Hamad Ayed Alfahaad1*, Mahdi Turki Bin Ali Alfataih2, Bader Majeed Mohsen Al Adainan2, Alhassan Ahmed M Al Dundur2, Ali Mahdi J Alyami2, Ali Hadi M Alyami2, Mana Mahdi R Almunajjim2, Hamad Mahdi K Al Khamsan2, Ali Mansour Z Al Abbas2, Rashed Saleh M Balhareth2, Batool Hamad Hussain Alyami2 and Aljoharah Ali H Alzabin2

1Associate Professor, College of Medicine, Najran University
2Medical Intern, College of Medicine, Najran University

Abstract: Frontline worker’s prevalence of occupational skin disease has increased as a result of staff infection control measures such as increased personal protective equipment (PPE) and stricter hand hygiene procedures. During the COVID-19 pandemic, assess the frequency of occupational skin disorders among healthcare workers at the general hospitals in the Najran region of southern Saudi Arabia is our main aim. Our objective comprises a cross-sectional study that will be carried out at the general hospitals in the Najran region of southern Saudi Arabia between March 1 and April 31, 2022, in order to achieve the goal. All medical professionals received a self-administered online survey (physicians, nurses and paramedics). The questionnaire asked about the severity of skin damage and the frequency and length of time that various infection prevention strategies were used. It was found that 68.2% had new onset of obvious skin damage and 31.8% did not. 21.6% of the new onset of obvious skin damage was on the fingertips, 46.6% was on the hands, 22.4% was in paws, 3.4% was on the face and 6.0% was under the eye. 29.8% of the symptoms of the damaged site was itching, 44.7% dryness, 12.8% burning/pain, and 12.8% tenderness. 16.5% of the type of skin lesions was peeling, 28.2% fissure, 18.8% erosion/ulcer, 24.7% redness, 4.7% papule (pimples) and 7.1% others. In our study, 68.2% of our participants suffered obvious skin damage during the pandemic: 90.6% of this occurred on the hands and 9.4% on the face. Contact dermatitis in the form of itching, dryness, burning, pain and tenderness were the most common adverse effects noted. Therefore, it is important to organize training on the prevention and management of possible skin lesions due to PPE use according to guidelines.

Keywords: COVID-19; Protection; Skin Diseases, Skin Damage, Side Effects.
1. INTRODUCTION

