



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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**Assessment of Nurses Knowledge, Knowledge of  
Practice Regarding Protective Measures of  
COVID-19 in Atbara Teaching Hospital  
June - September 2021**

**Research submitted for partial fulfillment of requirement B.S.C degree  
in nursing science**

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**2021**

# الآية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالى :

﴿ قُلِ اللَّهُ يُنَجِّيكُمْ مِنْهَا وَمِنْ كُلِّ كَرْبٍ ثُمَّ أَنْتُمْ مُشْرِكُونَ ﴾

صدق الله العظيم

سورة الأنعام الآية (64)

## **Dedication**

*To Allah for giving us the force and self - confidence to complete this research.*

*To our prophet Mohammad who recommend us for searching for science.*

*To our parents who are give us the best examples of love, sympathy and care to them for every drop of sweat or tear in bringing us .They are the real force behind our progress and success*

### ***OUR Fathers and Mothers***

*To someone who support us & learn us the meaning of love*

*To someone who teaches us the deep meaning of trust, and stand with us in every difficult moment.*

### ***OUR Sisters and Brothers***

*To someone who gives our life it is meaning & colors.*

### ***OUR best friends***

## Acknowledgment

*First and foremost we would like to thank Allah for giving us the strength, knowledge, ability and opportunity to undertake this research study and to persevere and complete it satisfactorily.*

*We are heartily thankful to our Supervisor:*

*Nagia Mohammed Shams Eldeen*

*Who constantly helped, advised and directed us throughout all the stages of this research.*

*And our colleagues, who encouraged and supported us a great deal during the time we were struggling with our research.*

## **Abstract:**

**Background:** The Novel Corona virus disease (COVID-19) is an infectious viral disease caused by Severe Acute Respiratory Syndrome Corona virus 2, which basically originated from Wuhan city, China in December 2019.

(<https://emedicine.medscape.com/article/2500114-overview>)

**The aim of this study:** to assessment of nurses knowledge, knowledge of practice regard protective measures of COVID in Atbara teaching hospital during period between June to September 2021.

**Material and method:** descriptive study was conduct over sample of 70 of nurses in

Atbara teaching hospital analyzed tools of data collection by questionnaire and SPSS used for data analyze.

**The main result:** total number of participant in research were 70 nurses 50% of nurses were knowledgeable regarding protective measure of COVID-19

More than 50% of nurses have good knowledge of practice regarding protective measure of COVID- 19.

**Conclusion:** The study show that half of nurses have good knowledge about Covid-19 protective measure, more than half have good knowledge of practice regard protective measure of Covid-19.

We recommended that hospital management should continues training to keep nurses updated, availability of all facilities and equipments for applying infection control and using of standard precaution .

## ملخص الدراسة:

**المقدمة:** مرض فيروس كورونا المستجد (كوفيد -19) هو مرض فيروسي معدي يسببه فيروس كورونا 2 المتلازمة التنفسية الحادة الوخيمة ، والذي نشأ أساساً من مدينة ووهان بالصين في ديسمبر 2019م.

**الهدف:** من هذه الدراسة تقييم معرفة الممرضات ومعرفتهم بالممارسة وتدابير الحماية من فيروس كورونا في مستشفى عطبرة التعليمي خلال الفترة من يونيو إلى سبتمبر 2021م.

**نوع الدراسة:** أجريت هذه الدراسة بالطريقة الوصفية على عينة مكونة من 70 ممرضة في مستشفى عطبرة التعليمي بتحليل أدوات جمع البيانات عن طريق الاستبيان واستخدام برنامج SPSS لتحليل البيانات.

**النتائج:** بلغ إجمالي عدد المشاركين في البحث 70 ممرضة ، وكان 50 % من الممرضات على دراية بمقاييس الحماية من فيروس كورونا.

أكثر من 50% من الممرضات لديهم ممارسات جيدة فيما يتعلق بإجراءات الحماية من كوفيد 19.

**الاستنتاج:** أظهرت الدراسة بأن نصف الممرضات لديهم معرفة جيدة حول الممارسة و تدابير الحماية من كوفيد -19 و أكثر من النصف لديهم ممارسه جيدة فيما يتعلق بإجراءات الحماية من كوفيد -19.

وصينا ادارة المستشفى أن تستمر في تدريب الممرضين ، و توفير جميع المعدات لتطبيق مكافحة العدوى و استخدام الاحتياطات الاحترازية.

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## List of Abbreviations

Symbols	Mean
WHO	World health organization
CDC	Center of disease control and prevention
FDA	Food and drug administration
EUA	Emergency use authorization
mRNA	Messenger ribo nucleic acid
COVID 19	Corona virus Disease 2019
SARS-CoV-2	Severe Acute Respiratory Syndrome Corona virus 2
URTI	Upper respiratory tract infection
MERSCOV	Middle East respiratory syndrome corona virus
PCR	Polymerase chain reaction
RRT	Random response technique
CT scan	Computed tomography
PR	Pulse rate
WBC	White blood cell count
Ph	Hydrogen ion concentration
LFT	Lung function test
AVPU	Alert 'verbal' painful' unresponsive (Neurological test)
SPO2	Pulse oximetry
Fio2	Fracture of inspired oxygen
Pao2	Oxygen pressure ;amount of o2 in arterial l blood
PEEP	Positive end expiratory pressure
ABG	Arterial blood gases
Hb	Hemoglobin
Qd	Once daily
Nih	National institute of health
PNS	Peripheral nervous system
ACIP	advisory committee on immunization practices
PT	Prothrombin Time
APTT	Activated partial thromboplastine Time
Kb	Kilobyte

## 1.1. Introduction:

Coronavirus disease (COVID-19) is an infectious viral disease caused by severe acute respiratory syndrome coronavirus 2, which basically originated from Wuhan city, China in December 2019<sup>(1)</sup>. This disease was originally classified under zoonotic disease which is transmitted from animal to human and human to human<sup>(2)</sup>.

COVID-19 is primarily transmitted from person to person through respiratory droplets; these droplets are released when someone with COVID-19 sneezes, coughs or talks<sup>(3)</sup>.

First emerged in December 2019, on 11th March 2020, it was declared a pandemic by the World Health Organization (WHO)<sup>(4)</sup>. By 6th April 2020, globally, there were more than 1.2 million confirmed cases of COVID-19 and 67,000 deaths across 209 countries, areas, or territories according to WHO updates<sup>(5)</sup>. As of June 28, 2021, there were around 182 million global cases of COVID-19. Around 166 million people had recovered from the disease, while there had been over 3.9 million deaths<sup>(6)</sup>.

In Africa, as of 18th April 2020, the CDC reported 19,895 confirmed cases, including 1,017 deaths and 4,642 recoveries, from 52 African countries, while two countries (Comoros and Lesotho) were still virus-free<sup>(7)</sup>. In 27 June 2021, there are 5,426,050 confirmed cases reported, 4,754,792 recoveries and 140,911 deaths<sup>(8)</sup>.

The COVID-19 has been reported in Sudan since 13 March 2020, and up to 3 July 2020, there had been 9,894 confirmed cases and 616 deaths, with a 6.6% case fatality rate<sup>(9)</sup>. In 27 June 2021, there had been 36,574 cases, 2,750 deaths and 30,423 recovered<sup>(10)</sup>.

In River Nile state, April 13 and 14, Sudan confirmed 13 new cases of COVID-19. One case is from Berber in the River Nile State<sup>(11)</sup>.

Standard recommendations to prevent the spread of COVID-19 include frequent cleaning of hands using alcohol-based hand rub or soap and water, covering the nose and mouth with a flexed elbow or disposable tissue when coughing and sneezing; and avoiding close contact with anyone that has a fever and cough <sup>(12)</sup>.

On December 11, 2020, the FDA granted emergency use (EUA) authorization to an mRNA COVID-19 vaccine developed by Pfizer and BIONTECH. One week later, the FDA granted EUA to an mRNA COVID-19 vaccine developed by Moderna. The Johnson and Johnson adenovirus vaccine was granted EUA by the FDA in late February 2021 <sup>(13)</sup>.

## **1.2. Problem statement**

The global outbreak of the SARS -COVID-2 virus has devastated economies and cause unprecedented challenges to the healthcare and food system around the world. Our research aim to increase nurses knowledge about COVID -19, improve knowledge of practice, and limited spread of covid-19.

### **1.3. Justification**

The nurses must have adequate knowledge and proper knowledge of practices of COVID-19 protective measure to protect them from COVID-19 with aim to improve quality of nurse's knowledge, knowledge of practice regarding COVID-19

## **1.4. Objectives**

### **1.4.1. General objective:**

- ❖ To assessment of nurses' staff knowledge, knowledge of practices regards protective measure of COVID -19 in ATBARA hospitals.

### **1.4.2. Specific objectives:**

- ❖ To assessment of nurses staff knowledge regards COVID -19 and protective measure.
- ❖ Evaluate of nurse's knowledge of practice toward COVID -19 protective measures.

## 2. Literature Review

**Corona virus disease (COVID-19):** is an infectious disease caused by a newly discovered corona virus <sup>(14)</sup>.

COVID-19 is a respiratory disease caused by SARS-CoV-2, a new corona virus discovered in 2019 <sup>(15)</sup>.

Corona viruses are non segmented, enveloped, positive-sense, single-strand ribonucleic acid viruses, belonging to the Corona viridae family <sup>(16)</sup>.

The novel corona virus disease 2019 (COVID-19) pandemic is considered a global epidemic and worldwide public health crisis that is causing serious illness and medical conditions in most infected people <sup>(17)</sup>.

Corona virus disease 2019 (COVID-19) is defined as illness caused by a novel corona virus now called severe acute respiratory syndrome corona virus 2 (SARS-CoV-2, formerly called 2019-nCoV, which was first identified amid an outbreak of respiratory illness cases in Wuhan City, Hubei Province, China<sup>(18)</sup>.

Corona virus: a type of common virus that infects humans, typically leading to an upper respiratory infection (URI.) <sup>(19)</sup>.

COVID-19 is a respiratory infectious disease caused by a new strain of corona virus that causes illness in humans <sup>(20)</sup>.

In 2003, a virus was identified in Guangdong province in China causing severe acute respiratory syndrome (SARS). Later on the virus was confirmed as a member of Beta-corona virus family and was named as SARS-COV. A decade later in 2012, a couple of Saudi Arabian nationals were identified to be infected with another corona virus which belongs to Beta ( $\beta$ ) corona virus family named as the Middle East respiratory syndrome corona virus (MERS-COV). In 2019, the novel COV caused the outbreak of a SARS-like illness in the Chinese city of Wuhan and was termed as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).<sup>(21)</sup>

In early December 2019, an outbreak of corona virus disease 2019 (COVID-19), caused by a novel severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), occurred in Wuhan City, Hubei Province, China. On January 30, 2020 the World Health Organization declared the outbreak as a Public Health Emergency of International Concern. As of February 14, 2020, (49,053) laboratory-confirmed and 1,381 deaths have been reported globally<sup>(22)</sup>.

Since the first patient admission was reported on December 12, 2019, and the first death of a Chinese national in early January 2020, travel-related cases began emerging in Thailand, Japan, South Korea, France, and the United States of America (USA) by mid-January. By the end of January, the novel corona virus had spread through the Western Pacific, South-East Asia, United state of america, Canada, Europe, and Eastern Mediterranean countries. This spread constituted a Public Health Emergency of International Concern (PHEIC). As of June 9, 2020, there were 7 039 918 confirmed cases with 404 396 deaths and 3 596 972 that recovered, globally <sup>(23)</sup>.

In March 2021 the American region accounted for the highest number of cases and deaths which was 2.2 million and 132 thousand respectively. The European region accounted for the second-highest confirmed cases and death which was approximately 2 million confirmed cases and 170 thousand deaths. The total number of confirmed cases and death in the Eastern Mediterranean region accounted for approximately 400 thousand and 11 thousand respectively <sup>(24)</sup>.

The global number of new cases reported last week (12-18 July 2021) was over 3.4 million, a 12% increase as compared to the previous week. Globally, COVID-19 weekly case incidence increased with an average of around 490 000 cases reported each day over the past week as compared to 400 000 cases reported daily in the previous week. Following a steady decline for over two

months, the number of weekly deaths reported was similar to the previous week, with almost 57 000 deaths reported.

The Region of the Americas and the European Region reported the highest weekly case incidence per capita, both reporting 95 new cases per 100 000 population, as well as the highest number of deaths per population over the past week, with 2.2 and 0.8 new deaths per 100 000 population, respectively. The Eastern Mediterranean and South-East Asia Regions reported 48 and 41 new cases per 100 000 population, respectively <sup>(25)</sup>.

Globally, as of, 6 August 2021, there have been 200,840,180 confirmed cases of COVID-19, including 4,265,903 deaths, reported to WHO <sup>(26)</sup>.

Since the first COVID-19 case in Africa was recorded on Feb. 14, 2020 in Egypt, there have been more than 1.1 million reported confirmed cases and more than 26,000 deaths across the continent. As of April 1, 2020 there were around 6,000 confirmed cases across all of Africa, with most countries having less than 100 cases <sup>(27)</sup>

15 July 2021 – Africa has recorded a 43% week-on-week rise in COVID-19 deaths. Fatalities increased to 6273 in the week ending on 11 July 2021 from 4384 deaths in the previous week. Africa is now less than 1% shy of the weekly peak reached in January when 6294 deaths were recorded. Namibia, South Africa, Tunisia, Uganda and Zambia accounted for 83% of the new deaths recorded in the past week. The continents case fatality rate, which is the proportion of deaths among confirmed cases, currently stands at 2.6% against the global average of 2.2% <sup>(28)</sup>

As of June 24, 2021, the number of confirmed COVID-19 cases in Africa amounted to 5,363,727 which represented around 2.97 percent of the infections around the world. People recovered from the disease. In the African continent, South Africa was the most drastically affected country, with more than 1.87 million infections. <sup>(29)</sup>

Since first case of COVID-19 reported in Sudan on 13 March 2020 and by 11 November 2020, there are 14,401 confirmed cases with 1,116 deaths and 9,535 recovered cases.

