



Article

**Personal Protective Equipment's Adverse Reactions and Psychological Preparedness  
Among Critical Care Nurses During COVID-19**

Safaa Adam, Naglaa AbdElhafez, Sanaa Mohamed, Seham Mohamed\*

Critical Care & Emergency Nursing Department, Faculty of Nursing, Sohag University, Sohag, Egypt  
82524

\*Corresponding author: [dreamheart.2013@yahoo.com](mailto:dreamheart.2013@yahoo.com)

**Article info.**

**Citation:** Adam S., AbdElhafez N., Mohamed S. and Mohamed S. (2022). Personal Protective Equipment's Adverse Reactions and Psychological Preparedness Among Critical Care Nurses During COVID-19. *Sohag Journal of junior Scientific Researchers*, vol. 2 (5), 27 - 38. <https://doi.org/10.21608/sjyr.2022.228612>

**Received:** 14/01/2022

**Accepted:** 23/02/2022

**Published:** 31/03/2022

**Publisher's Note:** SJYR stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

**Abstract**

COVID-19 emerged as a global threat, affecting millions of people worldwide, as a result, personal protective equipment is an important part of a country's efficient COVID-19 emergency response. The study aimed to assess personal protective equipment's adverse reactions and psychological preparedness among critical care nurses during COVID-19. A descriptive research design was used to conduct this research. This study was carried out in intensive care isolation units from different hospitals in Sohag city. Convenient nurses in intensive care isolation units constituted the sample. Web-based self-administrated questionnaire was used to collect data. The results of present study showed that the majority of the studied nurses were females and aged (20- 30) years. Majority of nurses felt anxious, Chest tightness or suffocations, shortness of breathing, dizziness or palpitations, thirst, and skin dehydration. The current study revealed that nurses in intensive care isolation units are affected with various adverse effects related to PPE and psychologically felt anxious.

**Keywords**

Adverse, Reactions, Psychological, Preparedness, COVID -19

**1. Introduction**

Coronavirus disease (COVID-19) has become a global threat, affecting millions of individuals around the world. This is a pandemic caused by a new coronavirus strain. This was unknown before the December 2019 Wuhan epidemic in China (El Zowalaty & Järhult, 2020). Inoculation of mucosal membranes with virus-containing droplets and contact with droplet-contaminated surfaces of various materials and objects, which can operate as live-virus reservoirs for hours to days, make this disease highly contagious (Murthy et al., 2020).

Protection against exposure to COVID-19 compromises both standards as well as transmission-based precautions. The core components of these Precautions are hand hygiene, personal protective equipment, sterilization and disinfection of instruments, safe disposal of wastes, sharps, and handling soiled linen. Besides these, personal health and safety education, immunization programs, and post-exposure prophylaxis. The PPE used to prevent exposure includes gloves, a gown, a respirator with a rating of N95 or higher, and a full face shield or goggles (Markos, et al., 2021). Nurses

are at risk from this extremely contagious infection, which is mostly preventable. Nurses must have personal protective equipment (PPE) which will be worn for hours at a time and can significantly reduce the infection risk associated with caring for COVID-19 patients, due to its rapid spread and uncertainty of the infection status of patients (Cook, 2020).

COVID-19 is an ongoing pandemic, and there is no confirmed therapy or vaccine that can provide complete protection at this time due to the virus's constant mutation. Because the duration of the pandemic's end is unknown, health care personnel and anyone participating in COVID-19 management can plan to work long shifts in a physically demanding setting. There haven't been much research done to look into the many negative impacts of this form of PPE. Unfortunately, wearing personal protective equipment has a severe impact on workers' physical and emotional wellbeing (Chand et al., 2021).

Controlling the disease's spread and providing medical care to infected patients has proven to be an enormous problem. There has been evidence of nurses becoming infected despite wearing personal protective equipment (PPE), particularly those in high-duty departments such as the emergency department and intensive care unit, are suffering from significant physical and emotional pressures as a result of the excessive workload and the inconvenience of wearing PPE for long periods of time (WHO, 2021).

COVID-19's expansion resulted in overcrowding in hospitals, a scarcity of healthcare resources, an increased workload for professionals, fear of transmission, burnout, and a scarcity of face masks, sanitizers, and gloves, all of which might make communication and compassion even more difficult. Nurses in particularly high-workload departments, such as the emergency room, have been suffering from significant short- and long-term mental health problem burdens due to the excessive workload at the front and pain from wearing PPE for long periods of time (Alshekaili et al., 2020).