In epidemics involving highly infectious diseases, such as Ebola, severe acute respiratory syndrome (SARS), or coronavirus (COVID-19), healthcare workers (HCW) are at much greater risk of infection than the general population due to their contact with patients' contaminated body fluids. Personal protective equipment (PPE) can reduce this risk by covering exposed body parts. COVID-19 can occur if a person touches a surface contaminated with SARS-CoV-2 and then the hands come into direct contact with mucous membranes such as the eyes, nose, or mouth. Thus, sufficient washing of hands with soap and water or hand sanitizers is recommended. Hand sanitizers mainly comprise ethanol, isopropyl alcohols, and hydrogen peroxides in different combinations. These preparations may become toxic to human health and the environment if misused as they may become overly released by evaporation. Whilst frequent use of hand sanitizers is proven to kill bacteria and viruses on organic surfaces, alcohol is also known to have a drying effect on skin by removing moisture, resulting in skin that is dry, flaky, and sensitive to the touch. In addition to being uncomfortable, the American Academy of Dermatology Association notes that having dry skin can actually increase the chances of contracting infections, and it can also trigger an eczema breakout. According to the Center for Disease Control and Prevention (CDC), the best way to clean hands is with soap and water, if available. A common form of PPE is a medical mask, which has been recommended for wear by healthcare professionals since the outbreak of COVID-19. The effects of wearing these for extended periods include skin irritation as wearing of a face mask leads to the accumulation of oils, dirt and sweat on the skin. This accumulation can cause skin irritation, redness, and even a rash that may worsen acne. For this reason, using masks made of cotton and natural filters, not synthetic fabrics, allows better air circulation to and from the mask. Washing masks after each use to clean and disinfect them of the dirt, washing of the face before wearing the mask, and not applying makeup under the mask are all recommended measures to keep the pores of the skin in their best condition. Chapped lips are also a common side effect of wearing a face mask, so it is important to keep them moisturized. Unfortunately, wearing a face mask during daylight hours in outdoor places can also cause sunburn in areas that are not covered by the mask. It is therefore recommended that wearers use sunscreen to protect the skin from the dangers of ultraviolet rays, especially on places that the mask does not cover. Healthcare workers (HCWs) are also encouraged to wear gloves by the WHO in the direct care of the patients during the COVID-19 pandemic. Medical gloves are made of different polymers, including latex, nitrile rubber, polyvinyl chloride, polyurethane, and neoprene. Nitrile and latex gloves are preferred due to better durability and strength. Interestingly, hypersensitivity to natural rubber latex (NRL) has been increasingly reported, with an incidence of 2.8% to 17% among HCWs. In fact, HCWs are highly at risk of developing allergic reactions to NRL, especially operating room personnel, dental assistants, laboratory personnel, hospital housekeeping personnel, and ambulance attendants. Atopic background, history of hand dermatitis, allergies to certain foods, begin female, and multiple exposures are among the risk factors for developing hypersensitivity to NRL. Skin reactions include localized pruritus, burning, stinging, and contact and generalized urticaria. The most frequently observed reaction is irritant contact dermatitis, presenting as dry, crusted, fissuring patches. In suspected patients, a thorough history of allergic reactions to balloons, gloves, barium enema, and other latex devices should be taken. The gold standard in the diagnosis is skin-prick testing in patients with localized symptoms and latex-specific IgE antibody assessment in cases of systemic symptoms. However, the wear and/or use test and the patch test are alternative diagnostic tests. The most effective approach for the management of latex allergy is personal and environmental avoidance via the use of hypoallergic gloves. There have been several dermatologic diseases reported to be associated with the wearing of PPE. Healthcare workers can develop acne mechanica as mechanical trauma from the mask and goggles can cause rupture of microcomedones, resulting in inflammation. The mask and goggles also create a hot and humid environment, causing excess sweat and sebum accumulation on the face. This enhances bacterial growth (Propionibacterium acnes) and creates an ideal environment for acne. Healthcare workers may also develop erythema and indentation from pressure caused by prolonged wearing of goggles and masks. Common sites for this are the nasal bridge and cheeks. Occasionally, blisters or erosion can develop at the sites of pressure. Hand dermatitis is a major skin disease associated with increased hand hygiene in conjunction with COVID-19 precautions. The hands have been reported to be a common site affected during this pandemic, potentially caused by the occlusion effects of gloves and goggles. In such skin reactions, topical steroids are used for inflammation and intensive emollients for skin barrier repair. When using lipid-bearing emollients or barrier creams on the hands, this should be done at least 1 h before a shift. Health care workers should also ensure their hands are completely dry before using PPE to avoid occlusive effects that precipitate skin damage. Avoiding oil or petroleum-based hand creams, as they may cause glove damage, is also recommended. It has been reported that more advanced protection, increased working frequency, and longer wearing times of protective suits, are more correlated with the appearance of facial skin lesions. The appearance of erythema was found to be related to protection level, working frequency, and the duration of wearing a protective suit.

2. PARTICIPANTS AND METHOD

2.1 Setting and Population

Between March 18 and March 25, the week following Saudi Arabia’s announcement of a lockdown, a cross-sectional poll was carried out. Jazan and Aseer in South-West Saudi Arabia, together with nearby rural communities, were chosen as the study’s focus areas. Regardless of whether they had COVID-19 infection, the study included all Saudi nationals and residents who were willing to take part, including HCWs and other members of the community who were 12 years of age or older. People who did not fit the aforementioned inclusion requirements were ineligible and were therefore not included in the study.

2.2 Sample Size

Using a Denial equation with an alpha level of 0.05 and a power (1-β) of 0.80, the necessary sample size for this investigation was determined. As a result, 384 people were needed as the final sample size. Therefore, 1,000 people were chosen as the sample size for this study in order to reduce mistakes.
2.3 Outcome Measure

In the current study, residents of South-West Saudi Arabia (HCWs and other community peoples) were asked to rate their level of preparedness for the prevention of COVID-19 using the following explanatory variables: location, gender, age, education level, and employment.