The highest number of confirmed cases were reported in Khartoum State 10,393 (72.2%), followed by Gezira state 1,214 (8.4%) . Regarding the total number of the death per the stat, Khartoum state has contributed the most in the country total deaths related to COVID-19 with 415 cases of death (37.18%), followed by Gezira state and North Darfur and the least one was Blue Nile state (0.08%).<sup>(30)</sup>

In Sudan there have been 37,138 infections and 2,776 corona virus- related deaths reported in the country since the pandemic began.<sup>(31)</sup>

The pandemic has had an impact on health services. Most of the public and private clinics were closed due to the high infection and mortality rates among healthcare providers<sup>(32)</sup>

In Sudan, from 3 January 2020 to 6 August 2021, there have been 37,138 confirmed cases of COVID-19 with 2,776 deaths, reported to WHO.<sup>(33)</sup>

The epidemiological data related to SARS-CoV-2 infection are constantly evolving and are daily updated in the corona virus disease (COVID-19) situation report of the WHO .According to a first study conducted in Wuhan, on a small cohort of 99 subjects, the infection was more likely to affect older males with co morbidities, in whom it induced the appearance of symptomatic episodes of serious or even fatal respiratory pathologies such as the acute respiratory distress syndrome. The data was confirmed by the major epidemiological study conducted by the Chinese Centre for Disease Control and Prevention, which found that the mortality rate grew from 0.2% in patients aged between 10 and 39 years to 14.8% in those over 80, and that the risk of death is greater among men (2.8%) than among women (1.7%).

Another lethality factor has been identified in the simultaneous presence of pre-existing diseases, especially cardiovascular ones, metabolic pathologies such as diabetes, chronic respiratory failure and hypertension.

However, among those who are in perfect health at the time of infection, the mortality rate is 0.9%. Furthermore, it has been shown that 80.9% of infections have no symptoms or a mild course, 13.8% severe, while 4.7% of those infected developed critical pathological symptoms with symptoms such as respiratory failure, septic shock or multi-organ failure .<sup>(34)</sup>

Corona viruses are frequent causes of the common cold, causing URTIs throughout the world, in all age groups, leading to millions of days of work and school absence, physician visits, and frequent inappropriate antibiotic<sup>(35)</sup>

Transmission of microbes among nurses is affected by hand disinfection, mask wearing, overcrowding, lack of single rooms for isolation, and is enhanced by the fact that some nurses have inadequate awareness of infection control practice<sup>(36)</sup>

In addition to the general life support care in emergency unit, till date there is no effective treatment that cure the disease, hence the crucial needs for strict compliance to the prevention measures recommended by the WHO, including maintaining self-hygiene and social distance of at least 6 feet, avoid the mass gathering and groups particularly in closed areas, and wearing the face mask.<sup>(37)</sup>

Healthcare systems, food systems, and economies are buckling under its strain. Lives have been turned upside down for multitudes and, for some, COVID-19 has caused a humanitarian tragedy.<sup>(38)</sup>

In fact, there is limited information regarding nurses' knowledge, attitudes, perceptions, and knowledge about the COVID-19 outbreak. Thus, it is crucial to understand what know about the virus, and their knowledge of pandemic complications and disease prevention nurses.<sup>(39)</sup>

**Mode of transmission:**

Respiratory infections can be transmitted through droplets of different sizes, when the droplet particles are  $>5\text{-}10\ \mu\text{m}$  in diameter they are referred to as respiratory droplets, and when they are  $<5\ \mu\text{m}$  in diameter, they are referred to as droplet nuclei. <sup>(40)</sup>

The principal mode by which people are infected with SARS-CoV-2 (the virus that causes COVID-19) is through exposure to respiratory fluids carrying infectious virus. Exposure occurs in three principal ways: inhalation of very fine respiratory droplets and aerosol particles, deposition of respiratory droplets and particles on exposed mucous membranes in the mouth, nose, or eye by direct splashes and sprays, and touching mucous membranes with hands that have been soiled either directly by virus-containing respiratory fluids or indirectly by touching surfaces with virus on them <sup>(41)</sup>

Broadly, two modes of transmission of COVID-19 exist—direct and indirect. The direct mode includes transmission via aerosols formed via surgical and dental procedures and/or in the form of respiratory droplet nuclei, other body fluids and secretions, for example, feces, saliva, urine, semen, and tears; and mother-to-child. Indirect transmission may occur via fomites or surfaces (e.g., furniture and fixtures) present within the immediate environment of an infected patient and objects used on the infected person (e.g., stethoscope or thermometer). <sup>(42)</sup>

.human-to-human via oral and respiratory aerosols and droplets with the virus-contaminated environment play a lesser role in the propagation of disease. <sup>(43)</sup>

The virus can spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing or breathe heavily. These liquid particles are different sizes, ranging from larger 'respiratory droplets' to smaller 'aerosols' <sup>(44)</sup>

The virus may also spread when a person touches another person (i.e., a handshake) or a surface or an object (also referred to as a fomite) that has the virus on it, and then touches their mouth, nose or eyes with unwashed hands (45)

The current literature suggests that SARS-CoV-2 is transmitted among the human population primarily through respiratory droplets and, to a lesser extent, via aerosols. Transmission appears to be affected by temperature, humidity, precipitation, air currents, pH, and radiation in the ambient environment. (46)

The incubation period between the ingestion of the virus and the onset of symptoms is 2 to 14 days (4 days on average). (47)

### **Path physiology:**

Corona viruses are enveloped, positive-sense, single-stranded RNA viruses of ~30 kb. They infect a wide variety of host species. They are largely divided into four genera;  $\alpha$ ,  $\beta$ ,  $\gamma$ , and  $\delta$  based on their genomic structure.  $\alpha$  and  $\beta$  corona viruses infect only mammals (48)

They have crown -like appearance under electron microscope (corona is the Latin term for crown) due to the presence of spike glycoprotein's on the envelope (49)

The genetic sequence of SARS - CoV-2 also shares > 80% and 50% sequence identity to SARS -Cov and MERS -CoV respectively. Thus, this finding indicates that the COVID -19 belongs to genus  $\beta$ -CoVs that infected human, bats and other wild animal (50)

Corona virus particles consist of a ;30-kb strand of positive sense RNA that forms the genome; this genome is coated with nucleocapsid (N) protein and enclosed in a lipid bi layer containing three membrane proteins: spike (S), membrane (M), and envelope (E). (51)

In the host, the life cycle of corona virus consists of 5 steps: 1) attachment, 2) penetration, 3) biosynthesis, 4) maturation, and 5) release. Once viruses bind

to host receptors (attachment), they enter host cells, particularly type II pneumocytes via endocytosis or membrane fusion (penetration).<sup>(52)</sup>

ACE2 (angiotensin \_converting enzyme ) has been identified as a functional receptor for SARS-COV and is highly expressed on the pulmonary epithelial cells. It is through this host receptor that the S protein binds initially to start the host cell invasion by the virus<sup>(53)</sup>

Host cell binding and entry are mediated by the S protein. The first step in infection is virus binding to a host cell through its target receptor. The S1 sub-unit of the S protein contains the receptor binding domain that binds to the peptidase domain of angiotensin-converting enzyme 2 (ACE 2). In SARS-CoV-2 the S2 sub-unit is highly preserved and is considered a potential antiviral target<sup>(54)</sup>

The release of the corona virus genome into the host cell cytoplasm upon entry marks the onset of a complex programmed of viral gene expression, which is highly regulated in space and time .newly produced genomic RNA results in budding into the lumen of secretory vesicular compartments. Finally, virions are secreted from the infected cell by exocytose<sup>(55)</sup>

The disease progression can be divided into three distinct phases: Early infection, phase, pulmonary phase, severe hyper inflammatory phase. During the early infection phase, the initial inflammatory response may cause local symptoms like throat irritation & dry cough and constitutional symptoms like fever, myalgia and headaches. Many patients may be asymptomatic. During this phase, the patient is infective and can transmit the disease.<sup>(56)</sup>

On binding to epithelial cells in the respiratory tract, SARS-CoV-2 starts replicating and migrating down to the airways and enters alveolar epithelial cells in the lungs. The rapid replication of SARS-CoV-2 in the lungs may trigger a strong immune response.<sup>(57)</sup>

Histo pathological studies in the lungs of patients who died from SARSCoV-2 infection demonstrated damages of pneumocytes with hyaline membrane

formation, interstitial lymphocyte infiltration, and multinucleated syncytial cells. Additionally, congestion of alveolar septal vessels with alveolar edema, infiltration of monocytes and lymphocyte in alveolar cavity and microthrombosis.<sup>(58)</sup>

Circulating virus can attack most vital organs (e.g., kidneys and heart). SARS-CoV-2 infected organs in the alimentary tract of the digestive system and in accessory organs i.e., salivary glands, liver, gallbladder, and pancreas. ACE2 is expressed in relatively high levels in duodenum, small and large intestines, rectum, as well as in gallbladder. Thus, following the consumption of contaminated food the virus likely reaches the stomach passively; the reported adverse effects in other accessory organs like liver or pancreas are probably the result of excessive nervous system as an infection route of SARS-CoV-2, ACE2, neuropilin-1 (NRP1) and CD147 that reportedly potentiate virus infectivity into the central nerves system.<sup>(59)</sup>

#### **Clinical manifestation:**

The Centers for Disease Control and Prevention (CDC) report that symptoms of COVID-19 typically appear 2–14 days Trusted Source after exposure to the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2,. The average incubation period appears to be roughly 5–6 days Trusted Source<sup>(60)</sup>

Most of the symptoms were mild to moderate and were easily managed by patients and their families at home. They experienced a mean of  $1.45 \pm 2.02$  symptoms, range from 0 to 9 symptoms. Ninety-four (42%) of them had no symptoms. Sixteen patients reported more than 5 symptoms. Fatigue was the most frequent symptom with a frequency of 39 (19.5%), and then dyspnea, weakness, and activity intolerance with a frequency of 37 (18.5%), 36 (18%), and 29 (14.5%) were reported respectively<sup>(61)</sup>

The Centers for Disease Control and Prevention (CDC) Trusted Source state that a person with COVID-19 can experience a wide range of symptoms, often including a dry cough and shortness of breath.

**They may also have a combination of at least two of the following symptoms:**

Fever, chills, repeated shaking with chills, muscle pain, headache, and sore throat, new loss of taste or smell.

**Other symptoms of COVID-19 may include Trusted Source:**

Blocked nose, diarrhea, sputum, or coughed up mucus and saliva, nausea

Vomiting, Fever, Doctors consider a temperature of 100.4°F or higher Trusted Source to be a fever, a person with a fever will feel hot to touch on their back or chest, Dry cough, A dry cough does not produce mucus.

According to the United Kingdom's National Health Service (NHS), if a person notices they are coughing a lot for over an hour, or they have three or more coughing episodes in a day, they may have corona virus.

Fatigue, Fatigue is a feeling of tiredness and an overall lack of energy. A person with fatigue may feel drained, weak, or sluggish.

Shortness of breath; is a subjective Trusted Source feeling. However, those experiencing shortness of breath may describe it feeling as if they are suffocating or unable to breath catch their <sup>(62)</sup>

The binary regression showed that there is no predictive variable for the severity of delayed symptoms based on different variables including demographic data, disease history, admission symptoms, Chest CT scan findings, and the treatment modalities.

**The most common things people who become ill with COVID-19 have included:**

Fever or chills, A dry cough and shortness of breath, Feeling very tired, Muscle or body aches, Headache, A loss of taste or smell, Sore throat, Congestion or runny nose, Nausea or vomiting, Diarrhea <sup>(63)</sup>

Signs to Watch for Based on what researchers have learned about COVID-19 thus far, the first symptoms which generally occur within seven days after

infection—can include the following, which are listed in order of their usual appearance:

Fever or chills, A persistent cough, Muscle pain, Nausea or vomiting, Diarrhea, Usually, COVID-19 symptoms are initially mild, and then Become more intense over the course of about seven days. With that said, it is important to understand that COVID-19 often does not produce noticeable symptoms. When it does, however, those are classic signs that should not be ignored. Additionally, some people experience:

Fatigue, Shortness of breath, Headache, A new loss of taste or smell, Sore throat, Nasal congestion or a runny nose.

If more people are able to spot the early signs of COVID-19, they can begin self-isolating sooner, when they are most contagious. Experts agree that is one of the most effective ways to minimize the spread of COVID-19, a highly infectious and dangerous virus, the long-term effects of which are still largely unknown.<sup>(64)</sup>

The most frequent delayed symptom was, fatigue, dyspnea, weakness, anxiety, and Activity intolerance, respectively (from 19.5% to 15%) and the other symptoms were in minimum range (from 1% to 8%). Fatigue was the most frequent delayed symptom<sup>(65)</sup>

The available limited evidence suggests that pregnant women do not show a greater risk of acquiring COVID-19 or having severe symptoms compared to other adults. But in general, pregnant women are more susceptible to viral respiratory infections such as the fulvous system.<sup>(66)</sup>

### **Diagnostic Test:**

Diagnostic testing to identify persons infected with severe acute respiratory syndrome related corona virus 2 (SARS-CoV-2) infections is central to control the global pandemic of COVID-19 that began in late 2019. In a few countries, the use of diagnostic testing on a massive scale has been a cornerstone of successful containment strategies. In contrast, the United

States, hampered by limited testing capacity, has prioritized testing for specific groups of persons. Real-time reverse transcriptase polymerase chain reaction based assays performed in a laboratory on respiratory specimens are the reference standard for COVID-19 diagnostics. <sup>(67)</sup>

The novel corona virus disease 2019 (COVID-19) was emergency turned into global public health after the first patients were detected in Wuhan, China, in December 2019. The disease rapidly expanded and led to an epidemic throughout China, followed by the rising number of cases worldwide. Given the high prevalence of COVID-19, rapid and accurate diagnostic methods are immediately needed to identify, isolate and treat the patients as soon as possible, decreasing mortality rates and the risk of public contamination by severe acute respiratory syndrome corona virus 2(SARS-CoV-2).