The COVID-19 pandemic has highlighted the critical need for personal protective equipment in preventing the spread of this infectious disease. However, despite being necessary for working properly, personal protective equipment (PPE) has been shown to be potentially dangerous due to its constant and repetitive use. Implementation of PPE fitting and materials, as well as the implementation of preventive measures such as reducing wearing time and preventing over time, are critical to ensuring a safe and secure working environment for healthcare workers, resulting in better emergency outbreak control (Battista et al., 2021).

So, The aim of this study was to assess personal protective equipment's adverse reactions and psychological preparedness among critical care nurses during COVID 19.

## **2. Materials and Method**

### **2.1. Research questions**

What are the personal protective equipment's adverse reactions and psychological preparedness among critical care nurses during COVID 19?

### **2.2. Research design**

A descriptive exploratory research design was used to conduct this study using a short survey designed for the study. The survey was conducted through an online questionnaire in Google Forms and aimed to gather data about personal protective equipment's adverse reactions and psychological preparedness among critical care nurses during COVID 19

### **2.3. Setting**

The study was carried out in intensive care isolation units from different hospitals in Sohag city (Sohag university hospitals, Sohag general hospital)

### **2.4. Sample**

A convenience of nurses from different hospitals in Sohag city (Sohag university hospitals, Sohag general hospital who worked at intensive care isolation units during the first wave of Covid -19 pandemic

## 2.5. Study Tools

In this study, data was collected via a web-based, by using the following tool:

Self-administered questionnaire: self-administered questionnaire of (no/yes) and multiple-choice questions after studying related literature. (Al-Dossary et al., 2020; Birhanu et al., 2021; Xia et al., 2020) There searchers constructed a tool in Arabic using Google forms, which they called "the electronic form initiated by the study's goal." It comprises the following parts.

### 2.5.1. Part I

Socio-demographic features of nurses designed by the researchers after conducting an assessment of related literature. It consisted of seven items: code, age, gender, qualifications, training about ICP regarding Covid 19, availability of PPE, Well acquisition standard ICP, getting infected with Covid-19, and The maximum time in the unit that nurse can withstand PPE for infection.

### 2.5.2. Part II

Psychological preparedness questionnaire to assess psychological feelings experienced by nurses during covid-19. There are 10 yes/no questions in this set.

### 2.5.3. Part III

Personal protective equipment's adverse reaction questionnaire of 4 yes/no and multiple-choice questions to assess physical adverse reactions experienced by nurses due to wearing of PPE during covid-19pandemic.

## 2.6. Method

This study was conceived in early October 2021, followed by a review of the literature, a study proposal, and the creation of the study tool until November 2021. The study sample's data was obtained in December 2021.

2.6.1. A pilot research was done to test the clarity and applicability of the tools, as well as the time required to collect data. No changes to the study tools were required." The questionnaire was tested using Cronbach's Alpha test, and the result was 0.899. The data from the pilot research was not included in the completion of the study sample.

### 2.6.2. Content validity

was ascertained by a group of three teaching staff members in critical care nursing experts at the Faculty of Nursing Sohag University. Their opinions were elicited regarding the format, layout, consistency, accuracy, and relevancy of tools.

### 2.6.3. Ethical considerations

Before the beginning of the study, each nurse was informed about the study's goal. The researcher highlighted that the nurses' involvement was optional, and the data was coded to ensure the confidentiality and anonymity of the nurses' information. Nurses also was informed that she/he may drop out of the study at any time for any reason.

### 2.6.4. Fieldwork

Nurses were recruited to participate in the study via WhatsApp, which included information about the study's goal and how long it would take to complete the questionnaire. The survey was administered using a Google Form <https://docs.google.com/forms/d/1iw3n5jZTqOQahEEhegf7rzKV4A3CjAN8jtq7uPKvD2Q/edit>

The online survey was written in Arabic. All of the replies of the nurses "who accepted to respond to the questionnaire" were compiled into an online

spreadsheet to evaluate personal protective equipment's adverse reactions and psychological preparedness among critical care nurses during COVID 19. Collected data were recorded in a special chart, coded, analyzed, and tabulated. Data entry and analysis were conducted using SPSS 24.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables. A person's test was used for correlation.