2.4 Study Tool

Our co-authors created a standard (structured, pre-coded, and validated) questionnaire for this study based on frequently asked questions (FAQ) found on the Centers for Disease Control (CDC) and WHO official websites because this is a novel coronavirus and no previous study of this kind has been done\textsuperscript{19-20}. The multiple-choice questions were designed to elicit information about the respondent’s knowledge of and readiness for COVID-19. To make sure the questions evoked proper responses and that there were no issues with the entry of answers into the database, a pilot survey of 10 people was first conducted. We chose to gather the data online using a Google survey because it was impractical to carry out a community-based nationwide sampling survey during this crucial time. Three elements make up the self-reported questionnaire. The purpose of the first section is to gather background data, such as demographics (nationality, age, gender, level of educational, and occupation). The survey’s second section asks questions about respondents’ knowledge of COVID-19 (reliable source of information, symptoms, mode of transmission, incubation period, complications, high-risk population, treatment, and preventive measures). The survey’s third section consists of inquiries regarding readiness to combat COVID-19. The questionnaire was pre-tested to verify that it kept its original meaning and was prepared in English before being translated into Arabic for the participants’ convenience and understanding.

2.5 Information Gathering and Analysis

Utilizing a random sample technique, data were gathered and examined using Stata 15. Data were provided as frequencies and percentages for categorical variables. Each awareness item’s relationship to each explanatory variable was investigated using a chi-squared (2) test in the bivariate analysis. To evaluate the correlations in the adjusted analysis, multivariable logistic regression was conducted using each item in awareness and preparation as an outcome independently. At $P \leq 0.05$, differences were deemed statistically significant.

3. ETHICAL APPROVAL

Before the official survey was done, the "Institutional Research Review and Ethics Committee (IRREC), College of Pharmacy, Jazan University” gave its ethical approval to the study protocol and informed consent procedures. A Google survey was created with an online informed consent form on the first page because this study was carried out during the lockdown. In order to validate their intent to engage voluntarily, participants are asked a yes/no question concerning the questionnaire’s contents. Minors (participants under the age of 16) are required to show their parents or legal guardians the form before picking their response. To participate in this study, patients/participants or their legal guardians must give their written informed consent. The participant is instructed to complete the self-report questionnaire after giving an affirmative answer to the question. Every response is private.

4. RESULTS

4.1 Demographic Characteristics

Table\textsuperscript{1} summarizes the demographic descriptions of the respondents. 1,000 people in total filled out the survey form, with 46.1% men and 53.9% women. 74.8 percent of participants are from the Jazan region, while 25.2 percent are from the Aseer province. 44.1% of the participants are less than 30 years old, making up more than half of the participant population (55.9%). About 20.5% of participants have only a secondary education, compared to 79.5% of respondents who have a bachelor’s degree or higher from a university (non-graduates). HCWs make up 36.7% of participation, while other participants make up 63.3%.

| Parameter            | Count (n) | Percentage % - N=1,000 |
|----------------------|-----------|------------------------|
| Region               |           |                        |
| Jazan                | 748       | 74.8                   |
| Aseer                | 252       | 25.2                   |
| Gender               |           |                        |
| Male                 | 461       | 46.1                   |
| Female               | 539       | 53.9                   |
| Age groups           |           |                        |
| More than 30 years   | 559       | 55.9                   |
| Less than or = 30 years | 441   | 44.1                   |
| Education            |           |                        |
| Middle school or less| 26        | 2.6                    |
| High school          | 179       | 17.9                   |
| Bachelor degree      | 634       | 63.4                   |
| Master/Ph.D./above   | 161       | 16.1                   |
| Occupation           |           |                        |
| Doctor               | 76        | 7.6                    |
| Nurse                | 51        | 5.1                    |
| Pharmacist           | 240       | 24                     |
| Other employed       | 238       | 23.8                   |
| Unemployed           | 123       | 12.3                   |
| Students             | 272       | 27.2                   |
4.2 Understanding the COVID-19 Disease and Personal Safety Precautions