In terms of statistics, the frequency of symptoms revealed no difference, except for cough, dizziness, and weakness. Among initial vital signs, PR and O2 Saturation were statistically different between the two groups. Evaluation of co morbidities revealed no difference except for hyperlipidemia. In the comparison of laboratory findings, only WBC counts, lymphocyte count, and Hb were statistically different between the two groups. <sup>(68)</sup>

In response to the growing COVID-19 pandemic and shortages of laboratory-based molecular testing capacity and reagents, multiple diagnostic test manufacturers have developed and begun selling rapid and easy-to-use devices to facilitate testing outside of laboratory settings. These simple test kits are based either on detection of proteins from the COVID-19 virus in respiratory samples (e.g. sputum, throat swab) or detection, in blood or serum, of human antibodies generated in response to infection <sup>(69)</sup>.

There is no doubt about the importance of diagnostic testing in an emergency; specifically, which range of tests is available, where and when they are dispensed, and who might be tested using laboratory-developed tests, or other diagnostic tests including experimental tests. This includes testing for the

SARS-CoV-2 virus that causes the COVID-19 disease. Testing is essential to “flatten the curve” of the number of confirmed positive cases of the disease, in addition to hand washing, isolation, and social distancing, among other essential measures. Is one diagnostic test enough to obtain the correct decision about a confirmed positive outcome? <sup>(70)</sup>.

We suggest that patients with typical CT findings but negative RRT-PCR results should be isolated, and RRT-PCR should be repeated to avoid misdiagnosis. <sup>(71)</sup>

Over the course of the Covid-19 crisis, the importance of reliable, accessible testing to screen for the disease has become increasingly apparent. Tests for Covid-19 can be divided into antigen or antibody tests, both of which use different kinds of samples to search for different hallmarks of the SARS-CoV-2 virus. Medical Device Network takes a closer look at the different types of Covid-19 test.

Polymerase chain reaction (PCR) tests are sent away to a lab to diagnose disease Lateral flow tests (LFTs) can diagnose Covid-19 on the spot, but aren't as accurate as PCR tests Antibody (or serology) tests cant diagnose active infection, but they can help to tell if a person has immunity to Covid-19 PCR tests are used to directly screen for the presence of viral RNA, which will be detectable in the body before antibodies form or symptoms of the disease are present. This means the tests can tell whether or not someone has the virus very early on in their illness.

During Covid-19 PCR testing, substances known as reverse transcriptase or DNA polymerase are added to a nasopharyngeal sample in a lab. These substances work to make numerous copies of any viral RNA that may be present. This is so that enough copies of the RNA are present to signal a positive result, as specifically designed primers and probes attach themselves to sequences of the genetic code of the virus to signal that a pathogen has been found.

PCR gives us a good indication of who is infected; says University of Sussex senior lecturer in microbiology Dr Edward Wright. “They can be isolated and get in contact with people they’ve been in touch with so they can be quarantined too, just in case. That’s the true advantage of the current major diagnostic tests; you can break that transmission chain and get a clearer picture of what’s happening.”

By scaling PCR testing to screen vast swathes of nasopharyngeal swab samples from within a population, public health officials can get a clearer picture of the spread of a disease like Covid-19.

However, PCR still has its caveats. These types of Covid-19 test need to be sent away to a laboratory for analysis, meaning it can take days for people to find out their results.

False negatives can occur up to 30% of the time with different PCR tests, meaning they’re more useful for confirming the presence of an infection than giving a patient the all-clear. They can also provide false positive results, as they’re so sensitive they can potentially signal a positive result upon detecting dead, deactivated virus still present in the body of someone who has recovered from Covid-19.

Warwick Medical School honorary clinical lecturer Dr James Gill said: “During the course of the outbreak, the PCR testing has been refined from the initial testing procedures and with the addition of greater automation to reduce errors. As we are looking at swabs taken from people, who have lots of other organisms floating around, we are essentially dealing with the question of how ‘right’ the result we are looking at is.

LFTs are similar to PCR tests, in that they’re both types of antigen test, designed to pick up active Covid-19 infection rather than antibodies to the disease. With a Covid-19 LFT, a nasopharyngeal sample is placed on a small absorbent pad, which is then drawn along the pad via a capillary line to a strip

coated in antibodies, which bind to SARS-Cov-2 proteins. If these proteins are present, this will show as a colored line on the test, indicating infection.

The major benefit of LFTs over PCRs is that they do not need to be sent away for confirmation, and instead provide results within 15 to 30 minutes. However, what they gain in speed they sacrifice in accuracy.

A review of 64 studies from Europe and the US showed a wide variance in accuracy between different brands of LFT. The review also found that the tests were far better at identifying Covid-19 in people who had symptoms than those who did not. LFT sensitivity in symptomatic people ranged from 34% to 88%, with an average accuracy of 72%. In people without symptoms the LFTs correctly identified an average of 58% of those who were infected.

While the use of LFTs for mass asymptomatic screening has been encouraged in countries like the UK, experts have cast doubt on how useful these types of Covid-19 test really are in this context.

Wright says: “An antibody test tells us what proportion of the population has been infected. It won’t tell you who is infected, because the antibodies are generated after a week or two, after which time the virus should have been cleared from the system. But it tells you who’s been infected and who should be immune to the virus.”

A study published in the journal *Immunity* has found that people who recover from even mild cases of Covid-19 produce antibodies for at least five to seven months, and could do so for much longer.

Historical studies have indicated that people who survived the sudden acute respiratory syndrome (SARS) outbreak in the early 2000s had antibodies in their blood for years after recovery. Both SARS and Covid-19 are caused by similar corona viruses, so it’s not unreasonable to think that Covid-19 could have a similar effect.

“If there’s a high enough level of people in the population who have immunity, they will then stop this virus from circulating within the

population, which is known as herd immunity, and says Wright. If someone is infected, as long as the people around them have immunity the virus won't be able to spread.”

Unlike PCR tests, which commonly use swabs to detect Covid-19, blood samples are usually used for antibody tests. This is because there will be a very small amount of Covid-19 circulating in the blood compared to the respiratory tract, but a significant and measurable antibody presence in the blood following infection.

Antibody tests are being used to evaluate the immune responses in people who have been vaccinated against Covid-19. Researchers don't yet know how long vaccine-induced immunity will last or if booster shots will be needed. There has been some indication that Covid-19 variants are making certain vaccines less effective, but thus far they still appear to generally provide enough protection to guard against severe or fatal disease<sup>(72)</sup>

#### **Treatment protocol:**

The COVID-19 Treatment Guidelines have been developed to provide clinicians with guidance on how to care for patients with COVID-19. The National Institutes of Health (NIH) published guidelines on prophylaxis use, testing, and management of patients with COVID-19.<sup>(73)</sup> The U.S. Food and Drug Administration (FDA) have approved remdesivir (Veklury) for the treatment of COVID-19 in certain situations. Clinical management of COVID-19 includes infection prevention and control measures and supportive care, including supplemental oxygen and mechanical ventilator support when indicated.<sup>(74)</sup>

#### **General treatment:**

Letting patients rest in bed and strengthening support therapy; ensuring sufficient caloric intake for patients; monitoring their water and electrolyte balance to maintain internal environment stability; closely monitoring vital signs and oxygen saturation.

According to patients' conditions, monitoring blood routine result, urine routine result, C - reactive protein (CRP), biochemical indicators (liver enzyme, myocardial enzyme, renal function etc.), coagulation function, arterial blood gas analysis, chest imaging and Cytokines detection if necessary.

Timely providing effective oxygen therapy, including nasal catheter and mask oxygenation and nasal high-flow oxygen therapy. If possible, inhalation of mixed hydrogen and oxygen (H<sub>2</sub>/O<sub>2</sub>: 66.6%/33.3%) can be applied.

Antiviral therapy: Hospitals can try Alpha-interferon (5 million U or equivalent dose each time for adults, adding 2ml of sterilized water, atomization inhalation twice daily),

lopinavir/ritonavir (200 mg/50mg per pill for adults, two pills each time, twice daily, no longer than 10 days), Ribavirin (suggested to be used jointly with interferon or lopinavir/ritonavir, 500 mg each time for adults, twice or three times of intravenous

injection daily, no longer than 10 days), chloroquine phosphate (500 mg bid for 7 days for adults aged 18-65 with body weight over 50 kg; 500 mg bid for Days 1&2 and 500 mg qd<sup>(75)</sup>)

Dexamethasone and other corticosteroids (prednisone, methylprednisolone) are potent anti-inflammatory drugs. They are readily available and inexpensive. The NIH COVID-19 treatment guidelines recommend the use of dexamethasone in certain people hospitalized with severe COVID-19. The recommendation was based on results from the RECOVERY trial. In the study, more than 6000 patients hospitalized with COVID-19 randomly received either dexamethasone or standard treatment. Patients who required supplemental oxygen or ventilators and who received dexamethasone were less likely to die within 28 days than those who received standard care. Dexamethasone did not have a benefit in patients who did not need respiratory support.

Hydroxychloroquine / Chloroquine (HCQ/CQ) and Lopinavir + Ritonavir arms of the Solidarity Trial were discontinued. There is strong recommendation against administering these products to COVID-19 patients. In contrary, Corticosteroids were identified as lifesaving medicines, substantially reducing mortality for critically ill patients. This study aimed at checking the alignment of countries' COVID-19 treatment protocols in the WHO African region with the WHO recommendations, and analyzes their impact on supply chain and quality of care <sup>(76)</sup>

### **Medical management:**

Paracetamol 500 mg IV /6 hrs, Hydroxychloroquine 500 mg every 12 hrs, N acetyl cysteine vial 20% IV 3 cc over 20 ml intravenous over 10 min every 6 hrs,

Meropenem 1 gram intravenous every 8 hrs, Levofloxacin 500 mg intravenous every 24 hrs, Oseltamivir 150 mg oral every 12 hrs for 10 days <sup>(77)</sup>

Symptomatic support– antipyretics for fever, hydration and rest.

Supplemental vitamin C 1000 units daily, Vitamin D 25 microgram daily (1000U), Zinc 15mg daily, Black seed (Nigella Sativa) 2 gm (tea spoon)and Honey (2 table spoon).

For diabetic patients: Black seed (Nigella Sativa) 2gm (tea Spoon), Honey: 5ml (tea spoon) and warm water (1 cup Check suitability for home isolation(checklist and hand-out)<sup>(78)</sup>

### **Nursing care plan:**

#### **Nursing Assessment:**

Assessment is the first step in the care of COVID 19 patients which involves critical thinking skills, clinical judgment, risk identification, history, physical examination and appropriate decision making strategies by the nurses.

History of:-

International travel in the last 14 days, Migration and return from one place to other, Contacts with laboratory confirmed cases, Hotspots/containment zones.<sup>(79)</sup>

Nurses are the frontline health care providers, who are involved in triage and sorting patients infected with SARS-CoV-2 based on the severity and history of the disease. They can use case definition, contact exposure definition<sup>13</sup> and the ABCDE history approach<sup>14</sup> given by WHO.

#### Airway (A)

Ensure the patency of airway while talking to the patient

Assess for dyspnea, abnormal breathing, sounds, cough and sputum

Expectoration.

#### Breathing (B)

Assess for tachypnea (>20/ min), dyspnea, abnormal breathing, sounds, cough

And sputum expectoration.

Measure oxygen saturation (SpO<sub>2</sub>>96%)

#### Circulation (C)

Assess for cyanosis, capillary refill time (<2 sec)

Assess tachycardia (>100 beats/min) and BP

Assess for any signs of shock (hypotension, tachycardia etc.)

#### Disability (D)

Assess the level of consciousness using AVPU, pupillary reflex

Previous history of any co-morbidity, drug intake history of fever, headache, coughing and malaise

Measure blood glucose level

#### Exposure (E)

Assessing for contact history as defined by WHO: <sup>13</sup>Exposures during 2 days before and the 14 days after the onset of symptoms.<sup>(80)</sup>

**Physical examination:**

Lung auscultation is controversial, as stethoscopes can be fomites that carry disease. Some providers have advocated foregoing lung auscultation in patients with suspected COVID-19 who will be having imaging. In general, patients with COVID-19 have bilateral findings on examination. Skin findings (rashes and “COVID toes”) and neurologic findings (altered mental status, dizziness, headache, and loss of taste/smell) can also be found.<sup>(81)</sup>

**Nursing Diagnosis:**

Difficulty in breathing related to disease condition as evidenced by  
Increased respiratory rate, cough, decreased oxygen saturation and  
Use of accessory muscles.

**Goal**

1. To reduce breathing difficulty
2. To promote patient comfort

**Nursing Interventions:**

Assess for signs of difficulty in breathing such as changes in respiratory rate, breathing pattern, bilateral air entry, breathing difficulty, SpO<sub>2</sub> level and PaO<sub>2</sub>/FiO<sub>2</sub> ratio or SpO<sub>2</sub>/FiO<sub>2</sub> ratio.

Provide propped up position

Monitor vital signs frequently

Provide humidified oxygen to the patient and titrate it to maintain SpO<sub>2</sub> level of >90%. Antitussive drugs may be administered to the patients to relieve cough as prescribed.

Maintain hydration of the patient as well as avoid fluid overload to prevent pulmonary congestion.

Provide ventilator support if needed.

