and sweating. During the Covid-19 pandemic, wearing PPE may have become the new normal for healthcare providers. For the healthcare workers' task, multiple layers of non-woven clothing, barrier fabrics, gloves, and eye protection are not optional, no matter how hot the environment happens to be. PPE may cause an increase in body temperature by preventing heat from being lost through sweat dehydration. A study from Doll (2017) stated that overheating due to PPE is quite common. All the participants have described that the main issue is dehydration when putting on PPE is compulsory. Not only dehydrated, sweating due to overheating when they do physical work contribute to uneasiness particularly with humid weather such as Malaysia. The multiple layers of protective clothing cause abundant sweating. Liu, Luo & Haase (2020) supported this situation when they reported that immense sweat levels among healthcare workers adopting PPE, increasing thermal distress, and fatigue during the Covid-19 crisis. As the condition progresses to dehydration, symptoms include lethargy, dizziness, weakness in muscles and dry mouth would appear too had confirmed by the participants in this study. All symptoms mentioned by the participants from the previous statement had the same results validated by (Houghton, Meskill, & Delaney, 2020). Besides, exposure to heat can result in heat cramps, exhaustion, and heat syncope. Study from (Wen, Qi, Lyon, Liang, Wang, & Feng, 2020) and (Jiang, Song, Zhou, Liu, Chen, & Bai, 2020) exaggerated the situation that dehydration from overheating and sweating can cause heat illness, ranging from a mild heat

rash to a life-threatening heat stroke as well as unconscious or syncope (Kooblall, Cadogan, Hopkins & Casserly, 2020).

Most nurses revealed that they must control drinking while working. The general workers added that less drinking is better to stop them from the toilet visit. Both professions disclosed the condition of controlling liquid intake contribute to dehydration too. One of the participants realized that the dehydrated issue occurs because they are cutting drinks in order not to waste PPE and raising the risk of dehydration. Another participant also reacts that those working on her ward were afraid to take off their masks to drink because this means that they must throw it away after drinking. Furthermore, Jiang et al. (2020) mentioned that hefty sweating and extensive period of wearing PPE during work would cause skin injuries. One of the nurses has sensitive skin. She said that red marks and bruises on her face (face shield) can be detected after wearing PPE during long shifts as well as blemishes too around the mouth (mask). The general workers have encountered a different problem. For them, gloves are a vital issue when performing their tasks. They develop skin irritation and sweaty hands when wearing gloves but immediately remove them, wash their hands, and consider alternatives. The nurses added that those involve with surgeries are more tough and difficult. Because a prolonged period during an operation may cause health care workers fatigued and dehydrated due to excessive sweating. The following quotes from the participants show that they all had the same problems:

- "You may feel thirsty, exhaustion, dizzy, and your energy decrease...you may feel it for several hours of working."
- "You see my skin but only several parts I felt so itchy after dressing in PPE about 8 to 9 hours."
- "Gloves. It makes our work slow. Sweaty hand another issue for me."
- "Blemishes around my mouth because of the mask."

It is essential to understand that operating in PPE is not simply working in an intolerant environment especially dehydration and sweating. They knew that the treatment must go on and they cannot risk patient safety.

5. Communication interruption

Wearing a protective face mask as a part of PPE makes communication much harder to understand. People cannot see frontliners mouth moving so patient or colleagues may not be aware of our speech, may sound a bit inaudible and it is much harder to read facial expression when only the eyes are visible. Wearing a face mask makes recognizing people very difficult as their faces are hidden. Most of the nurses from this study come to an understanding that the difficulties in verbal communications and interactions with patients and family members are encountered by them while in a PPE suit. With the challenge of a mask and face shield, interactions with the patients must be repeated especially with the elderly. They said that most of the staff have to be more patience and talk a bit louder to those patients and colleagues as well so that they may listen clearly. Grote and Izagaren (2020) have verified this situation when the use of masks has made communication between patients over the age of 70 with healthcare professionals harder. One of the participants declared that in

study, all of them approved that wearing PPE downgrade the communication effect not only with the patients but also with the teammates too. Relevant excerpts from the interviews are as follows:

- "A bit difficult to talk to the patients especially the elderly. They cannot hear us, so we must speak out loud. Because of the mask, they cannot read our lip too."
- "Another issue is to talk among colleagues. Face shield and a mask covering our mouth cause to disadvantage. We cannot hear clearly what the other party speak."
- "Main problem if any of us involved with the operation task. The instruction is given by the superior, we cannot get distinctly. For me, I personally afraid I could make a mistake with this situation."