Respondents had the option of selecting multiple options from the available choices in accordance with their understanding and conscience. The findings showed that most of the respondents were aware of and had heard about COVID-19 condition. The majority of participants (97.7%) correctly recognised the main mode of transmission as human-to-human transfer (infected person with virus). Additionally, according to 89.8, 83.9, and 90.9% of respondents, respectively, fever, cough, and breathing difficulties are the most typical COVID-19 symptoms. Pneumonia (79.4%), kidney failure (22.8%), and mortality (54.9%) were the most commonly mentioned COVID-19 side effects among the respondents. 76.4 percent of respondents say there is no treatment for COVID-19 now, 47.1 percent say supportive care is the sole choice, and 45.8 percent say personal safety is the primary kind of treatment. Washing hands is the most popular personal protective technique used by participants (92.7%), followed by social withdrawal (92.3%), wearing a face mask (86.5%), and avoiding travel to affected regions or nations (86.9%). Importantly, however, 63.8% of participants agree that eating uncooked or undercooked animal products should be avoided, and 1.7% are aware of effective preventative techniques. Nearly half of the respondents (42.4%) claim to be interested in learning more about COVID-19.

5. DISCUSSION

It has been dubbed a "pandemic" since the COVID-19 outbreak is escalating rapidly, crossing international boundaries and continents. It caused chaos and horror in all nations. The populace are successfully made uneasy, confused, and afraid by this new viral virus. This illness is special in that it manifests little to no symptoms at first, and many people are unaware they have it. The infected person does not experience any significant symptoms or changes, allowing him to seek medical help as soon as possible. By the time infected individuals become aware of their condition, they may have unknowingly and foreseeably spread the illness to a significant number of individuals. Therefore, effectively halting the disease's spread among people will be the primary tactic in the fight against COVID-19. Therefore, the primary goal of this study was to evaluate people's knowledge of the disease, particularly that of HCWs and other inhabitants, as well as their readiness to combat it and their involvement in the effort to eradicate the virus. We are aware that when the country was least equipped to deal with the pandemic, COVID-19 caught everyone off guard. To the best of our knowledge, this is the first survey of its sort to be carried out in Saudi Arabia, measuring citizens' awareness of and readiness for COVID-19. The HCWs and other study area inhabitants responded well to our survey. The poll was filled out by people with a variety of employment histories and educational levels. Graduates make up the majority of them, followed by those who only completed high school. Similarly, HCWs account for more than one-third of the sample size across all work backgrounds. First and foremost, HCWs and graduates need to be informed of the disease profile in order to rapidly convey the word to their family members, neighbors, and everyone else with whom they come into touch. The analysis of the study's findings revealed that graduates and HCWs both have sufficient understanding about the virus. The study's final observation was that by raising awareness about the condition, people can not only help keep themselves and others safe from the virus. According to the findings, health organisations (89.6%) and healthcare workers (57.9%) are able to convince participants and help them comprehend the patterns and stages of an infection through effective communication. Previous to this, MERS-CoV was a significant global worry following its initial discovery in Saudi Arabia in 2012. Following the MERS outbreak, numerous awareness assessments revealed varying degrees of MERS disease knowledge among Saudi healthcare professionals and residents (47–49). The results of the current study indicated that COVID-19 illness awareness was higher than MERS awareness. This can be attributed to COVID-19's global reach, which makes it more dangerous than MERS due to its rapid pace of transmission, alarmingly high number of cases, and ongoing death toll. The ability to understand the infection quickly was found to be significantly influenced by educational background. This poll revealed that highly educated individuals and HCWs have a better understanding of the condition than their less educated peers. Even while all the groups had nearly comparable understanding of the fundamentals of the disease, there are several areas where there is a definite difference, such as disease complications, high-risk populations, personal safety precautions, and treatment accessibility. For instance, only 68.78% of those with lower levels of education acknowledged the increased danger of catching an infection from an older person. To boost preventive actions, including raising awareness and educating HCWs about preparatory activities, the WHO has launched a number of online training sessions and materials on COVID-19 in several languages. Misunderstandings among HCWs have frequently slowed down efforts to manage the delivery of vital care, causing an infection to spread quickly through hospitals and endangering the lives of patients. In the current study, the preparedness of HCWs to combat COVID-19 was also examined, and it was discovered that all participating HCWs were well-prepared and ready for the current epidemic. The adoption of precautionary measures that reduce the exposure risk to the sickness depends on one's understanding and awareness of the disease. Our data imply that inhabitants with lower educational levels and non-healthcare professionals are less knowledgeable than their counterparts about COVID-19 disease and preventive measures. Programs for health promotion and awareness are therefore necessary to target these specific groups of the population. In order to eradicate this disease and broaden the knowledge of rural and undereducated individuals, COVID-19 awareness initiatives and other educational strategies should be created and implemented more effectively. The target demographics for COVID-19 prevention and health education can be identified using these findings by public health policymakers and healthcare professionals.