Monitor ventilator settings. Keep low tidal volume (4-8ml/kg predicted body weight), low inspiratory pressure (< 30 cm H<sub>2</sub>O) and high PEEP (10-15 mmHg).

Suction as and when needed taking all the necessary droplet and aerosol precautions. Use closed suctioning system only.

Monitor ABG and assess for any deviation.

- Reassess the condition of the patient for monitoring the effect of intervention done.<sup>(82)</sup>

### **Complication of COVID 19:**

#### **Complications of COVID-19 respiratory systems:**

Respiratory failure and acute respiratory distress syndrome (ARDS) are the most common complications of severe COVID-19 infection<sup>(83)</sup>

##### **❖ Acute respiratory failure:**

When you have acute respiratory failure, your lungs might not pump enough oxygen into your blood or might not take enough carbon dioxide out. Both of these problems can happen at the same time.<sup>(84)</sup>

##### **❖ COVID-19 Pneumonia:**

In pneumonia, the lungs become filled with fluid and inflamed, leading to breathing difficulties. For some people, breathing problems can become severe enough to require treatment at the hospital with oxygen or even a ventilator.<sup>(85)</sup>

##### **❖ Sepsis:**

Is a life-threatening systemic illness associated with a dys regulated host response due to invasion of the bloodstream by pathogen, such as bacteria, viruses, fungi or parasites<sup>(86)</sup>

Signs of multi-organ injury typical of sepsis occur in approximately 2-5% of those with COVID-19 after approximately 8-10 days.<sup>(87)</sup>

##### **❖ Acute respiratory distress syndrome:**

There is a direct correlation between COVID 19 and ARDS, severe cases of COVID 19 infection leads to ARDS and pneumonia, which can prove to be fatal for the infected individual. Acute Respiratory Distress Syndrome causes dry cough, heavy breathing, breathing difficulties and increased heart rate.<sup>(88)</sup>

### ❖ **Pulmonary embolism:**

Pulmonary embolism is not a well-established complication of acute respiratory distress syndrome (ARDS), yet the critical illness and accompanied prolonged hospital stay represents a hypercoagulable state in general. <sup>(89)</sup>

### ❖ **Super infection:**

Galiatsatos notes that when a person has COVID-19, the immune system is working hard to fight the invader. This can leave the body more vulnerable to infection with another bacterium or virus on top of the COVID-19 — a super infection. More infection can result in additional lung damage <sup>(90)</sup>.

### ❖ **Post COVID 19 syndrome:**

Post-acute COVID-19, a syndrome characterized by persistent symptoms and/or delayed or long-term complications beyond 4 weeks from the onset of symptoms <sup>(91)</sup>

### **Complications of COVID-19 in cardiovascular systems:**

Cardiovascular complications, such as acute myocardial injury and myocarditis, cardiac fibrosis, arrhythmias, endothelial dysfunction, dysautonomia, and thrombotic events, may also contribute to overall morbidity and mortality of COVID-19 patients <sup>(92)</sup>

### **Myocardial Infarction and COVID-19:**

In COVID-19 patients, cardiac damage occurs in many ways. Infection, inflammation, and fever make the blood more prone to clotting and interfere with the body's ability to dissolve clots <sup>(93)</sup>

### **Gastrointestinal complications:**

Critically ill patients with COVID-19 often develop gastrointestinal complications during their hospital stay, including bowel ischemia, transaminitis, gastrointestinal bleeding, pancreatitis, Ogilvie syndrome, and severe illness. <sup>(94)</sup>

- ❖ GI ischemia is an uncommon medical condition and results from any etiology that leads to bowel hypo perfusion' Recent studies suggest that the possible coagulopathy or vasculopathy caused by COVID-19 may increase the risk of thromboembolic events and associated ischemia <sup>(95)</sup>
- ❖ Acute liver injury and elevated transaminases — nearly two-thirds of patients with severe COVID-19 develop elevated liver transaminases. <sup>(96)</sup>
- ❖ Acute cholecystitis — acute cholecystitis has been widely reported in patients with COVID-19, especially those who are critically <sup>(97)</sup>

### **Neurological complications of COVID 19:**

Neurological complications in COVID-19 infected patients have not been widely reported. Since elderly patients with chronic medical conditions are at an increased risk of altered mental status in the setting of acute infections, patients with COVID-19 infection can also present with acute encephalopathy and changes in their level of consciousness <sup>(98)</sup>

These neurological complications manifest as CNS-related Complications, such as dizziness, headache, impaired consciousness, acute cerebro vascular disease

Ataxia, and seizure, or as PNS manifestations, such as loss of taste and smell, vision impairment, and nerve pain, as well as skeletal muscular injury <sup>(99)</sup>

Delirium and coma are diagnosed in more than 50% and 80% of patients admitted to the intensive care unit (ICU) with COVID-19 <sup>(100)</sup>

### **Hematological complications:**

COVID-19 can commonly be complicated with acute thrombotic events, including venous thromboembolism, acute stroke, acute myocardial infarction, clotting of hemodialysis and extracorporeal membrane oxygenation (ECMO) catheters, and acute limb ischemia. <sup>(101)</sup>

Hypercoagulability is common among hospitalized COVID-19 patients. Elevated D-Dimer levels are consistently reported, whereas their gradual increase during disease course is particularly associated with disease

worsening. Other coagulation abnormalities such as PT and APTT prolongation, fibrin degradation products increase, with severe thrombocytopenia lead to life-threatening <sup>(102)</sup>

### **Reproductive systems complications:**

The SARS-CoV-2 employs the angiotensin-converting enzyme 2 (ACE2) receptor in the renin-angiotensin system (RAS) for viral entry. The ACE2 receptor is present in the reproductive system, and reports of multi-organ involvement have led to uncertainty regarding COVID-19's effects on the reproductive system and fertility .

The virus was also recovered from the placenta of COVID-19 positive women and some studies have shown the possibility of vertical transmission, potentially leading to pregnancy complications.

The high expression of ACE2 on the surface of spermatogonia and supporting cells in the testes, as well as the immune response caused by COVID-19, can lead to testicular spermatogenesis dysfunction and reduced sperm count <sup>(103)</sup>

### **Urinary systems complications:**

Signs of kidney problems in patients with COVID-19 include high levels of protein in the urine and abnormal blood work. The kidney damage is, in some cases, severe enough to require dialysis.

Acute kidney injury (AKI) is defined as increased serum creatinine level (by 0.3 mg/dL within 48 h or > 1.5 times from its baseline level) or decreased urine output (< 0.5 mL/kg/h for 6 h) according to the Kidney Disease Improving Global Outcomes guideline. <sup>(104)</sup>

### **Musculoskeletal complications:**

Myalgia, defined as muscle aches and pain, has been frequently reported in COVID-19 patients with a prevalence ranging from 11 to 50% in large cohort studies. Myositis broadly refers to inflammation of muscles and is associated with SARS-CoV-2 as well <sup>(105)</sup>

**Prevention measures:**

Preventive measures are the current strategy to limit the spread of cases. Early screening, diagnosis, isolation, and treatment are necessary to prevent further spread. <sup>(106)</sup>

The majority of the health professionals prevented themselves and others who came to the health facility by using personal protective equipment (PPEs) (facemask ‘glove, and gown), frequently washing hands with soap and water. They continuously maintained recommended physical distance as needed, distance beds in the ward <sup>(107)</sup>

The WHO recommends prevention of spread by protecting health care workers (HCWs) and patients close contacts. Primary preventive measures include regular hand washing, social distancing, and respiratory hygiene (covering mouth and nose while coughing or sneezing). <sup>(108)</sup>

In July 2021, the CDC advised all people - vaccinated and unvaccinated - to wear masks in public indoor places, in areas with substantial or high transmission of the virus. The CDC has always advised unvaccinated people to mask indoors, and also advises anyone at increased risk to wear a mask indoors, regardless of the level of community transmission. The change in guidance for people who are fully vaccinated was made amidst increasing numbers of infections and hospitalizations across the country. <sup>(109)</sup>

Wash your hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing.

If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry. <sup>(110)</sup>

People with symptoms of acute respiratory infection should practice cough etiquette (maintain distance, cover coughs, and sneezes with disposable tissues or clothing, and wash hands) within healthcare facilities, enhance

standard infection prevention and control practices in hospital, especially in emergency departments. <sup>(111)</sup>.

Wearing medical masks is one of the prevention measures to limit spread of certain respiratory diseases, including the corona virus in affected areas. However, the use of a mask alone is insufficient to provide the adequate level of protection and other equally relevant measures should be adopted. Masks should be worn by persons displaying symptoms of respiratory illness. <sup>(112)</sup>.

Individual social distancing measures (e.g. avoiding shaking hands and kissing and avoiding crowded transports and nonessential meetings and mass gatherings) should be recommended at organizational, national unit as preventive Measure.

Additional steps include school and day care measures or closures, measures at the workplace, and measures related to mass gatherings. <sup>(113)</sup>

Maintain at least 1 meter (3 feet) distance between yourself and anyone who is coughing or sneezing. <sup>(114)</sup>

Avoid touching your face SARS-CoV-2 can live on some surfaces for up to 72 hours. You can get the virus on your hands if you touch a surface like: gas pump handle your cell phone a doorknob.

Avoid touching any part of your face or head, including your mouth, nose, and eyes. Also avoid biting your fingernails. This can give SARS-CoV-2 a chance to go from your hands into your body.

Stop shaking hands and hugging people — for now similarly, avoid touching other people. Skin-to-skin contact can transmit SARS-CoV-2 from one person to another.

Do not share personal items like: phones\_makeup\_combs

It's also important not to share eating utensils and straws. Teach children to recognize their reusable cup, straw, and other dishes for their own use only <sup>(115)</sup>

Viruses can survive on furniture surfaces, such as door handles or tables, for two weeks. If you are unsure whether you should touch the surface, start with these two steps: cleaning and sanitizing. We recommend cleaning and sanitizing in a 25-foot circle <sup>(116)</sup>

**Vaccine:**

COVID-19 vaccine is a vaccine intended to provide acquired immunity against severe acute respiratory syndrome coronavirus 2 (SARSCoV2).<sup>(117)</sup>

Profile of vaccine developers, of the confirmed active vaccine candidates, 56 (72%) are being developed by private/industry developers, with the remaining 22 (28%) of projects being led by academic, public sector and other non-profit organizations. Although a number of large multinational vaccine developers (such as Janssen, Sanofi, Pfizer and GlaxoSmithKline) have engaged in COVID-19 vaccine development, many of the lead developers are small and/or inexperienced in large-scale vaccine manufacture. So, it will be important to ensure coordination of vaccine manufacturing and supply capability and capacity to meet demand. Most COVID-19 vaccine development activity is in North America, with 36 (46%) developers of the confirmed active vaccine candidates compared with 14 (18%) in China, 14 (18%) in Asia (excluding China) and Australia, and 14 (18%) in Europe . Additional vaccine development efforts have been reported for China.<sup>(118)</sup>

The vaccines are widely credited for their role in reducing the spread, severity, and death caused by COVID-19. several COVID-19 vaccines have demonstrated efficacy as high as 95% in preventing symptomatic COVID-19 infections. <sup>(119)</sup>

nucleocapsid (N) protein. However, our in-depth literature analysis suggests that TH17 responses may direct these cellular responses, following immunization with inactivated viruses and vaccines delivered in virus vectors, and other key elements. In part, this evidence includes the link between TH17 cell development and IL-6, a cytokine strongly up regulated in patients with

COVID-19 who experience cytokine storm (together with IL-8 induction). Further support comes from the role of IL-17 in promoting the activation, recruitment from bone marrow and extravasations of eosinophils into target organs, such as the lungs <sup>(120)</sup>

Response/coronavirus-disease-2019-covid-19/pfizer-biontech-covid-19-vaccine Updated on 17 March 2021 to reflect the fact that WHO has listed two versions of the AstraZeneca/Oxford COVID-19 vaccine for emergency use. A further update was made on 19 April 2021 to reflect the latest WHO Global Advisory Committee on Vaccine Safety statement.

COVID-19 vaccine distribution began in the United States on Dec. 14, more than 334 million doses have been administered, fully vaccinating over 159 million people or 48% of the total U.S. population <sup>(121)</sup>

The corona virus disease 2019 (COVID-19) pandemic has spread to all 55 countries in Africa. The prevalence is highly heterogeneous, and the majority of cases are asymptomatic. Several factors are thought to explain heterogeneity of COVID-19 in Africa, including the level of containment measures, demographic aspects, climate and environmental factors, host genetics and immune factors. Here, we discuss the prevalence of COVID-19 in Africa, the status of serological studies, COVID-19 and co morbidities, as well as the spread of SARS-CoV-2 variants and the status of vaccine roll-outs in Africa.

KHARTOUM, 3 March 2021 Sudan has become the first country in the Middle East and North Africa (MENA) region to receive vaccines against COVID-19 from the COVAX facility today. Over 800,000 doses of the AstraZeneca vaccine touched down at the Khartoum In tee (World Health Organization) draft landscape of COVID-19 vaccines, around 64 vaccine candidates are in clinical assessment. So far, WHO has approved five vaccines; Pfizer, AstraZeneca, Johnson & Johnson, Moderna, and

Sinopharm. Although vaccine technology is proposed to be safe, the adverse effects of the vaccines are not yet fully characterized. <sup>(122)</sup>

In December 11, 2020, the U.S. Food and Drug Administration issued the first emergency use authorization (EUA) for a vaccine for the prevention of corona virus disease 2019 (COVID-19) caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) in individuals 16 years of age and older. On May 10, 2021, the FDA expanded the emergency use authorization for the Pfizer -BioN Tech COVID-19 Vaccine to include adolescents 12 through 15 years of age. While vaccine supplies are limited, it is recommended that priority be given to health workers at high risk of exposure and older people, including those aged 65 or older.