### 3. Results and Discussion

In addition to the stressors in everyone's life with the pandemic, the challenges faced by health care professionals were numerous. Such stressors include the long working shifts; the stay in the isolation hospitals for long durations; fear of catching COVID-19 infection, especially with the close and long contact with patients; and concerns about bringing the infection to family members (Qiu *et al.*, 2020; Rajkumar, 2020).

The new coronavirus pandemic necessitates the use of personal protective equipment (PPE) and respiratory protective equipment (RPE) by nurses to prevent exposure. However, this protection comes with some physiological drawbacks. During the COVID pandemic, we investigated the changes linked with the use of personal protective equipment (PPE) and psychological preparedness by frontline nurses (Choudhury *et al.*, 2020).

Regarding age and gender, our study found that the vast majority of participants were females aged 20 to 30, which matches the findings of Çağlar *et al.* (2020), who investigated Symptoms Associated with Personal Protective Equipment among Frontline Health Care Professionals during the COVID-19 Pandemic. Women between the age of 20 and 30 made up the bulk of the participants, according to them. However, contrary to Bandaru, *et al.* (2020), who investigated the effects of the N95 mask and face shield on speech perception, the majority of participants were above the age of 30.

The majority of participants reported working 6-12 hours in the unit while wearing PPEs, which contradicts the findings of Choudhury *et al.*, 2020 study 's titled "Physiological Effects of N95 FFP and PPE on Healthcare Workers in COVID Intensive Care Unit: ". Who stated that the average time spent doing hard work while wearing protective gear (PPE with N95) was less than 4 hours.

Regarding good acquisition with standard infection control procedures, more than three quarters of respondents are well acquainted with Standard infection control techniques, that in the line with the study of Xia, *et al.* (2020), who reported that the highest percentage appointed to good knowledgeable.

When it comes to infection control training regarding covid-19 in hospitals, the current research found that more than half of participants has not received such training. This is consistent with the finding in the study conducted by Hoernke *et al.* (2021) "Frontline healthcare workers' experiences with personal protective equipment during the COVID-19 pandemic" stated that they had received PPE training during previous outbreaks; however the majority were unaware of the PPE required for COVID-19 patients.

The current study suggests the lack of infection control training for nurses caring for Covid-19 patients to the virus's sudden onset and rapid dissemination of the infection, as well as efforts to provide the most effective means of avoiding this stage. As a result, we've discovered that current research is attempting to develop training regimens to combat Covid 19 infection.

The current study claims that maximum tolerance time in PPE among participants between (4-6)hours that in the line with Xia, *et al.* (2020) who stated that most of the respondents considered that 4 to 6 hours was their maximum PPE tolerance time. Inconsistent with Swaminathan, *et al.*

(2020) who stated that a smaller percentage of participants endure PPE without a break for more than 4 hours in the study of "Impact of increased personal protection equipment on the physical and mental well-being of healthcare workers during COVID-19."

According to our online questionnaire, nurses experienced a significant prevalence of unpleasant symptoms while fighting the COVID-19 outbreak. Regarding to Psychological preparedness. According to our research, the majority of nurses are always uncomfortable and anxious. The current study suggests the worry and anxiety among critical care nurses caring for Covid-19 patients due to the rapid mutation and spread of the virus, despite all efforts made to eliminate it. Current results are in line with the findings of a study conducted by Swaminathan, et al. (2020) titled "Impact of increased personal protection equipment on the physical and mental well-being of healthcare workers during COVID-19," which stated that the most common percentage mental impact related to PPE includes somnolence, anxiety, and depression of participants. Also, Birhanu, et al. 2020 was studied Personal protective equipment (PPE) use against the COVID-19 pandemic claimed that nearly half of the participants believe their workplace is unsafe for COVID-19 transmission. Nearly two-thirds of those who took part in the study agreed that they were at high risk of contracting COVID-19. Half of the participants were pessimistic about acquiring COVID-19 at work in the future.

The current study shows that the response to feeling threatened if one of my coworkers develops COVID-19 varies from rarely to regularly, which contradicts Hoernke, et al C. (2021). "Front-line healthcare workers' experiences with personal protection equipment during the COVID-19 epidemic," they wrote in their report. When they heard in the news that colleagues in other hospitals were getting infected, some nurses felt concerned and anxious. They also claimed that at the onset of the outbreak, interviewed health care providers reported poor PPE guidelines, enabling them to treat suspected COVID-19 patients without appropriate PPE, resulting in confusion, distrust, and a lack of trust.