Table 2: Transcriptions and themes from the interview

Main themes	Sub-themes	Interview transcriptions
Physical discomfort	Uncomfortable Astronaut Exhausted Many pieces Hot 8 hours New suit Awkward Discomforted	"Very uncomfortable especially if you want to go to the toilet. And of course, to drink as well. I am psychologically and physically exhausted with the PPE. But we have no alternative." "You just like an astronaut...so many pieces and you will feel so hot. You know that our country already with this kind of temperature....so imagine so many pieces at one time for 8 hours." "For me as general workers, it's a new suit. You feel awkward and discomforted. But we have no option. Compulsory to wear especially do all the cleaning part in the department related to Covid-19."
Mental strength	Our life Organize our stomach Food Drinks Too long Difficulty to do the job quickly Illustrate the situation Time-consuming to wear and strip off Specific location Procedure to follow	"Several main issues that the public need to think about us when doing our job. Of course, in our life as healthcare workers, to organize our stomach, I mean food and drinks. Especially drinks. And we need to be like this for 8 hours for 1 shift too long." "Normally when I go and treat the patients it's easy with our uniform. But now hahaha the outfit sometimes give you difficulty to do the job quickly. For example, the glove instead of our hands and fingers in dealing with health facilities." "Now to wear the outfit we may take 2-3 minutes and we have to wear it in the particular location assign by the department. Another concern is, when you want to remove the clothes there is a procedure you need to follow...Donning...doffing..."
The call of nature	Prepare physically and mentally Toilet calling Do your business before dress in Organize our need properly Its program naturally Manage to learn Stay away from the toilet Several pieces Sweating Thirsty Exhaustion Energy decrease Dizzy Control drinking	"We have to prepare physically and mentally in managing ...hahaha toilet calls. So be prepare and if possible do your business before dressing in the outfit." "Please get ready with nature's call. Organize our needs properly. I mean food as well. Try and avoid to pee and the major one after dressing in PPE. In the beginning, it's hard to manage from visiting the toilet. But after several weeks its program naturally." "As a cleaner, certainly we have a problem with the toilet issues. It's a new thing and avoids the toilet especially when we are older than the rest of the staff. But, we manage to learn and organize ourselves to stay away from the toilet." "I have to wear this suit several pieces gloves, apron, face shield, etc... you know and my attire and sweating of course and smelly too." "Several pieces of cloth with PPE and our weather. My God, it's so terrible sweating and needs to control drinking habit." "You may feel thirsty, exhaustion, dizzy, and your energy decrease...you may feel it for several hours of working." "Gloves. It makes our work slow. Sweaty hand another issue for me." "Blemishes around my mouth because of the mask. Sweating around my mouth."

Communication interruption	- Speak - Out loud - Read - Lip - Difficult - Hear - Clearly - Repeat - Instruction - Distinctly	"A bit difficult to talk to the patients especially the elderly. They cannot hear us, so we must speak out loud. Because of the mask, they cannot read our lip too." "Another issue is to talk among colleagues. Face shield and a mask covering our mouth cause to disadvantage. We cannot hear clearly what the other party speak." "We have to be extra endurance and patience. When we speak to the patients they seem to get us to repeat the instruction given." "Main problem if any of us involved with the operation task. Instruction given by the superior, we cannot get distinctly. For me, I personally afraid I could make a mistake with this situation."
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DISCUSSION

Lai J. et al. (2020) mentioned that different backgrounds and professions have been infected either from patients or in the hospital. Wingfield and Taegtmeier (2020) declared that healthcare workers have the concern that they can be a transmission agent to others, which has contributed to distress among them in Liverpool. They also mentioned the same situation in China among healthcare staff. As human beings, we express thanks to the healthcare workers for their noble contributions and sacrifices. They have shared their experience dressing in PPE with less major effects in terms of dizziness, thirst and hunger, difficulty concentrating, restricted respiration, toilet break mobility or other problems. The physical and mental resilience among the healthcare workers while serving the nation must be valued and appreciated. The principle of this survey is to understand and be familiar with the experience of frontliners dressed in PPE during the Covid-19 crisis. The intention of this study is similar to that reported by (Gordon & Langmaid, 1988), as the idea of qualitative research is centrally concerned with understanding things rather than with measuring. WHO has recommendations which emphasize the importance of rational and appropriate use of all PPE for frontliners during the Covid-19's crisis.

Therefore, frontliners need to take responsibility to properly use PPE while dealing with Covid-19, and management should ensure that the staff members they supervise make proper use of PPE (World Health Organization, 2020). Additionally, WHO also vouches for staff training due to these practices being uncommon to most of the staff. In this study, all participants have reported that they felt discomfort with PPE while treating patients and doing most of the work in the department (Windarwati, Ati, & Paraswati, 2020; Ong et al., 2020; Yuan et al., 2020; Yuzana, Zakirah & Azliha, 2020).

The issues that they mentioned are an adaptation to the situation such as managing toilet visits, organizing food and drinking intake, dehydration and exhaustion, and difficulty in working in a humid environment. Whatever issues that they discussed with researchers, they follow PPE procedures to protect themselves from getting Covid-19. This situation is happening presently and is being experienced by frontliners all over the world. Workers wear PPE and follow the rules because they should believe it is the right thing to do (Cook, 2020). To put it briefly, physical and psychological resilience among frontliners while serving the nation during Covid-19 must be respected and appreciated.

CONCLUSION

This survey has provided several healthcare workers an opportunity to share their personal stories about working during the Covid-19 crisis as frontliners in the country. The ability of frontliners to work in PPE is deserving of respect as

they save lives. However, further studies could focus more on the demographic issues such as male and several other professions as frontliners. In addition, more research would need to be conducted with larger samples so that generalizations could be made to the Malaysian workforce more generally during the Covid-19 pandemic. These results have shown the resilience of the frontliners and their capability to work through tough times during Covid-19 and come out unharmed. Resilience brings skills to adapt to changes in the work environment among frontliners in these circumstances.

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