Vaccination is recommended for persons with co morbidities that have been identified as increasing the risk of severe COVID-19, including obesity, cardiovascular disease, respiratory disease and diabetes. Although further studies are required for persons living with HIV or auto-immune conditions or who are immunocompromised, people in this category who are part of a group recommended for vaccination may be vaccinated after receiving information and counseling.

Vaccination can be offered to people who have had COVID-19 in the past. But individuals may wish to defer their own COVID-19 vaccination for up to six months from the time of SARS-CoV-2 infection, to allow others who may need the vaccine more urgently to go first, can be offered to breastfeeding women if they are part of a group prioritized for vaccination. WHO does not recommend discontinuation of breastfeeding after vaccination, While pregnancy puts women at higher risk of severe COVID-19, very little data are available to assess vaccine safety in pregnancy, Pregnant women may receive the vaccine if the benefit of vaccinating a pregnant woman outweighs the potential vaccine risks, For this reason, pregnant women at high risk of exposure to SARS-CoV-2 (e.g. health workers) or who have co morbidities

which add to their risk of severe disease, may be vaccinated in consultation with their health care provider .

People with a history of severe allergic reaction to any component of the vaccine should not take it and not recommended for persons younger than 18 years of age.

On June 25, 2021, Prof, The scientists who developed the Pfizer/BioNTech Covid-19 vaccine are a Turkish-German power couple. Covid-19: Pfizer vaccine efficacy was 52% after first dose and 95% after second dose,

On December 12, 2020, ACIP voted 11–0 (three recusals) in favor of the interim recommendation for use of Pfizer-BioNTech COVID-19 vaccine. Three ACIP members recused themselves because of participation in clinical trials and/or other studies involving companies producing COVID-19 vaccines

Vaccination with the Pfizer-BioNTech COVID-19 vaccine consists of 2 doses (30 µg, 0.3 mL each) administered intramuscularly, 3 weeks apart. On December 12, 2020, the Advisory Committee on Immunization Practices (ACIP) issued an interim recommendation\* for use of the Pfizer-BioNTech COVID-19 vaccine in persons aged  $\geq 16$  years for the prevention of COVID-19.

The most commonly reported side effects, which typically lasted several days, were pain at the injection site, tiredness, headache, muscle pain, chills, joint pain, and fever. Of note, more people experienced these side effects after the second dose than after the first dose, so it is important for vaccination providers and recipients to expect that there may be some side effects after either dose, but even more so after the second dose. .

Allergic reactions including anaphylaxis after receipt of the first dose of Pfizer-BioNTech COVID-19 vaccine United States, December 1423, 2020, During December 1423, 2020, monitoring by the Vaccine Adverse Event Reporting System detected 21 cases of anaphylaxis after administration of a

reported 1,893,360 first doses of the Pfizer-BioNTech COVID-19 vaccine (11.1 cases per million doses); 71% of these occurred within 15 minutes of vaccination.<sup>(123)</sup>

The WHO Strategic Advisory Group of Experts on Immunization (SAGE) has issued interim recommendations for use of the Oxford/AstraZeneca COVID-19 vaccine. Prof Sarah Gilbert: The woman who designed the Oxford vaccine 23 November 2020.

The recommended dosage is two doses given intramuscularly (0.5ml each) with an interval of 8 to 12 weeks. The AZD1222 vaccine against COVID-19 has an efficacy of 63.09% against symptomatic SARS-CoV-2 infection. Longer dose intervals within the 8 to 12 weeks range are associated with greater vaccine efficacy.

In the meantime, we must maintain and strengthen public health measures that work: masking, physical distancing, hand washing , respiratory and cough hygiene, avoiding crowds, and ensuring good ventilation.

As of 19 April 2021, the AstraZeneca vaccine is safe and effective at protecting people from the extremely serious risks of COVID-19, including death, hospitalization and severe disease. Read the 16 April 2021 statement of the WHO Global Advisory Committee on Vaccine Safety on AstraZeneca COVID-19 vaccine, which covers reports of very rare side effects.

According to the vaccine safety profile within the product information, the most common side effects include mild-to-moderate symptoms of one or more of the following:

Headache (52.6%), Fatigue (53.1%), Muscle or joint pain (44% or 26.4%), Fever (33.6%), Chills (31.9%), Nausea (21.9%),

The percentages are based on reports from four clinical trials with a total of 23,745 participants.

Individuals also commonly reported pain and irritation at the site of the vaccine injection.

Additionally, an allergic reaction to certain ingredients in the vaccine may occur. Symptoms of an allergic reaction may include hives, a rash, swelling, and respiratory symptoms.

There have also been a few cases of anaphylaxis, which refers to a severe and potentially life threatening allergic reaction. However, anaphylaxis is a very rare event

All the side effects listed above are similar to those associated with other vaccines, as the Centers for Disease Control and Prevention (CDC) indicate for the Pfizer-BioNTech and Moderna vaccines.

Potential risk of Guillain-Barré syndrome

Due to reports that some people who have received the Oxford-AstraZeneca vaccine have developed Guillain-Barré syndrome, on July 9, 2021 the EMA recommended that a warning be added to the vaccines label to reflect this potential risk.

Guillain-Barré syndrome is a neurological disorder characterized by the immune system misfiring and mistakenly attacking the myelin sheath the protective layer that insulates nerve cell endings, called axons. This causes muscle weakness and paralysis. However, despite the recommendation it issued, the EMA specified that it is not yet able to conclude

Beyond all doubt that the Oxford-Astra-Zeneca vaccine directly causes this neurological disorder<sup>(124)</sup>

### **Modrena:**

On December 18, 2020, the U.S. Food and Drug Administration issued an emergency use authorization (EUA) for the second vaccine for the prevention of corona virus disease 2019 (COVID-19) caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2). On June 25, 2021, the FDA revised the patient and provider fact sheets regarding the suggested increased risks of myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the tissue surrounding the heart) following vaccination. On August 12,

2021, the FDA amended the Moderna COVID-19 Vaccine EUA to allow for an additional dose to be given to certain immunocompromised individuals. The emergency use authorization allows the Moderna COVID-19 Vaccine to be distributed in the U.S for use in individuals 18 years of age and older<sup>(125)</sup>

Moderna, is an American pharmaceutical and biotechnology company based in Cambridge, Massachusetts. It focuses on vaccine technologies based on messenger RNA (mRNA).<sup>(126)</sup> The Moderna COVID-19 Vaccine contains the following ingredients: messenger ribonucleic acid (mRNA), lipids (SM-102, polyethylene

Glycol [PEG] 2000 dimyristoyl glycerol [DMG], cholesterol, and 1,2-distearoyl-sn-glycero-3-phosphocholine [DSPC]), tromethamine, tromethamine hydrochloride, acetic acid, sodium acetate trihydrate, and sucrose.<sup>(127)</sup>

MRNA vaccines are a new type of vaccine to protect against infectious diseases.

MRNA vaccines teach our cells how to make a protein—or even just a piece of a protein—that triggers an immune response inside our bodies.

The benefit of mRNA vaccines, like all vaccines, is those vaccinated gain protection without ever having to risk the serious consequences of getting sick with COVID-19.<sup>(128)</sup>

The Moderna COVID-19 Vaccine is a suspension for intramuscular injection administered as a series of two doses (0.5 mL each) 1 month apart.<sup>(129)</sup>

### **Common Side Effects**

The most commonly reported side effects, which typically lasted several days, were pain at the injection site, tiredness, headache, muscle pain, chills, joint pain, and swollen lymph nodes in the same arm as the injection, nausea and vomiting, and fever. Of note, more people experienced these side effects after the second dose than after the first dose, so it is important for vaccination

providers and recipients to expect that there may be some side effects after either dose, but even more so after the second dose.<sup>(130)</sup>

Cases of myocarditis and pericarditis in adolescents and young adults have been reported more often after getting the second dose than after the first dose of one of the two mRNA COVID-19 vaccines, Pfizer-BioNTech or Moderna. These reports are rare and the known and potential benefits of COVID-19 vaccination outweigh the known and potential risks, including the possible risk of myocarditis or pericarditis.

If you have had a severe allergic reaction (anaphylaxis) or an immediate allergic reaction, even if it was not severe, to any ingredient in an mRNA COVID-19 vaccine (such as polyethylene glycol), you should not get an mRNA COVID-19 vaccine.

If you had a severe or immediate allergic reaction after getting the first dose of an mRNA COVID-19 vaccine, you should not get a second dose of either of the mRNA COVID-19 vaccines (Moderna or Pfizer-BioNTech).

A severe allergic reaction is one that needs to be treated with epinephrine or EpiPen or with medical care. Learn about common side effects of COVID-19 vaccines and when to call a doctor.

An immediate allergic reaction means a reaction within 4 hours of getting the shot, including symptoms such as hives, swelling, or wheezing (respiratory distress).<sup>(131)</sup>

**Johnson:**

On April 23, CDC and the U.S. Food and Drug Administration (FDA) recommended use of Johnson & Johnson's Janssen (J&J/Janssen) COVID-19 Vaccine resume in the United States after a temporary pause.<sup>(132)</sup>

Johnson & Johnson (the Company) today announced that the U.S. Food and Drug Administration (FDA) has issued Emergency Use Authorization (EUA) for its single-dose COVID-19 vaccine, developed by the Janssen

Pharmaceutical Companies of Johnson & Johnson, to prevent COVID-19 in individuals 18 years of age and older<sup>(133)</sup>

Initially, the Johnson & Johnson vaccine was shown to produce antibodies against SARS-CoV-2 in 90% of people who received it after the first dose. The amount of antibodies was greater for those who received 2 doses of the vaccine. Data released by Johnson & Johnson suggest that 1 dose of vaccine was 66% effective in preventing moderate to severe COVID-19 and 100% effective in preventing COVID-19–related hospitalization and death. These data are being reviewed by the US Food and Drug Administration to consider whether to grant an Emergency Use Authorization (EUA) to allow use of this vaccine.<sup>(134)</sup>

The Janssen COVID-19 Vaccine will be given to you as an injection into the muscle. The Janssen COVID-19 Vaccine vaccination schedule is a single dose.<sup>(135)</sup>

Vaccine is recommended for people 18 years and older  
19-The J&J/Janssen COVID

19-Learn more about how CDC is making COVID  
recommendations<sup>(136)</sup>

#### WHO SHOULD NOT GET THE JANSSEN COVID-19 VACCINE?

You should not get the Janssen COVID-19 Vaccine if you: had a severe allergic reaction to any ingredient of this vaccine.<sup>(137)</sup>

#### **Possible Side Effects:**

In the arm where you got the shot:

Pain, Redness, Swelling

Throughout the rest of your body:

Tiredness, Muscle pain, Headache, Chills, Fever, Nausea.

This side effect happens within day or two of getting the vaccine. They are normal signs that your body is building protection and should go away with in

few days after vaccination. Fainting or anxiety like rapid breathing, fainting (syncope)

and other events that may be low blood pressure, numbness, or tingling after getting any vaccine. Although uncommon, these events are not expected, and they are generally not serious.

According to information from the Vaccine Adverse Event Reporting System (VAERS), there were 653 reports of fainting events (fainting and near-fainting) among nearly 8 million doses of J&J/Janssen COVID-19 Vaccine administered in the United States in March and April 2021. This translates to a rate of about 8 fainting events for every 100,000 doses of the J&J/Janssen COVID-19 Vaccine given. These events occurred during the recommended 15-minute wait after vaccination. It's not clear at this time whether these events were associated with the vaccine or with anxiety, possibly related to pre-existing concerns some people who chose to get the J&J/Janssen COVID-19 Vaccine may have about needles or shots. By comparison, the rate of fainting after flu vaccination in 2019 was 0.05 per 100,000 doses. The J&J/Janssen COVID-19 Vaccine was 66.3% effective in clinical trials (efficacy) at preventing laboratory-confirmed COVID-19 infection in people who received the vaccine and had no evidence of being previously infected. People had the most protection 2 weeks after getting vaccinated.

In the clinical trials, the vaccine had high efficacy at preventing hospitalization and death in people who did get sick. No one who got COVID-19 at least 4 weeks after receiving the J&J/Janssen COVID-19 Vaccine had to be hospitalized.

CDC will continue to provide updates as we learn more about how well the J&J/Janssen COVID-19 Vaccine works in real-world conditions.<sup>(138)</sup>

### **3. Methodology**

#### **3.1. Study design:**

This was Descriptive, hospital-based study, done to assess nurse's knowledge and knowledge of practice regard protective measure of covid 19 in Atbara hospital.

#### **3.2. Study duration:**

This study was done during the period which extended from June to September 2021

#### **3.3. Study area:**

This study was done in Sudan, River Nile state in Atbara town. is located in North Sudan Atbara is a city located in the state of the River Nile in Sudan, at an altitude of 350 meters above sea level, about 310 km from the capital, Khartoum, and about 10 km from the city of Aldamer, the state capital, and from Port Sudan port in the east, 611 km, and about 474 km south from Wadi Halfa. (WIKIPDIA)

#### **3.4. Study setting:**

This study was conducted in Atbara educational hospital, located in River Nile state. Republic in Sudan

#### **3.5. Study population:**

Include all nurses in Atbara hospital whom work all two shifts during the time of study, excluded nurses in holiday.

#### **3.6. Sampling & Sample size:**

The study was covered all nursing staff in hospital work in all unit during study period with various certificates of diploma, bachelor and master in nursing

**Inclusion criteria:** all nurse work in hospital at all unit in two shift during time of study.

**Exclusion criteria:** Nurses in holiday and out of the shift.

### **3.7. Data collection tool:**

The tool used in this research is questionnaire

### **3.8. Data collection technique:**

Interview is used in data collection , the data was collected during two week during two shift, the nurses were allowed to filled questioner, and it takes about (15) minutes, no one refuse to participate.

### **3.9. Data analysis:**

SPSS program for data analyze.