Regarding the presence of personal protective equipment's reactions related to PPE wearing, the current study revealed that the highest percentage appointed to chest tightness or suffocation followed by shortness of breathing then dizziness or palpitations and (thirst or dehydration) have the same percentage, then the difficulty in working and accomplishing duties. Breathing problems could be caused by inhaling less oxygen (O<sub>2</sub>) and too much CO<sub>2</sub> that has accumulated within the respirator facepiece. At the same point of wearing PPE, in the study of Battista et al. (2021) "Personal Protective Equipment (PPE) in COVID 19 Pandemic (Related Symptoms and Adverse Reactions in Healthcare Workers and General Population" illustrated that majority of respondents of health care workers reported nasal symptoms such as obstruction or dyspnea, dry nose or crusting, sneezing or runny nose, and nasal itching.

On the other hand of the presence of skin adverse reaction current study cleared that the majority of the nurses suffered from skin dehydration followed by Eczema signs, Increase incidence of skin dehydration in the current study may be related to drinking insufficient fluid while wearing PPE during working at ICU. In addition, the nature of (protective suit) which is designed from waterproof materials that will increase the temperature inside the suit and worsen the fluid status of the body leading to dehydration.

Table 1. Socio-demographic features of nurses who worked at isolation ICU

| Socio-Demographic | (n= 68) |      |
|-------------------|---------|------|
|                   | No.     | %    |
| Gender:           |         |      |
| Female            | 51      | 75.0 |
| Male              | 17      | 25.0 |
| Age               |         |      |
| 20-30             | 60      | 88.2 |
| >30 – 40          | 6       | 8.8  |
| >40               | 2       | 2.9  |
| Qualifications    |         |      |
| Institute         | 40      | 58.8 |
| Bachelor          | 21      | 30.9 |
| Postgraduate      | 7       | 10.3 |

Table (1) represents the Socio-demographic features of nurses working in ICU isolation unit. It was found that most of the studied sample were females aged (20- 30) years. More than half of the nurses have an Intermediate education level.

Table 2. Nature of work environment at isolation ICU

| Nature of work environment  | (n= 68) |      |
|---|---------|------|
|   | No.     | %    |
| Training with ICP regarding Covid -19                             |         |      |
| Yes   | 30      | 44.1 |
| No  | 38      | 55.9 |
| Availability of PPE   |         |      |
| Yes   | 41      | 60.3 |
| No  | 27      | 39.7 |
| Well acquisition standard ICP                                     |         |      |
| Yes   | 55      | 80.9 |
| No  | 13      | 19.1 |
| The maximum time in the unit that can withstand PPE for infection |         |      |
| < 2 Hrs   | 14      | 20.6 |
| 2- 4 Hrs  | 18      | 26.5 |
| 4-6 Hrs   | 20      | 29.4 |
| 6-12 Hrs  | 16      | 23.5 |
| Infected with Corona virus?                                       |         |      |
| Yes   | 33      | 48.5 |
| No  | 35      | 51.5 |

Table (2) represents the Nature of the work environment at the ICU isolation unit. It was found that more than half of the nurses didn't train with ICP regarding Covid -19 and the majority had well acquisition with infection control procedures. PPE was available at ICU with a high percentage. The maximum time in the unit that can withstand PPE for infection was 4-6 Hrs. 2- 4 Hrs., 6-12 Hrs. and < 2 Hrs. with percentage (29.4%), (26.5%), (23.5%), (20.6%) respectively.

Table 3. Psychological feelings experienced by nurses related to work at ICU during covid-19

| Psychological feelings  | Never<br>% | Rarely<br>% | Sometimes<br>% | Frequently<br>% | Always<br>% |
|---|------------|-------------|----------------|-----------------|-------------|
| I feel anxious at work in my workplace during COVID-19                                    | 7.4        | 14.7        | 8.8            | 44.1            | 25          |
| I feel I had a risk to get infected with covid-19 at work                                 | 8.8        | 17.6        | 22.1           | 39.7            | 11.8        |
| I feel desperate that I might eventually catch the virus at the end.                      | 29.4       | 27.9        | 14.7           | 11.8            | 16.2        |
| I feel threatened if one of my colleagues gets COVID-19                                   | 8.8        | 26.5        | 16.2           | 26.5            | 22.1        |
| I felt that I would transmit the COVID-19 virus to my family members                      | 5.9        | 25          | 44.1           | 17.6            | 7.4         |
| I feel like my family will avoid me because I work in the hospital                        | 47.1       | 17.6        | 4.4            | 14.7            | 16.2        |
| I didn't feel that I have been trained enough with the infection control procedure        | 22.1       | 26.5        | 10.3           | 20.6            | 20.6        |
| I feel that hospital infection control officials can be reached to respond to my concerns | 14.7       | 13.2        | 14.7           | 30.9            | 26.5        |
| I feel that there is a plan for the spread of COVID-19 at my work                         | 14.7       | 13.2        | 14.7           | 30.9            | 26.5        |
| I feel anxious at work despite using infection control precautions                        | 23.5       | 13.2        | 5.9            | 32.4            | 25          |