5.1 Knowledge of Potential Risk Factors and Virulence of Covid-19

This evaluation shows the level of knowledge among medical students regarding possible risk factors for covid-19. The majority of medical students (95.0%) thought that COVID-19 was very contagious among persons with chronic diseases. Instead, they were divided about the risk to pregnant women and children, with 48.3 and 23.6% of the medical students indicating, respectively, that these groups are at an elevated risk. Additionally, almost 76.4% of students thought that COVID-19, unlike typical cold and flu viruses, is more likely to cause pneumonia in infected people. They also thought that an infected patient can transmit the infection for up to four
people at each encounter if preventative measures are not done. While just 19.3% of the students thought masks might protect against COVID-19 infection, 60.6% of them thought that only COVID-19 carriers should wear masks to stop the spread of the disease. However, 67.1% of students thought that 90.0% of infected people will recover naturally without the need for medical help, and 75.0% thought that an effective vaccination would stop the spread of COVID-19. The majority of students (83.3%) also concurred that if a person contracted the virus, they should be avoided. Less pupils (76.9%) thought that this person’s family should be kept apart. Table 2 shows the evaluation.

| Statement | Agree | Don’t know | Disagree |
| --- | --- | --- | --- |
| Children at high risk for covid-19 | 23.60% | 17.20% | 59.3% |
| Chronic diseased people at high risk for covid-19 | 95% | 3.30% | 1.70% |
| Pregnant women at high risk for covid-19 | 48.30% | 43.70% | 8% |
| Transmitting disease from one sick person to 4 other people | 76.40% | 15.80% | 7.80% |
| Prevention of disease by wearing regular mask | 19.30% | 21.50% | 59.20% |
| Vaccine can prevent the spread of the disease | 75% | 19.70% | 5.30% |
| Covid-19 has a high recovery rate /90% recover | 67.1% | 22.60% | 10.30% |
| The sick people only should wear masks | 60.60% | 9.90% | 29.50% |

6. CONCLUSION

The current study provides information on the level of awareness of COVID-19 in the South-West of Saudi Arabia, which is still working to eradicate the disease completely. This information includes knowledge, preventative activities, and readiness. According to the survey’s findings, the majority of participants were knowledgeable about COVID-19 and were ready to take preventive action. It was clear that the community’s general awareness of COVID-19 and level of readiness among educated and HCW populations were acceptable. However, there were a few misunderstandings about how COVID-19 was sent among the participants that needed to be cleared up. This study demonstrated that increased activities for COVID-19 prevention are a direct result of knowledge and readiness. It would also be beneficial to invest in a variety of COVID-19 prevention initiatives, such as health education and cutting-edge methods based on local evidence, to increase community awareness and enhance its preventative practices.

7. AUTHOR CONTRIBUTIONS STATEMENTS

Conceptualization, technique, writing of the first draught, research, project management, and final editing by RT and PT. SSA and AA: supervision, joint project management, data gathering, feedback, and significant change. AM: formal analysis, validation, and software. SA: research and visualization. WA and DB are responsible for gathering data, making calculations, writing, editing, and formal analysis of the publication. FA: setting up the Google form and translating it into Arabic. Each author took part in the survey’s distribution.

8. CONFLICT OF INTEREST

Conflict of interest declared none.

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