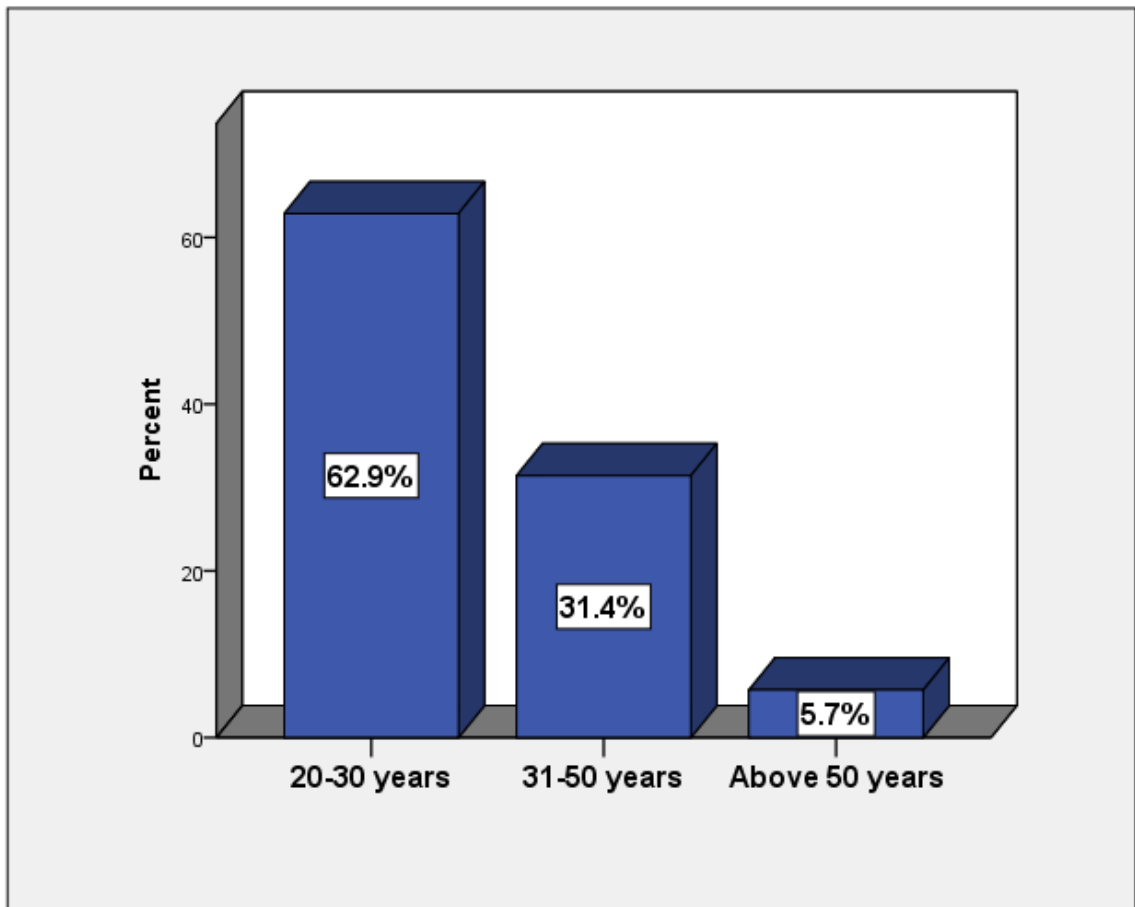
### **3.10. Ethical consideration:**

The proposal was approved from the scientific committee board, and then permission was taken from general hospital manger and the head nurse to conduct the research.

The purpose of the study has been explained verbally clearly to participant and their information should be used for the purpose of study only

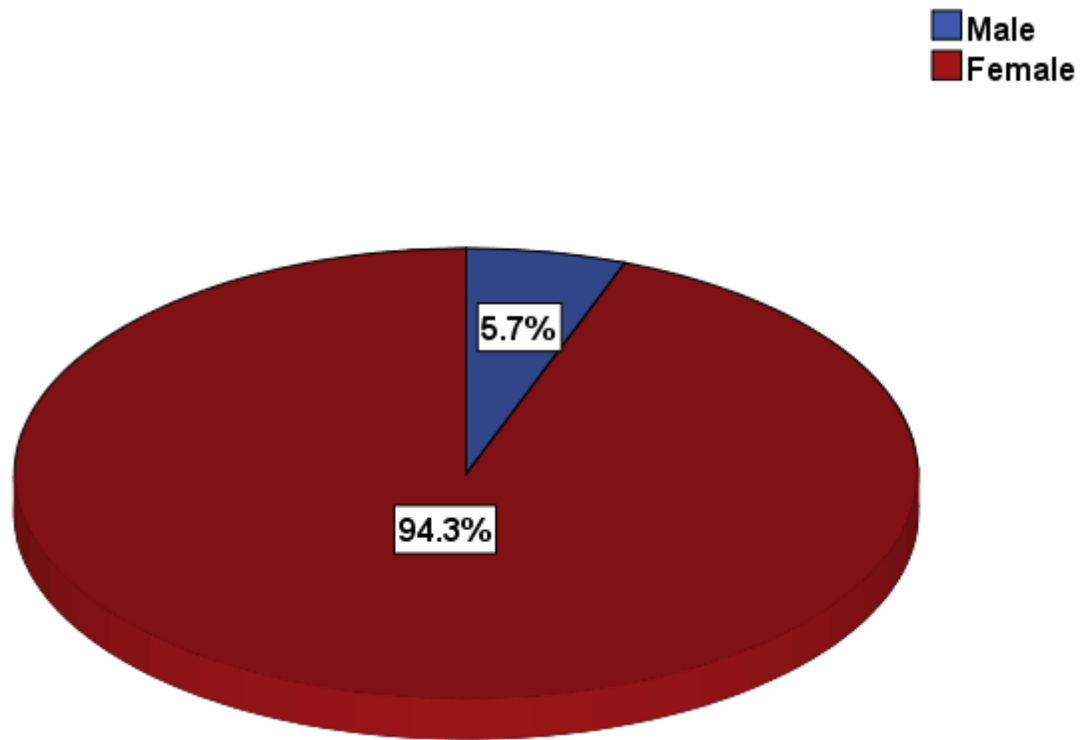
## Results

**Figure (1): Distribution of study group according to age group:**



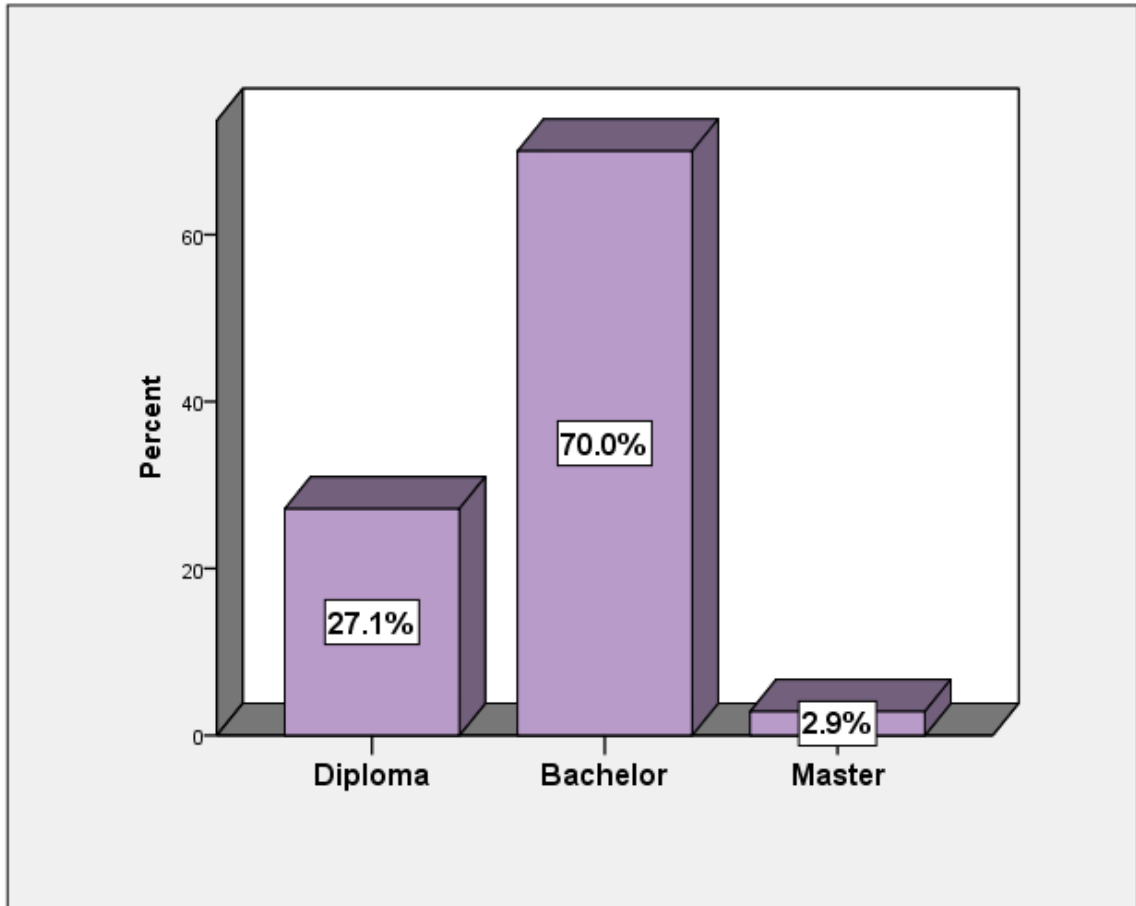
In the above figure the study showed that more than half (62.95%) of nurses their age between 20-30 years ,near third (31.4%)of nurses their age between 31-50 years and (5.7%) of nurses age above than 50 years.

**Figure (2): Distribution of study group according to gender:**



In the above figure the study showed that majority (94.3%) of nurses are female and (5.7% ) of nurses are male.

**Figure (3): Distribution of study group according to level of education**



In the above figure the study showed that more than half (70%) of nurses have bachelor degree, more than quarter (27.1)of nurses have diploma degree and (2.9%) of nurses have master degree .

**Table (1): Distribution of study group according to source of information:**

<b>Source of information</b>	<b>Frequency</b>	<b>Percent</b>
Social and news media	31	44.3%
WHO	13	18.6%
Governments site and media	10	14.3%
Journal	3	4.3%
Other	13	18.6%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that less than half (44.3%) of nurses take their information about COVID-19 from social and news media, less than quarter (18.6%) of nurses take their information from WHO and OTHER media, less than quarter (14.3%) of nurses take their information from government site and media and (4.3%) of nurses take their information about COVID-19 from journal.

**Table (2): Distribution of study group according to definition of corona virus:**

<b>Definition of corona virus</b>	<b>Frequency</b>	<b>Percent</b>
Virus that originated in China cause a respiratory illness	66	94.3%
I don't know	4	5.7%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed the majority (94.3%) of nurses know that corona virus is virus that originated in China cause a respiratory illness and (5.7%) of nurse not know

**Table (3): Distribution of study group according to name of the virus:**

<b>Name of the virus</b>	<b>Frequency</b>	<b>Percent</b>
SARS-COV-2	18	25.7%
SARS-COVID-1	11	15.7%
MERS-COV	2	2.9%
I don't know	39	55.7%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that More than half (55.7%) of nurses not know the name of the virus that cause COVID-19, quarter (25.7%) of nurses agree that the name of virus is SARS-COVID-2, less than quarter (15.7%) of nurses agree that the name of virus is SARS-COVID-1 and (2.9%) of nurses agree that the name of virus is MERS-COVID.

**Table (4):distribution of study group according mode of transmission:**

<b>Mode of transmission</b>	<b>Frequency</b>	<b>Percent</b>
Respiratory droplets	19	27.1%
Direct contact with patient	17	24.35
Air borne	7	10.0%
All of them	26	37.1%
I don't know	1	1.4%
<b>Total</b>	<b>70</b>	<b>100%</b>

In The above table the study showed that more than third (37.1%) of nurses agree that the mode of transmission is all of them, near quarter (27.1%)of nurses agree the mode of transmission is respiratory droplets , near quarter (24.35%) of nurses agree that the mode of transmission is direct contact with patient ,(10.0%) of nurses agree the mode of transmission is air borne and (1.4%) of nurses not know the mode of transmission.

**Table (5): Distribution of study group according to signs and symptoms of COVID-19:**

<b>Signs and symptoms</b>	<b>Frequency</b>	<b>Percent</b>
Shortness of breath	19	27.1%
High grade fever	9	12.9%
Cough	5	7.1%
Muscles pain	1	1.45
All of them	36	51.4%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that more than half (51.4%) of nurses know all signs and symptoms of COVID-19 , more than quarter (27.1%) of nurses agree the signs and symptoms of COVID-19 is shortness of breath , less than quarter (12,9%) of nurses agree the signs and symptoms of COVID -19 is high grade fever , (7.1%) of nurses agree the signs and symptoms of COVID -19 is cough and (1.45%) of nurses agree the signs and symptoms of COVID-19 is muscles pain .

**Table (6): Distribution of study group according to high risk people for getting of COVID-19:**

<b>High risk people for getting of COVID-19</b>	<b>Frequency</b>	<b>Percent</b>
People have chronic disease	31	44.3%
Elderly	21	30.0%
Both of them	18	25.7%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that less than half (44.3%) of nurses believe the high risk people for getting COVID-19 is people have chronic disease ,near third (30,0%) of nurses believe the high risk people for getting COVID-19 is elderly and Only quarter (25.7%) of nurses know the high risk people for getting of COVID-19.