Table (3) shows psychological feelings experienced by nurses related to work at ICU during Covid-19. More than third felt anxious at work in my workplace during COVID-19 and felt had a risk to get infected with covid-19 at work

Table 4. Personal protective equipment's adverse reactions related to wearing of PPE during Covid-19

| PE's adverse reaction          | (n= 68) |      |
|--------------------------------|---------|------|
|                                | No.     | %    |
| Dizziness or palpitations      | 22      | 32.4 |
| Chest tightness or suffocation | 33      | 48.5 |
| Pain                           | 19      | 27.9 |
| Desire to urinate              | 11      | 16.2 |
| Nausea or vomiting             | 6       | 8.8  |
| Thirst or dehydration          | 22      | 32.4 |
| Difficulty working             | 20      | 29.4 |
| Shortness of breath            | 32      | 47.1 |

Table (4) represents the Personal protective equipment adverse reaction experienced by nurses due to wearing of PPE during Covid-19 pandemic. It illustrated that the highest percentage appointed to chest tightness or suffocation (48.5%) from PPE followed by shortness of breathing

(47.1%) then (dizziness or palpitations) and (thirst or dehydration) have the same percentage with (32.4%)

| No. of PPE adverse reactions | <2 | 2-4 | 4-6 | 6-12 | R     | P. value |
|------------------------------|----|-----|-----|------|-------|----------|
| 1                            | 7  | 5   | 7   | 9    |       |          |
| 2                            | 3  | 2   | 0   | 0    | 0.442 | 0.000    |
| 3 or more                    | 4  | 11  | 13  | 7    |       |          |

Table 5. Correlation between adverse reactions and maximum time nurses can withstand PPE.

Table (5) represents the Correlation between adverse reactions and maximum time nurses can withstand PPE, there was a statistically significant difference.

Table 6: Adverse reactions from eye goggles and gloves.

|  | No. | %    |
|--|-----|------|
| Pressure areas related to use of (eye goggles) |     |      |
| Ears   | 10  | 14.7 |
| Nose   | 45  | 66.2 |
| Forehead                                       | 6   | 8.8  |
| Cheeks   | 7   | 10.3 |
| Skin adverse reaction from gloves              |     |      |
| Eczema   | 18  | 26.5 |
| Skin erosions                                  | 10  | 14.7 |
| Skin dehydration                               | 51  | 75   |

Table (6) illustrates that the nose was the most affected area with pressure (66.2%). Skin dehydration was the most occurred adverse reaction from PPE donning with (75%). Nurse infected with Coronavirus accounted for (48.5%) of the studied sample.