**Table (7): Distribution of study group according to incubation period of corona virus infection :**

<b>Incubation period</b>	<b>Frequency</b>	<b>Percent</b>
2-14 days	60	85.7%
1-7 days	4	5.7%
3-21 days	6	8.6%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that near majority(85%) of nurses trust that the incubation period of corona virus infection between (2 – 14) days , (8.6%) of nurses agree that the incubation period of corona virus infection between (3-21)days and (5.7%)of nurses agree that the incubation period of corona virus infection between (1-7)days.

**Table (8): Distribution of study group according to recovery period for the corona virus disease:**

<b>Recovery period</b>	<b>Frequency</b>	<b>Percent</b>
1-3 weeks	37	52.9%
2-6 weeks	18	25.7%
4-8 weeks	9	12.9%
5-10 weeks	6	8.6%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that more than half (52.9%) of nurses believe that the recovery period for the corona virus disease between (1 – 3) weeks ,quarter (25.7%)of nurses believe that the recovery period for the corona virus disease between (2-6)weeks , less than quarter (12.9%) of nurses believe that the recovery period between(4-8)weeks and (8.6%) of nurses believe that the recovery period for corona virus disease between (5-10)weeks.

**Table (9): Distribution of study group according to percent of alcohol at an effective hand sanitizer:**

<b>Percent of alcohol</b>	<b>Frequency</b>	<b>Percent</b>
30%	6	8.6%
45%	7	10.0%
60%	18	25.7%
80%	39	55.7%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that more than half (55.7%) of nurses agree that the percent of alcohol at an effective hand sanitizer 80%, quarter (25.7%) of nurses agree that the percent of Alcohol at effective hand sanitizer 60% , (10.0%) of nurses agree that the percent of alcohol at an effective hand sanitizer 45% and (8.6%) of nurses agree that the percent of alcohol at an effective hand sanitizer 30%.

**Table (10): Distribution of study group according to preventive measure to prevent people from infection by COVID-19:**

<b>Preventive measure</b>	<b>Frequency</b>	<b>Percent</b>
Avoid going to crowded place	33	47.1%
Isolation	5	7.1%
Treatment people with COVID19	4	5.7%
All of them	27	38.6%
I don't know	1	1.4%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that less than half (47.1%) of nurses trust that avoid going to crowded place prevent people from infection by COVID-19 , more than third (38.6%) Of nurses ,(7.1%) agree that isolation prevent people from infection by COVID-19 , (5.7%) of nurses agree that the treatment people with COVID-19 prevent people from infection by COVID -19 and (1.4%) not know the preventive measure to prevent the people from infection by COVID -19.

**Table (11): Distribution of study group according to precaution to protect from virus:**

<b>Precaution to protect from virus</b>	<b>Frequency</b>	<b>Percent</b>
Avoid travelling or crowd	7	10%
Maintaining health and hygiene	11	15.7%
Using sanitizer or soap regularly	21	30%
All of them	31	44.3%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that less than half (44.3%) of nurses , near third (30%) of nurses agree that using sanitizer or soap regularly protect from virus , less than quarter (15.7%) agree that maintaining health and hygiene protect from virus, (10%) of nurses trust that avoid travelling or crowd protect from virus.

**Table (12): Distribution of study group according to gone to crowded place:**

<b>Gone to crowded place</b>	<b>Frequency</b>	<b>Percent</b>
Always	15	21.4%
Sometimes	43	61.4%
Never	12	17.1%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed than more than half (61.4%) of nurses sometimes gone to crowded place , less than quarter (21.4%) of nurses always gone to crowded place and less than quarter (17.1%) of nurse no gone to crowded place .

**Table (13): Distribution of study group according to period washing hand:**

<b>Period washing hand</b>	<b>Frequency</b>	<b>Percent</b>
10 second	17	24.3%
20 second	12	17.1%
30 second	8	11.4%
40 second	33	47.1%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that less than half (47.1%) of nurses believe that hand must be washing for 40 second ,less than quarter (24.3%) of nurses believe that hand must be washing for 10 second , less than quarter (17.1%) of nurses believe that hand must be washing for 20 second and less than quarter (11.4%) of nurses believe that hand must be washing for 30 second .

**Table (14): Distribution of study group according to wearing mask when in contact with patient:**

<b>Wearing mask</b>	<b>Frequency</b>	<b>Percent</b>
Always	33	47.1%
Sometimes	32	45.7%
Never	5	7.1%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that less than half (47.1%) of nurses always wear mask when in contact with patient, less than half (45.7%) of nurses sometimes wear mask when in contact with patient and (7.1%) of nurses not wear mask when in contact with patient.

**Table (15): Distribution of study group according to washing hand after handling each patient:**

<b>Washing hand</b>	<b>Frequency</b>	<b>Percent</b>
Always	48	68.6%
Sometimes	12	17.1%
Never	10	14.3%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that more than half (68.6%) of nurses always washing their hand after handling each patient ,less than quarter (17.1%) of nurses sometimes washing their hand after handling each patient and less than quarter(14.3%) of nurses no wash after handling each patient.

**Table (16): Distribution of study group according to type of hand wash procedure:**

<b>Type of hand wash procedure</b>	<b>Frequency</b>	<b>Percent</b>
Water and soap	34	48.6%
Hand sanitizer	19	27.1%
Both of them	17	24.3%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that less than half (48.6%) of nurses trust that water and soap enough for washing hand , more than quarter (27.1%) of nurses believe the hand sanitizer enough for washing hand and near quarter (24.3%) of nurses believe that the( water , soap and hand sanitizer )is used for washing hand .

**Table (17): Distribution of study group according to stand 1 meter in front of effected patient:**

<b>Stand 1 meter</b>	<b>Frequency</b>	<b>Percent</b>
Stand	35	50%
Not stand	35	50%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that half (50% ) of nurses stand 1 meter in front of effected patient and half (50%)of nurses not stand 1meter in front of effected patient.

**Table (18): Distribution of study group according to cover mouth and nose with tissue when sneezing or coughing:**

<b>Cover mouth and nose with tissue</b>	<b>Frequency</b>	<b>Percent</b>
Cover	70	100%
Not cover	0	0%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that all nurses (100%) cover their mouth and nose with tissue when sneezing or coughing.

**Table (19): Distribution of study group according to exposed to patient with COVID-19:**

<b>Exposed to patient with COVID-19</b>	<b>Frequency</b>	<b>Percent</b>
Continuous of preventive measure	26	37.1%
Quarantine	9	12.9%
Both of them	35	50%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that half (50% ) of nurses know that when they exposed to patient with COVID-19 they continuous of preventive measure and quarantine, more than third (37.1%) of nurses continuous of preventive measure when they exposed to patient with COVID-19 and less than quarter (12.9%) of nurses quarantine when they exposed to patient with COVID-19 .

**Table (20): Distribution of study group according to apply preventive measure during duty:**

<b>Preventive measure during duty</b>	<b>Frequency</b>	<b>Percent</b>
Apply	61	87.1%
Not apply	9	12.9%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that near majority (87.1%) of nurses apply preventive measure during duty and less than quarter (12.9%) of nurses not apply preventive measure during duty.

**Table (21): Distribution of study group according to avoided patient suspected of COVID-19:**

<b>Patient suspected of COVID-19</b>	<b>Frequency</b>	<b>Percent</b>
Avoided	51	72.9%
Not avoided	19	27.1%
<b>Total</b>	<b>70</b>	<b>100%</b>

In the above table the study showed that more than half(72.9%)of nurses avoided patient suspected of COVID-19 and more than quarter (27.1%) of nurses not avoided patient suspected of COVID -19.

**Table (22):** Distribution of study group according to correct and in correct answers:

question	correct		In correct	
	count	%	count	%
definition of corona virus	66	94.3%	4	5.7%
name of the virus	18	25.7%	52	74.3%
mode of transmission	46	65.7%	24	34.3%
signs and symptoms of COVID-19	36	51.4%	34	48.6%
high risk people for getting of COID-19	18	25.7%	52	74.3%
incubation period of corona virus infection	60	85.7%	10	14.3%
recovery period for the corona virus disease	18	25.7%	52	74.3%
percent of alcohol at an effective hand sanitizer	18	25.7%	52	74.3%
preventive measure to prevent people from infection by COVID-19	27	38.6%	43	61.4%
precaution to protect from virus	31	44.3%	39	55.7%
gone to crowded place	12	17.1%	58	82.9%
period washing hand	12	17.1%	58	82.9%
wearing mask when in contact with patient	33	47.1%	37	52.9%
washing hand after handling each patient	48	68.6%	22	31.4%
type of hand wash procedure	17	24.3%	53	75.7%
stand 1 meter in front of effected patient	35	50.0%	35	50.0%
cover mouth and nose with tissue when sneezing or coughing	70	100.0%	0	0.0%

**Table (23):** Correlation between level of education & definition of corona virus

		Education			Total
		Diploma	Bachelor	Master	
Virus that originated in China cause a respiratory illness	Count	16	48	2	66
	%	24.2%	72.7%	3.0%	100.0%
I don't know	Count	3	1	0	4
	%	75.0%	25.0%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.928 <sup>a</sup>	2	.085
Likelihood Ratio	4.327	2	.115
Linear-by-Linear Association	4.462	1	.035
N of Valid Cases	70		

a. 4 cells (66.7%) have expected count less than 5. The minimum expected count is .11.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.254-	.119	-2.168-	.034 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.259-	.123	-2.216-	.030 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.034 (Significant)

**Table (24):** Correlation between level of education & toname of the virus

		Education			Total
		Diploma	Bachelor	Master	
SARS-COVID-1	Count	1	10	0	11
	%	9.1%	90.9%	0.0%	100.0%
MERS-COV	Count	0	2	0	2
	%	0.0%	100.0%	0.0%	100.0%
SARS-COV-2	Count	2	14	2	18
	%	11.1%	77.8%	11.1%	100.0%
I don't know	Count	16	23	0	39
	%		59.0%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.892 <sup>a</sup>	6	.031
Likelihood Ratio	14.611	6	.024
Linear-by-Linear Association	5.364	1	.021
N of Valid Cases	70		

a. 8 cells (66.7%) have expected count less than 5. The minimum expected count is .06.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.279-	.082	-2.394-	.019 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.352-	.090	-3.100-	.003 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.019 (Significant)

**Table (25):** Correlation between level of education & mode of transmission

		Education			Total
		Diploma	Bachelor	Master	
Airbone	Count	1	6	0	7
	%	14.3%	85.7%	0.0%	100.0%
Rspiratory droplets	Count	5	13	1	19
	%	26.3%	68.4%	5.3%	100.0%
Direct contact with patient	Count	5	12	0	17
	%	29.4%	70.6%	0.0%	100.0%
All of them	Count	8	17	1	26
	%	30.8%	65.4%	3.8%	100.0%
I don't know	Count	0	1	0	1
	%	0.0%	100.0%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.511 <sup>a</sup>	8	.961
Likelihood Ratio	3.465	8	.902
Linear-by-Linear Association	.262	1	.609
N of Valid Cases	70		

a. 10 cells (66.7%) have expected count less than 5. The minimum expected count is .03.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.062-	.112	-.509-	.613 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.062-	.115	-.511-	.611 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.613 (Not significant)

**Table (26):** Correlation between level of education & signs and symptoms of COVID-19

		Education			Total
		Diploma	Bachelor	Master	
High grade fever	Count	2	6	1	9
	%	22.2%	66.7%	11.1%	100.0%
Cough	Count	0	5	0	5
	%	0.0%	100.0%	0.0%	100.0%
Shortness of breath	Count	8	11	0	19
	%	42.1%	57.9%	0.0%	100.0%
Muscles pain	Count	1	0	0	1
	%	100.0%	0.0%	0.0%	100.0%
All of them	Count	8	27	1	36
	%	22.2%	75.0%	2.8%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.026 <sup>a</sup>	8	.263
Likelihood Ratio	10.822	8	.212
Linear-by-Linear Association	.020	1	.888
N of Valid Cases	70		

a. 10 cells (66.7%) have expected count less than 5. The minimum expected count is .03.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.072-	.110	-.596-	.553 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.106-	.117	-.875-	.385 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.553 (Not significant)

**Table (27):** Correlation between level of education & high risk people for getting of COID-19

		Education			Total
		Diploma	Bachelor	Master	
Elderly	Count	5	15	1	21
	%	23.8%	71.4%	4.8%	100.0%
People have chronic disease	Count	10	21	0	31
	%	32.3%	67.7%	0.0%	100.0%
Both of them	Count	4	13	1	18
	%	22.2%	72.2%	5.6%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.198 <sup>a</sup>	4	.699
Likelihood Ratio	2.936	4	.569
Linear-by-Linear Association	.008	1	.930
N of Valid Cases	70		

a. 4 cells (44.4%) have expected count less than 5. The minimum expected count is .51.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig. <sup>c</sup>
Interval by Interval	Pearson's R	.011	.123	.087	.931 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	.007	.121	.061	.952 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.931 (Not significant)

**Table (28):** Correlation between level of education & incubation period of corona virus infection

		Education			Total
		Diploma	Bachelor	Master	
2-14 days	Count	17	41	2	60
	%	28.3%	68.3%	3.3%	100.0%
1-7 days	Count	1	3	0	4
	%	25.0%	75.0%	0.0%	100.0%
3-21 days	Count	1	5	0	6
	%	16.7%	83.3%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	.805 <sup>a</sup>	4	.938
Likelihood Ratio	1.118	4	.891
Linear-by-Linear Association	.132	1	.717
N of Valid Cases	70		

a. 7 cells (77.8%) have expected count less than 5. The minimum expected count is .11.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	.044	.098	.361	.719 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	.045	.104	.374	.709 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.719 (Not significant)