Figure 1. Other adverse reactions related to PPE

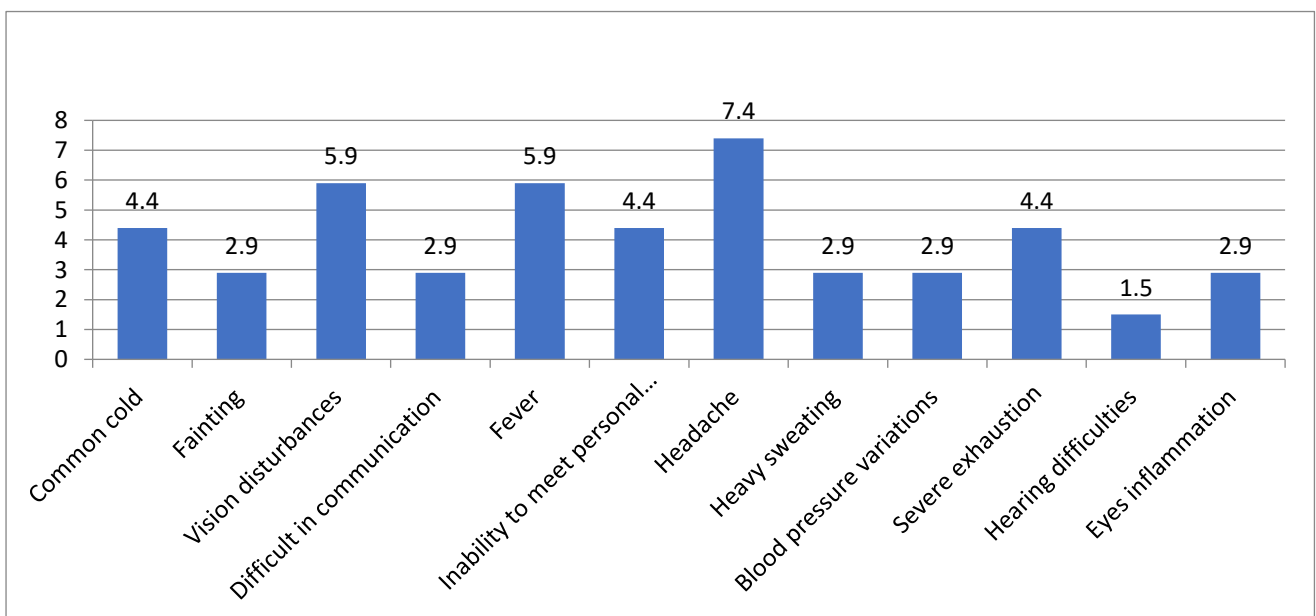


Figure 1. represents other adverse reactions from PPE donning with different variations of their occurrence.



Battista et al. (2021) cleared that facial itching, skin rash or dermatitis, increased pore size or acneis which were the most occurred signs in the current study. According to a multicenter Chinese study conducted during the COVID-19 pandemic, near half of medical staff experienced at least one of the three major skin injuries: device-related pressure ulcers (DRPU), moist-associated skin damage (MASD), and skin tears. Higher prevalence was manifested in the male healthcare population with an increased risk associated with sweating and wearing time (Jiang et al., 2020).

Concerning terms of the area's pressure site; the current study revealed that the nose is the most affected area. It comes in line with Chand et al. (2021) who cleared that an Abrasion nose bridge affects most health care workers. Also Bambi et al. (2021) agree with the current study that cleared that majority of the nurses developed device-related pressure injuries, mainly on the nose, ears, and forehead. Moreover, Dell'Era and colleagues, (2020) claim that nasal pressure arose among health care professionals at the end of the shift during the COVID-19 Epidemic because the skin on the back of the nose appears red, unpleasant, and accompanied by pain on palpation, and occasionally requires treatment with anti decubitus ointments. High and sustained pressure, or pressure mixed with shear, causes the injury, which can be unpleasant.

Regarding the relation between adverse reactions frequency and maximum time in the unit that can withstand PPE for infection, there was a statistically significant difference. This was confirmed with Battista et al. (2021) who cleared that Focusing on the medical staff, all symptoms were significantly correlated with the daily wearing time of PPE.

Current study also revealed that headache was one of the most common adverse effects of wearing PPE, where pressure forces from the mask and/or goggles, combined with the accompanying straps, may cause local tissue damage and irritate the underlying superficial sensory nerves (particularly trigeminal or occipital nerve branches) innervating the face, head, and cervical region. As a result of the strain on the cervical neck caused by using the apparatus, tension-type headaches may have developed. Simultaneously according to Ramirez-Moreno et al 2020, PPE-related headache is caused by disruptions in internal and external hemostasis, such as insomnia, physical and mental stress, irregular eating, and insufficient hydration, which are all produced by working circumstances in the pandemic.

The present study findings support the findings of Gohet al. (2020), who did a study on "Headaches Due to Personal Protective Equipment during the COVID-19 Pandemic" and stated that the high prevalence of headaches reported by PPE-wearing healthcare professionals.

The present study revealed that about half of the nurses working at the Intensive care isolation unit were infected with Covid-19, which may be poor immunization of nurse, the rapid mutation and spread of the virus, a different way of virus's transmission, and prolonged duration of virus's life on the surrounding. El-Raey et al. (2021) cleared that there is an increased risk of severe COVID-19 among healthcare workers with 15% infected nurses in ICU.

#### **4. Conclusions**

The current study revealed that the maximum time in the unit that can withstand PPE for infection was 4-6 Hrs, 2- 4 Hrs, 6-12 Hrs and < 2 Hrs with percentage (29.4 %), (26.5 %), (23.5 %), (20.6 %) respectively. More than a third of the nurses felt anxious at work in the workplace during COVID-19 and felt had a risk to get infected with covid-19 at work. Most Physical adverse reactions experienced by the nurse were Chest tightness and suffocations, shortness of breathing, (dizziness or palpitations), and (thirst or dehydration). Also, skin dehydration affected the majority of the nurses.

So, the implications of these findings might help to provide support and identify the needs of nurses in all affected hospitals to ensure that they can work and respond with more confidence.

Further research should be done to support the nurses, determine adequate solutions for preventing and treating personal protective equipment's adverse reactions and their influence on nurses' work tolerance.

## References

- Al-Dossary, R., Alamri, M.,Albaqawi, H., Al Hosis, K.,Aljeldah, M., Aljohan M.,Aljohani K., Almadani N.,Alrasheadi B., Falatah R.,Almazan J., (2020);Awareness, Attitudes, Prevention, and Perceptions of COVID-19 Outbreak among Nurses in Saudi Arabia. *Int. J. Environ. Res. Public Health* , 17, 8269.
- Alshekaili, M., Hassan, W., Al Said, N, (2020);Factors associated with mental health outcomes across healthcare settings in Oman during COVID-19: frontline versus non-frontline healthcare workers. *BMJ m* 10 (10): e042030.
- Aswad, Y., & Loleh, S. (2021); Effect of Personal Protective Equipment (PPE) on oxygen saturation and dehydration status in COVID-19 nurses in Gorontalo Province. *IOP Conference Series: Earth and Environmental Science*, Vol 819 NO (1), 012086.
- Bambi, B., Giusti G., Galazzi A., Mattiussi E., Comisso I. , Manici M., MorisRosati. (2021); Pressure Injuries Due to Personal Protective Equipment in COVID-19 Critical Care Units, *Am J Crit Care* , 30 (4), 287–293.
- Bandaru, S., Augustine, A., Lepcha, A., Sebastian, S., Gowri, M., Philip, A., & Mammen, M., (2020); The effects of N95 mask and face shield on speech perception among healthcare workers in the coronavirus disease 2019 pandemic scenario, *The Journal of laryngology and otology*, 134, 895 – 898.
- Battista, R. A., Ferraro, M., Piccioni, L. O., Malzanni, G. E., &Bussi, M. (2021); Personal Protective Equipment (PPE) in COVID 19 Pandemic: Related Symptoms and Adverse Reactions in Healthcare Workers and General Population. *Journal of occupational and environmental medicine*, 63 (2), e80–e85.
- Birhanu, A., Balis B., AssebeYadeta, T., Bayu, M. (2021);Personal protective equipment utilization practice and psychological preparedness of health care workers against COVID-19 pandemic in Eastern Ethiopia. *SAGE Open Medicine*, 9, 1-10.
- Çağlar, A., Kaçer İ., Hacimustafaoğlu M., Öztürk, B., ÖztürkK. (2020 );Symptoms Associated With Personal Protective Equipment Among Frontline Health Care Professionals During the COVID-19 Pandemic. *Disaster Med Public Health Prep.* 19, 1-4.
- Chand, S., Sharma, N., Kumar, S. (2021);Adverse effects of prolonged use of personal protective equipment among health care workers during COVID-19 pandemic *International Journal of Community Medicine and Public Health* , *Int J Community Med Public Health.*; 8 (9), 4400-4403.
- Choudhury, A., Singh, M., Khurana, D., Mustafi, S., Ganapathy, U., Kumar, A., & Sharma S. (2020); Physiological Effects of N95 FFP and PPE in Healthcare Workers in COVID Intensive Care Unit: A Prospective Cohort Study. *Indian journal of critical care medicine : peer-reviewed, official publication of Indian Society of Critical Care Medicine*, 24 (12), 1169–1173.
- Cook, T. (2020); Personal protective equipment during the COVID-19 pandemic: a reply. *Anaesthesia*, 75, 1114-1123.
- El Zowalaty, M.E., Järhult, J.D. (2020 ). From SARS to COVID-19: A previously unknown SARS- related coronavirus (SARS-CoV-2) of pandemic potential infecting humans - Call for a One Health approach. *One Health.* 9:100124.