**Table (29):** Correlation between level of education & recovery period for the corona virus disease

		Education			Total
		Diploma	Bachelor	Master	
1-3 weeks	Count	11	24	2	37
	%	29.7%	64.9%	5.4%	100.0%
2-6 weeks	Count	2	16	0	18
	%	11.1%	88.9%	0.0%	100.0%
4-8 weeks	Count	4	5	0	9
	%	44.4%	55.6%	0.0%	100.0%
5-10 weeks	Count	2	4	0	6
	%	33.3%	66.7%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.991 <sup>a</sup>	6	.424
Likelihood Ratio	7.033	6	.318
Linear-by-Linear Association	.513	1	.474
N of Valid Cases	70		

a. 8 cells (66.7%) have expected count less than 5. The minimum expected count is .17.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.086-	.122	-.714-	.478 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.045-	.125	-.367-	.714 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.478 (Not significant)

**Table (30):** Correlation between level of education & percent of alcohol at an effective hand sanitizer

		Education			Total
		Diploma	Bachelor	Master	
30%	Count	4	2	0	6
	%	66.7%	33.3%	0.0%	100.0%
45%	Count	4	3	0	7
	%	57.1%	42.9%	0.0%	100.0%
60%	Count	3	15	0	18
	%	16.7%	83.3%	0.0%	100.0%
80%	Count	8	29	2	39
	%	20.5%	74.4%	5.1%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.175 <sup>a</sup>	6	.083
Likelihood Ratio	10.900	6	.092
Linear-by-Linear Association	7.499	1	.006
N of Valid Cases	70		

a. 9 cells (75.0%) have expected count less than 5. The minimum expected count is .17.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	.330	.117	2.880	.005 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	.279	.121	2.395	.019 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.005 (Significant)

**Table (31):** Correlation between level of education & preventive measure to prevent people from infection by COVID-19

		Education			Total
		Diploma	Bachelor	Master	
Avoid going to crowded place	Count	11	20	2	33
	%	33.3%	60.6%	6.1%	100.0%
Isolation	Count	0	5	0	5
	%	0.0%	100.0%	0.0%	100.0%
Treatment people with COID19	Count	0	4	0	4
	%	0.0%	100.0%	0.0%	100.0%
All of them	Count	8	19	0	27
	%	29.6%	70.4%	0.0%	100.0%
I don't know	Count	0	1	0	1
	%	0.0%	100.0%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.186 <sup>a</sup>	8	.517
Likelihood Ratio	10.500	8	.232
Linear-by-Linear Association	.001	1	.973
N of Valid Cases	70		

a. 11 cells (73.3%) have expected count less than 5. The minimum expected count is .03.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.004-	.122	-.034-	.973 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	.019	.124	.158	.875 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.973 (Significant)

**Table (32):** Correlation between level of education & precaution to protect from virus

		Education			Total
		Diploma	Bachelor	Master	
Avoid travelling or crowd	Count	2	5	0	7
	%	28.6%	71.4%	0.0%	100.0%
Maintaining health and hygiene	Count	0	11	0	11
	%	0.0%	100.0%	0.0%	100.0%
Using sanitizer or soap regularly	Count	11	9	1	21
	%	52.4%	42.9%	4.8%	100.0%
All of them	Count	6	24	1	31
	%	19.4%	77.4%	3.2%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.278 <sup>a</sup>	6	.039
Likelihood Ratio	15.928	6	.014
Linear-by-Linear Association	.012	1	.912
N of Valid Cases	70		

a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .20.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	.013	.103	.110	.913 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	.043	.108	.357	.722 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.913 (Not significant)

**Table (33):** Correlation between level of education & gone to crowded place

		Education			Total
		Diploma	Bachelor	Master	
Always	Count	6	9	0	15
	%	40.0%	60.0%	0.0%	100.0%
Sometimes	Count	9	33	1	43
	%	20.9%	76.7%	2.3%	100.0%
Never	Count	4	7	1	12
	%	33.3%	58.3%	8.3%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.152 <sup>a</sup>	4	.386
Likelihood Ratio	4.091	4	.394
Linear-by-Linear Association	.785	1	.376
N of Valid Cases	70		

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .34.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	.107	.132	.885	.379 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	.100	.133	.831	.409 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.379 (Not significant)

**Table (34):** Correlation between level of education & period washing hand

		Education			Total
		Diploma	Bachelor	Master	
10 second	Count	11	6	0	17
	%	64.7%	35.3%	0.0%	100.0%
20 second	Count	1	11	0	12
	%	8.3%	91.7%	0.0%	100.0%
40 second	Count	5	26	2	33
	%	15.2%	78.8%	6.1%	100.0%
30 second	Count	2	6	0	8
	%	25.0%	75.0%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.528 <sup>a</sup>	6	.005
Likelihood Ratio	18.292	6	.006
Linear-by-Linear Association	8.412	1	.004
N of Valid Cases	70		

a. 7 cells (58.3%) have expected count less than 5. The minimum expected count is .23.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	.349	.115	3.073	.003 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	.326	.123	2.847	.006 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.003 (Significant)

**Table (35):** Correlation between level of education & wearing mask when in contact with patient

		Education			Total
		Diploma	Bachelor	Master	
Always	Count	8	23	2	33
	%	24.2%	69.7%	6.1%	100.0%
Sometimes	Count	10	22	0	32
	%	31.3%	68.8%	0.0%	100.0%
Never	Count	1	4	0	5
	%	20.0%	80.0%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.717 <sup>a</sup>	4	.606
Likelihood Ratio	3.483	4	.480
Linear-by-Linear Association	.494	1	.482
N of Valid Cases	70		

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .14.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.085-	.113	-.701-	.486 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.087-	.116	-.721-	.473 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.486 (Not significant)

**Table (36):** Correlation between level of education & washing hand after handling each patient

		Education			Total
		Diploma	Bachelor	Master	
Always	Count	10	36	2	48
	%	20.8%	75.0%	4.2%	100.0%
Sometimes	Count	2	10	0	12
	%	16.7%	83.3%	0.0%	100.0%
Never	Count	7	3	0	10
	%	70.0%	30.0%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	11.635 <sup>a</sup>	4	.020
Likelihood Ratio	10.901	4	.028
Linear-by-Linear Association	7.410	1	.006
N of Valid Cases	70		

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .29.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.328-	.117	-2.860-	.006 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.281-	.122	-2.418-	.018 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.006 (Significant)

**Table (37):** Correlation between level of education & type of hand wash procedure

		Education			Total
		Diploma	Bachelor	Master	
Water and soap	Count	9	24	1	34
	%	26.5%	70.6%	2.9%	100.0%
Hand sanitizer	Count	4	14	1	19
	%	21.1%	73.7%	5.3%	100.0%
Both of them	Count	6	11	0	17
	%	35.3%	64.7%	0.0%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.660 <sup>a</sup>	4	.798
Likelihood Ratio	2.055	4	.726
Linear-by-Linear Association	.395	1	.530
N of Valid Cases	70		

a. 4 cells (44.4%) have expected count less than 5. The minimum expected count is .49.

**Symmetric Measures**

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.076-	.118	-.626-	.533 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.062-	.121	-.509-	.612 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.533 (Not significant)

**Table (38):** Correlation between level of education & stand 1 meter in front of effected patient

		Education			Total
		Diploma	Bachelor	Master	
Stand	Count	7	27	1	35
	%	20.0%	77.1%	2.9%	100.0%
Not stand	Count	12	22	1	35
	%	34.3%	62.9%	2.9%	100.0%
Total	Count	19	49	2	70
	%	27.1%	70.0%	2.9%	100.0%

#### Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.826 <sup>a</sup>	2	.401
Likelihood Ratio	1.843	2	.398
Linear-by-Linear Association	1.461	1	.227
N of Valid Cases	70		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 1.00.

#### Symmetric Measures

		Value	Asymp. Std. Error <sup>a</sup>	Approx. T <sup>b</sup>	Approx. Sig.
Interval by Interval	Pearson's R	-.145-	.118	-1.213-	.229 <sup>c</sup>
Ordinal by Ordinal	Spearman Correlation	-.151-	.117	-1.256-	.213 <sup>c</sup>
N of Valid Cases		70			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

**P. value significant if 0.05**

P. value = 0.229 (Not significant)

## **Discussion:**

In this study 94, 3% of nurses awareness about definition of corona virus 37,1% awareness about mode of transmission of corona virus, 51, 4 % awareness about signs and symptoms of corona virus and 85,7% awareness about incubation period .

The study show that nurses not awareness about name of virus that causes COVID-19, high risk people for getting COVID- 19, recovery period of COVID-19 and percent of alcohol and effective hand sanitizer.

86, 6% of nurses not take vaccines because 43, 8% of nurses believe that vaccine have side effects and complications.

Half of nurses not knowledgeable because they take information from social and news media

About 47% of nurses have good practice regard preventive measure to prevent people from covid19 by avoid going to crowded place ,44'3% of nurses good practices about precaution protect from virus,47,1% of nurses wearing mask,68,6% of nurses wash hand after handling each patient,50% of nurses stand 1 meter in front of effected patient ,48,6% of nurses use water and soap in hand washing procedure,27,1% of nurses use hand sanitizer in hand ,24,3% of nurses uses water and soap and hand sanitizer.

The nurses have poor practices about going to crowded place because 61,4% of nurses sometime gone to crowded place, about period if hand washing, 50% of nurses have poor practices in stand one meter in front of effected patient.

87.1% of nurses Applying preventing measure during duty.

100% of nurses have good attitude regard cover mouth and nose with tissue when sneezing or coughing .

50% of nurses continue preventive measure and quarantine when expose to patient with COVID-19.

About 77.9% of nurses avoided patient suspected COVID-19.

This study clarified the relation between level of education and knowledge of nurses about definition of covid 19 was significant, while knowledge of nurses about name of virus was significant, in addition the knowledge of nurses about mode of transmission was not significant, while nurses knowledge about Sign and symptoms of covid 19 was not significant, in addition knowledge of nurses about High risk people who getting covid 19 was not significant, while knowledge of nurses about incubator period and recovery period was not significant in addition knowledge of nurses about percent of alcohol in hand sanitizer was significant.

Another study conducted in Wuhan town in china 2020 by Zhengjiang jin... ect show that the nurses in Wuhan during the epidemic have insufficient knowledge about COVID-19 infection prevention and control, and there are gaps in attitude and practice, which further affect their attitude and practice and this study result not similar to our study result

Another study Daklak Department of health in vietnamese 2021 by Thuong Quang Tien.. ect show that Overall, HCWs have good knowledge (91.3%), a positive attitude (71.5%), and appropriate practice (83.1%) regarding COVID-19 prevention. There was 89.6% of HCWs facing difficulties in practicing preventive measures such as felt difficult to change their habits (56.4%), insufficient personal protective equipment (PPE) (40.0%), and inconvenience to practice preventive measures (14.4%). The factors associated with implementing good practices are age group, residence, and knowledge about COVID-19 and this study similar to our study.

**Conclusion:**

The study show that half of nurses have good knowledge about Covid-19 , more than half have good practices and 99% have a good attitude regard protection measure of Covid-19.

**Recommendation:**

We recommended that hospital management should continues training to keep nurses updated

Availability of all facilities and equipments for applying infection control and using of standard precaution.

Provide each unit with picture and poster about covid-19 protection and wear masks.

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# Appendix

بسم الله الرحمن الرحيم

Elshaikh Abdallah Albadary university

Faculty of health science

Department of nursing

Questionnaire about assessment of nurses knowledge ,knowledge of practice and attitude regard protection measure of Covid- 19 in Atbara teaching hospital

**Demographic data:**

**1) Age:** a. 20\_30            b.30\_50            C. above50

**2) Sex:** a. Male    b. Female

**3) Level of education:** a. Diploma    b. Bachelors    c. Master.    d.PH

**4) Source of information:**

a. WHO b. Governments site and media. c. Social and news media d. Journal e. Other

**5) Corona virus is :**

a. virus that originated in China cause a respiratory illness.

b. I don't Know

**6) Name of the virus that cause Covid -19:-**

a.SARS-COVID-1.

b. MERS -COV

c. SARS -COV-2

d/I do not know

**7) Mode of transmission:**

a. Airborne.

b. Respiratory droplets.

c. Direct contact with patient

d. I do not know

**8) Main sign and symptom of Covid-19:**

a High grade fever

b. Cough

- c. Shortness of breath \_ muscles pain
- d. I don't know

**9) High risk people for getting of Covid-19 :**

- a. Elderly
- b. People have chronic disease
- c. I don't know

**10) Incubation period of corona virus infection?**

- a. 2-14days
- b. 1-7days
- c. 3-21days
- d. 4-28days

**11) Recovery period for the corona virus disease:**

- a. 1\_3weeks
- b.2\_6weeks
- c.4\_8weeks
- d.5\_10weeks

**12) An effective hand sanitizer contains at least this percentage of alcohol to kill the corona virus and other germs:**

- a. 30%.
- b. 45%.
- c. %.60
- d. 80%.

**13) Preventive measure to prevent people from infection by COVID 19:**

- a. Avoid going crowded place
- b. Isolation
- c. Treatment people with COVID 19
- d. I don't know

**14) Precaution you can take to protect yourself from virus:**

- a. Avoid Travelling or Crowd
- b. Maintaining Health and Hygiene
- c. Using Sanitizer or soap regularly
- d. Not take any protective measures

**15) Do you gone to any crowded place:**

- a. Always
- b. Sometimes
- c. Never

**16) How long should you wash your hand for?**

- a. 10second
- b. 20second
- c. 40second
- d. 30second

**17) Wearing mask when in contact with patient:**

- a. Always
- b. Sometimes
- c. Never

**18) Washed your hand befor and after handling each patient :**

- a. Always
- b. Sometimes
- c. Never

**19)Type of Hand wash procedures :**

- a. Water and soap
- b. Hand sanitizer
- c. Not use any type of hand wash

**20) Do you stand 1 meter when you speak in front of effected patient and others:**

a/ Yes

b/ No

**21) Do you cover your mouth and nose with tissue when you sneezing or coughing:**

a/ Yes

b/No

## Ethical Consideration