- El-Raey, F., Alboraie, M., Youssef N., Yousef, A., Abdelmoaty, A., Hassan, E., Hassany, S.M, Abd-El salam, S., Elsharkawy, R., Farrag, K., Elbadry, M., Tag-Adeen, M., Abdeen, N., Elshaarawy, O., Haydara, T., Ahmed, A., El-Sayed, M., Fouad, Y., Abdel Baki, A., & Zaky S. (2021); Predictors for Severity of SARS-CoV-2 Infection Among Healthcare Workers, *Journal of Multidisciplinary Healthcare*, *14*, 2973–2981
- Goh, Y., Ong, J. J. Y., Bharatendu, C., Tan, B. Y. Q., Sharma, V. K. (2020); Headaches due to personal protective equipment during COVID-19 pandemic: A comment. *Headache*, *60* (7), 1446–1447.
- Hoernke, K., Djellouli, N., Andrews, L., Lewis-Jackson, S., Manby, L., Martin, S., ...Vindrola-Padros, C. (2021). Frontline healthcare workers' experiences with personal protective equipment during the COVID-19 pandemic in the UK: a rapid qualitative appraisal. *BMJ Open*, *11* (1), e046199
- Jiang, Q., Liu, Y., Wei, W., Zhu, D. (2020);The prevalence, characteristics, and related factors of pressure injury in medical staff wearing personal protective equipment against COVID-19 in China: a multicentre cross-sectional survey. *Int Wound J*, *1*: 10.
- Markos, T., Sinkie, S.O., Garedew, M.G. (2021). Compliance with Infection Prevention Practices and Associated Factors among Health Professionals in the Public Hospitals of KembataTembaro Zone, south Ethiopia. *Health Sci J*. *15*. (7): 861
- Qiu, D., Yu, Y., Li, R.Q., Li, Y.L., Xiao, S.Y. (2020); Prevalence of sleep disturbances in Chinese healthcare professionals: a systematic review and meta-analysis. *Sleep Med* (67), 258–266.
- Rajkumar, R.P. (2020); COVID-19 and mental health: a review of the existing literature. *Asian J Psychiatr* *52*:102066.
- Ramirez-Moreno, J., Ceberino, D., Gonzalez-Plata, A., Rebollo, B., Macías-Sedas, P., Ramchandani, R. (2020); . Mask-associated De Novo Headache in Healthcare Workers during the COVID-19 Pandemic, *78* (8), 548 – 554.
- Srinivas, M., Charles, D., Robert, A. (2020);Care for Critically Ill Patients With COVID-19. *JAMA*, *323*, (15), 1499 – 1500.
- Swaminathan, R., Mukundadura, B., Prasad, S. (2020). Impact of enhanced personal protective equipment on the physical and mental well-being of healthcare workers during COVID-19. *Postgraduate Medical Journal*, *postgradmedj*
- Valeria, D., Paolo, A., Massimiliano, G. (2020); Nasal Pressure Injuries During the COVID-19 Epidemic. *Ear, Nose & Throat Journal*, *99*, (9), 567– 568.
- WHO. World Health Organization corona virus disease (COVID-19), 2021, <https://covid19.who.int/region/afro/country/et> (accessed 15 May 2021).
- Xia, W., Fu, L., Liao, H., Yang, C., Guo, H., & Bian, Z (2020); The Physical and Psychological Effects of Personal Protective Equipment on Health Care Workers in Wuhan, China: A Cross-Sectional Survey Study. *Journal of Emergency Nursing*, *46*, (6), 791- 801.

## الملخص باللغة العربية

### الاثار الجانبية لمعدات الحماية الشخصية والتأهب النفسي بين هيئة تمريض الرعاية الحرجة أثناء

#### جائحة كوفيد 19

صفاء ادم، نجلاء عبد الحافظ، سناء محمد، سهام محمد

قسم تمريض الحالات الحرجة و الطوارئ ، كلية التمريض، جامعة سوهاج، مصر 82524

ظهر كوفيد 19 كتهديد عالمي يؤثر على ملايين الأشخاص في جميع أنحاء العالم، ونتيجة لذلك اعتبرت معدات الحماية الشخصية جزءًا مهمًا كوسيلة من وسائل الطوارئ لصد خطر انتشار كوفيد 19 وقد اوضحت الدراسه الحاليه ان استخدم تلك المعدات ارتبط بحدوث بعض الاثار الجانبيه نظرا لاستخدامها لفترات طويله وتنوعت تلك الاعراض ما بين ضيق الصدر و الاختناق وضيق التنفس والدوخة والخفقان والعطش وجفاف الجذ. كما ان غالبية الممرضات أظهرت قلقهن أثناء التعامل في ظل ظروف كوفيد 19.